ATTACHMENT A

SCHEDULE OF DOCUMENTS – FOI 3472

Doc no.	Date	Pages	Description	Decision on access[1]	Exemptions applied
1	June 2020	67	Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Project; Executive Summary; Final Report - Part A	R	N/A
2	June 2020	140	IPAC Project Final Report to the Australian Government, Department of Health, MSAC application Assessment Report	R	N/A
3	28/1/2020	12	Appendix 1 – IPAC Protocol published 2020	R	N/A
4	18/11/2019	97	Appendix 2 – IPAC Protocol version 1.6	RE	section 47F - part
5	June 2020	1	Appendix 3 – IPAC Trial Theory of Change	R	N/A
6	22/03/2019	1	Appendix 4 – IPAC Trial Logic Model for the Evaluation	R	N/A
7	13/1/2020	1	Appendix 5 – Clinical Algorithm 1 IPAC Project Logic Model – proposed service	R	N/A
8	28/4/2020	1	Appendix 6 – Clinical Algorithm 1 IPAC Project Logic Model – usual care	R	N/A
9	Feb 2020	29	Appendix 7 – Literature Review CEA NDP 2021	R	N/A
10	31/1/2020	13	Appendix 8 – Integration of non-dispensing pharmacists into primary healthcare services: an umbrella review and narrative synthesis of the effect on patient outcomes	R	N/A

[1] R = Release in full, RE = Release with exemptions applied, E = Exempt in full

Doc no.	Date	Pages	Description	Decision on access[1]	Exemptions applied
11	May 2020	85	Appendix 9 – Integrated pharmacists in ACCHSs- Analysis of the assessment of clinical endpoints in Aboriginal and Torres Strait Islander patients with chronic disease (IPAC Project) Report to the Pharmaceutical Society of Australia for the IPAC Project	R	N/A
12	Feb 2020	66	Appendix 10 - Assessment of medication appropriateness using the Medication Appropriate Index (MAI) in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC project)	R	N/A
13	Feb 2020	44	Appendix 11 - Assessment of medicines underutilisation in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC project)	R	N/A
14	Feb 2020	55	Appendix 12 - Assessment of Home Medicines Review (HMR) and non-HMR in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community - Controlled Health Services (IPAC Project)	R	N/A
15	May 2020	88	Appendix 13 - Assessment of change in medication adherence and self-assessed health status in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC project)	R	N/A

Doc no.	Date	Pages	Description	Decision on access[1]	Exemptions applied
16	Feb 2020	237	Appendix 14a - Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Project	R	N/A
17	Feb 2020	94	Appendix 14b - Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Project	R	N/A
18	Dec 2019	10	Appendix 15 - Net Cost to The PBS of Medication Changes Arising From The IPAC Intervention: Method Used to Assess Health System Costs for Economic Analysis	R	N/A
19	April 2020	60	Appendix 16 – Integrated Pharmacists within ACCHSs: Support for practice-based activities report to the pharmaceutical society of Australia for the IPAC project	R	N/A
20	May 2020	11	Appendix 17 – Methodology for a model extending an integrated pharmacist program into all Aboriginal Community Controlled Health Services (ACCHSs) in Australia	R	N/A
21	3/6/2020	67	Appendix 18 – Thematic analysis of feedback received by the PSA Coordinators	RE	section 47F - part
22	3/6/2020	36	Appendix 19 – PSA Report, Pharmacist Recruitment	RE	section 47F - part
23	3/6/2020	45	Appendix 20a – PSA Report, Pharmacist Induction Training	RE	section 47F - part
24	3/6/2020	32	Appendix 21 – PSA Report, Support for Pharmacists	RE	section 47F - part
25	May 2020	80	Appendix 22 – NACCHO Report – IPAC project ACCHS Support	R	N/A

Doc no.	Date	Pages	Description	Decision on access[1]	Exemptions applied
26	2/6/2020	1	Appendix 23 – List of People involved in the development of this assessment report	RE	section 47F - part
27	22/10/18	60	Appendix 24 - Information brief and Consent form	RE	section 47F - part
28	May 2020	28	Appendix 25 - Economic evaluation of the Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) to improve Chronic Disease Management (IPAC Project)	R	N/A
29	5/9/21	9 worksheets	IPAC Intervention – Section 4 worksheet	R	N/A
30	26/8/21	14 worksheets	IPAC Intervention – Section 5 worksheet	R	N/A
31	26/8/21	7	Table 10 – Financial Implications of extending the IPAC Intervention to all ACCHS Methodology for model for extending a program embedding pharmacists in all Aboriginal Community Controlled Health Services (ACCHSs) in Australia	R	N/A
32	April 2020	56	Integrated pharmacists within the ACCHSs: support for practice-based activities – Report to the Pharmaceutical Society of Australia for the IPAC Project	R	N/A
33	27/2/2020	20	Pharmacist Induction Training Appendix 1 – Master Vic Pharmacist Participation Brief	RE	section 47F - part
34	2/3/2020	3	Pharmacist Induction Training Appendix 2 – MCQ Assessment Questions	R	N/A
35	12/2/2020	12	Pharmacist Induction Training Appendix 3 – IPAC Project Overview	R	N/A

Doc no.	Date	Pages	Description	Decision on access[1]	Exemptions applied
36	9/7/2018	1	Pharmacist Induction Training Appendix 4 – Data Collection Table	R	N/A
37	12/2/2020	12	Pharmacist Induction Training Appendix 5 – Consent Presentation	R	N/A
38	22/4/2020	1	Pharmacist Induction Training Appendix 6 – Master Vic Pharmacist Consent Form	R	N/A
39	25/10/2018	2	Pharmacist Induction Training Appendix 7 – Master Vic Participant Information Brief	RE	section 47F - part
40	22/4/2020	2	Pharmacist Induction Training Appendix 8 – Pharmacist 10 core roles	R	N/A
41	12/2/2020	36	Pharmacist Induction Training Appendix 9 – Core Role 1 Medication Management Reviews	R	N/A
42	2/3/2020	2	Pharmacist Induction Training Appendix 10 - Guidelines for the provision of Home Medicines Reviews	R	N/A
43	12/11/2018	2	Pharmacist Induction Training Appendix 11 – IPAC Project Criteria for non-HMR	R	N/A
44	1/3/2019	1	Pharmacist Induction Training Appendix 12 – IPAC Project HMR Model	R	N/A
45	12/2/2020	8	Pharmacist Induction Training Appendix 13 – Core Role 2 Team Collaboration PowerPoint Presentation	R	N/A
46	12/2/2020	10	Pharmacist Induction Training Appendix 14 – Core Role 3 Medical Adherence	R	N/A
47	23/10/2018	2	Pharmacist Induction Training Appendix 15 – NMARS Survey with SF1	R	N/A
48	21/5/2018	1	Pharmacist Induction Training Appendix 16 – Medication Appropriateness Index Patient Survey	R	N/A

Doc no.	Date	Pages	Description	Decision on access[1]	Exemptions applied
49	12/2/2020	18	Pharmacist Induction Training Appendix 17 – Core Role 4 Medication Appropriateness Audit Presentation	R	N/A
50	25/5/2018	2	Pharmacist Induction Training Appendix 18 – Medication Appropriateness Index - Examples	R	N/A
51	12/2/2020	29	Pharmacist Induction Training Appendix 19a – Core Role 4 Assessment of Underutilisation Presentation	R	N/A
52	23/10/2018	2	Pharmacist Induction Training Appendix 19b – assessment of underutilisation patient survey	R	N/A
53	12/2/2020	13	Pharmacist Induction Training Appendix 20 – Core Role 5 – Preventive Health Care Presentation	R	N/A
54	12/2/2020	7	Pharmacist Induction Training Appendix 21 – Core Role 6 Drug Utilisation Review Presentation	R	N/A
55	23/5/2018	2	Pharmacist Induction Training Appendix 22 – Drug Utilisation Review Report	R	N/A
56	12/2/2020	6	Pharmacist Induction Training Appendix 23 – Core Role 7 Education and Training Presentation	R	N/A
57	30/5/2018	1	Pharmacist Induction Training Appendix 24 – Education Session Evaluation Survey	R	N/A
58	30/5/2018	2	Pharmacist Induction Training Appendix 25 – Education Session Evaluation Summary Report	R	N/A
59	12/2/2020	4	Pharmacist Induction Training Appendix 26 – Core role 8 Medicines Information Service Presentation	R	N/A
60	12/2/2020	6	Pharmacist Induction Training Appendix 27 – Core Role 9 – Medicines Stakeholder Liaison Presentation	R	N/A

Doc no.	Date	Pages	Description	Decision on access[1]	Exemptions applied
61	25/5/2018	2	Pharmacist Induction Training Appendix 28 – Medicine Stakeholder Liaison plan and outcomes	R	N/A
62	12/2/2020	4	Pharmacist Induction Training Appendix 29 – Core Role 10 – Transitional Care Presentation	R	N/A
63	30/3/2020	5	Pharmacist Induction Training Appendix 30 – Pharmacist Activity Workplan Template	R	N/A
64	8/11/2018	16	Pharmacist Induction Training Appendix 31 – Pharmacist Logbook Instructions v4	R	N/A
65	8/6/2018	4	Pharmacist Induction Training Appendix 32 – IPAC Project Pharmacist Resources List	R	N/A
66	30/7/2018	13	Pharmacist Induction Training Appendix 33 – Pharmacists in Aboriginal Community Controlled Health Services Procedures for Best Practice	E	s47E(d)
67	15/8/2018	18	Pharmacist Induction Training Appendix 34 – Pharmacists in Aboriginal Community Controlled Health Services Procedures of Communicare	E	s47E(d)
68	22/4/2020	5	Pharmacist Induction Training Appendix 35 – Pharmacists' Training Presentation	RE	section 47F - part

IPAC

Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Project

Executive Summary
Final Report - Part A

June 2020

JAMES COOK UNIVERSITY AUSTRALIA

NACCHO

Pharmaceutical Society of Australia

Document Version Control

Version Number	Date Changed	Author	Reason for Change
V7	04/06/2020	Deb Smith	Final draft completed for comment
V8	24/06/2020	Deb Smith	Version control introduced Feedback from Steering Committee incorporated

Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project.

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The authors also acknowledge members of the IPAC Evaluation Team, the Affiliates of the National Aboriginal Community Controlled Organisation, the participating ACCHSs, IPAC pharmacists, and the IPAC Steering Committee members. In presenting this document the authors would like to thank the Aboriginal and Torres Strait Islander people for their cooperation and assistance as consented patients for the research information that was essential for this project.

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Background

In Australia, Aboriginal peoples and Torres Strait Islanders are five times more likely to die from chronic disease before the age of 75 years (premature mortality) than other Australians (2011-15).[1] This profound health disparity has generated many policies and programs to encourage better chronic disease prevention and management within primary healthcare services. Yet, despite their higher burden of disease, medication underutilisation, and inappropriate use of medications by Aboriginal peoples and Torres Strait Islanders persists when assessed within primary health care settings.[2] [3] There are many reasons for this including health system factors such as poorer access to primary health care services, [4] culturally unsafe pharmaceutical support,[5] lack of health service integration,[6] disease profiles inconsistent with medicines listed on the PBS,[7] and suboptimal prescribing quality.[8] Patient factors include insufficient health literacy for optimal self-management of disease,[9] distrust of health services,[10] family and community obligations,[11] and belief in traditional medicines, [12] whilst condition-related factors include disproportionately high multimorbidity.[13] Socioeconomic factors may also affect the personal management of medicines such as adherence and storage.[14]

A whole of health system response is needed to tackle these factors. One strategy has been to integrate pharmacists within primary health care multidisciplinary teams so that patients and teams can receive enhanced medication management support, direct care from a pharmacist, and a more joined-up experience of care. This builds upon the role that pharmacists have within community pharmacy settings. Increasingly, studies are reporting that the addition of pharmacists to healthcare teams enhances quality prescribing,[15] biomedical outcomes,[16] [17] and reduces hospitalisation.[18] [19] Co-location of pharmacists within general practice has been demonstrated to enable greater communication, collaboration and relationship building among health professionals.[20] However, the impact of integrated pharmacists on health outcomes for patients with chronic disease, in Aboriginal health settings, needs further investigation.

The Australian Government Department of Health, under the Pharmacy Trials Program (PTP, Tranche 2) funding as part of the Sixth Community Pharmacy Agreement (6CPA) sought to improve clinical outcomes for patients by utilizing the full scope of pharmacist's role in delivering primary health care services. This Program supported a project to investigate the potential gains in health outcomes arising from integrated models of care within Aboriginal health settings- the *Integrating Pharmacists within Aboriginal Community Controlled Health Services* (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project.[21] [22] The project explored if integrating a registered pharmacist as part of the primary health care (PHC) team within ACCHSs (the intervention) led to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples with chronic diseases, when compared with prior (usual) care (Appendices 1 and 2). It was anticipated that pharmacists integrated within these settings would facilitate increased access to medication-

related expertise and assessments, which when coupled with increased engagement with participants, staff and other stakeholders, would result in improved services and quality use of medicines as outlined in the proposed the theory of change for the IPAC Project (Appendix 3).

Methodology

The IPAC project was a pragmatic, non-randomized, prospective, pre and post quasi-experimental study (Trial Registration Number and Register: ACTRN12618002002268) implemented in three jurisdictions: Victoria, Queensland and the Northern Territory. There were three project phases: Phase 1: Establishment (4-8 months); Phase 2: Implementation of the intervention (up to 15 months); Phase 3: Analysis and reporting (6 months).

The project adhered to community-based participatory research (CBPR) principles, adapted from the World Health Organization guiding principles[23] as described in a previous project involving Aboriginal peoples and Torres Strait Islanders.[24] This approach ensured clear benefits to project sites, acceptability and sustainability of the intervention within ACCHSs, and ultimately, transferability to other PHC services. For this reason, study outcomes were compared before and after the intervention without the use of control sites, for within-subject comparisons (with repeated measures). The project assessed any changes in study sites that occurred pre to post intervention through serial health systems assessments and qualitative methods.

ACCHSs in geographically diverse settings in the three jurisdictions that met the established site eligibility criteria were invited to participate in the project. Each service was offered an integrated pharmacist (aggregated 0.57 FTE across 22 sites each for 15 months duration) under a service agreement with the PSA. Service selection aimed to recognise the diversity of Aboriginal peoples and Torres Strait Islanders and models of care across Australia, to deliver an impact assessment that can best be generalizable to other Australian sites/settings in the future. All participating ACCHSs received the intervention, with study measures referring to periods prior to and after implementation, activities within ACCHSs, and aggregated ACCHSs.

The pharmacist intervention involved delivery of ten core roles, which were classified as either patient-related roles or as systems and health practitioner-level roles. The Logic Model for the evaluation of the IPAC project outlines the roles and the expected outputs and outcomes from each role (Appendix 4). Activities targeting patients included the assessment of medication management through medication reviews, medication adherence and appropriateness, medication-related problems, improving patient medication knowledge and giving preventive health advice. Medication management reviews comprised either a Home Medicines Review (HMR) or a non-HMR which was defined as a comprehensive medication management

review comprising some or all of the elements of a HMR, but not fulfilling all relevant HMR criteria stipulated by the Medicare Benefits Schedule (MBS). Pharmacists at each ACCHS undertook an audit of medication appropriateness and an assessment of underutilisation, for a sample of participants at the rate of 30 participants per one full time equivalent (FTE) pro rata. Pharmacists also provided patient education and preventive health activities.

Activities targeting health professionals and systems included conducting education sessions, responding to medication-related queries, reviewing prescribing and mentoring new prescribers, participating in case conferences, undertaking drug utilisation reviews, and liaising with community pharmacies and other stakeholders to ensure continuity of care and transitional care that supported patients discharged from hospital.

Outcome measures focused on Aboriginal and Torres Strait Islander patients with chronic disease aged 18 years or over, who were regular patients of the ACCHSs. Measures included indices to assess the quality of prescribing, intermediate clinical endpoints, health service utilisation measures, medication adherence, self-assessed health status, a qualitative evaluation, and a cost-effectiveness analysis to explore if the intervention was cost effective relative to usual care (at baseline).

Project Governance

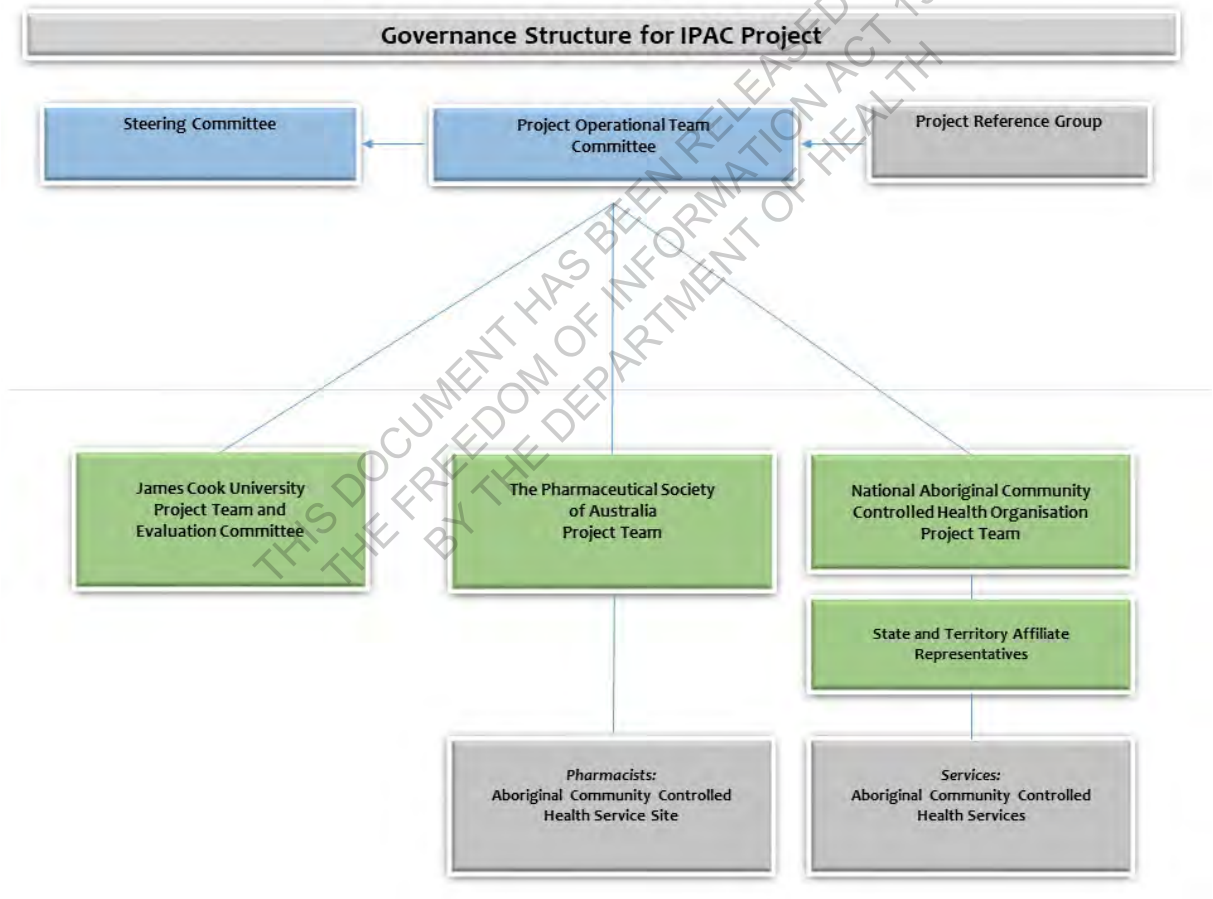
The IPAC project was conducted through a partnership between the Pharmaceutical Society of Australia (PSA), the National Aboriginal Community Controlled Health Organisation (NACCHO), and James Cook University (JCU) College of Medicine and Dentistry, guided by a Memorandum of Understanding that outlined communication and governance processes which were grounded in Aboriginal and Torres Strait Islander leadership and self-determination.

All partners were involved in the conceptualisation and development of the project. The PSA, as the lead agency, had responsibility for managing the Head Agreement with the Australian Government Department of Health, and service agreements with partners and ACCHSs. PSA coordinated the appointment of pharmacists, their recruitment, training, placement, mentoring and performance. The NACCHO provided Aboriginal governance leadership for the project and coordinated communication with ACCHSs, Affiliates and the NACCHO Board. NACCHO recruited ACCHSs to participate in the project and provided induction and ongoing support. Affiliates of NACCHO are state and territory peak bodies who represent ACCHSs at this level and provided input into project design, governance and evaluation and additional support for participating ACCHSs where required. JCU designed the research study, methodology, data requirements, and built data collection platforms and study tools. JCU managed data management subcontractors, acted as data custodian, monitored and guided project progression through its phases to meet study timelines and sample

size, and developed the project evaluation reports.

The project was coordinated by a Project Operational Team with members from the three partners (Figure 1). A Steering Committee with an independent Chair, oversaw the project with representatives from partner organisations, a representative from the Pharmacy Guild of Australia (PGA), an independent pharmacist and a representative from the Department of Health. A Project Reference Group, including representatives from all participating ACCHSs, NACCHO, and its Affiliates, provided Aboriginal and Torres Strait Islander oversight and input into the Project, and to advise on implementation issues. The Evaluation Team was led by JCU with representatives from the partners, the Affiliates, Aboriginal Academics and content experts. Members of the operational team, evaluation team and steering committee reviewed and provided feedback on all reports, led by JCU.

Figure 1. Governance structure for the IPAC project.

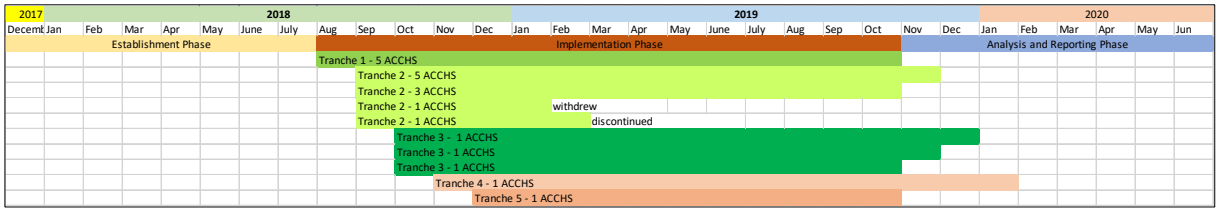


Timelines

The final timeline indicates the project phases and the commencement and end dates of integrated pharmacist activity delivered in the ACCHSs (Figure 2). The original timeline reflected the project implementation phase commencing in April 2018. However, delays in the establishment phase of the project meant the implementation phase did not commence until August 2018. The implementation phase was

shortened due to the end of study date set for 31st October 2019. The first pharmacists commenced in ACCHSs on 2nd August 2018 and the first patient was recruited into the study that same day.

Figure 2. Project timeline with ACCHS/pharmacist commencement and end dates.



In some sites where pharmacists commenced in later tranches of the implementation phase, efforts to optimise project delivery within the data capture period were achieved by increasing the FTE allocation over a reduced period of time (e.g. 0.6 FTE over 15 months became a 0.8 FTE contract over 12 months). A small proportion of pharmacist hours could not be compressed to fit within the intervention phase (eg where the pharmacist was already working 1.0 FTE). In such circumstances, pharmacist hours continued into the analysis phase to honour the project's commitment to participating ACCHSs to provide access to an integrated non-dispensing pharmacist for a total period of 15 months.

ACCHS Recruitment and Support

NACCHO conducted a two-phase Expression of Interest (EOI) site recruitment strategy for the IPAC Project, which was overseen by the NACCHO executive and managed by the two NACCHO project coordinators. Service inclusion criteria were used to select sites in urban, regional and remote locations across three jurisdictions, the Northern Territory, Queensland and Victoria,[25] after reviewing the responses to the advertised EOI. ACCHSs selected were endorsed by the Steering Committee. ACCHS participation required a formal agreement between the ACCHS and the PSA as the head contractor, outlining the requirements of each party to the agreement, consent for ACCHS participation in the IPAC Project and consent to install the GRHANITE™ software to enable extraction of deidentified patient specific data.

Twenty ACCHSs commenced delivering the pharmacist intervention across 24 clinic sites. During the implementation phase one ACCHS withdrew due to the unexpected workload placed on other staff due to the pharmacist's recommendations and activities, in an already busy period where staff shortages were ongoing. Another ACCHS chose to discontinue with the intervention after 6 months of activity, when their pharmacist resigned for personal reasons. There were insufficient patient numbers at the ACCHS to warrant re-recruitment of a pharmacist for the remaining project duration. Eighteen ACCHSs completed the intervention and were well distributed across urban, regional and remote settings (Table 1).

Table 1. Distribution of ACCHSs by setting and jurisdiction.

	Urban	Regional	Remote	**Total**
Northern Territory	0	1	4	5
Queensland	3	2	2	7
Victoria	2	4	0	6
Total	**5**	**7**	**6**	**18**

NACCHO project coordinators visited each ACCHS at least twice in accordance with the project protocol. The initial visit was undertaken at the commencement of the Project and facilitated discussion of the ACCHSs preferred system for referring patients to the pharmacist and for seeking consent, conducted the ACCHS Pharmacist Needs Assessment, collected ACCHS data recorded on the health systems assessment, and discussed logistical issues including access to the clinical information system (CIS), consulting space and availability of a uniform. The NACCHO coordinators also worked to build a strong rapport with relevant ACCHSs staff and arranged a nominated ACCHS staff member to act as a 'go to' person for the integrated pharmacist to assist in the pharmacists' orientation to the service.

At the second site visit during the final three months of the implementation phase, the health system assessment was repeated to identify any changes that might impact upon the project results. The final visit also provided an opportunity for the project coordinator to seek feedback from ACCHS staff on the conduct of the project as well as their experience of having a pharmacist as part of the team. In response to significant ACCHS demand, information was provided by the project coordinator about possible sources of ad-hoc funding for ACCHSs to continue access to a pharmacist beyond the project.

Ongoing support was provided to the participating ACCHSs through communication with NACCHO project coordinators, provision of resources, promotional materials and information updates, and meetings of representatives from all participating sites, jurisdictional Affiliates and NACCHO (Project Reference Group). The report outlining the method used to select ACCHSs and support provided to participating services is included in Appendix 22.

Pharmacist Recruitment

An overview of the pharmacist recruitment process for the project is depicted in Figure 3. This algorithm was derived by the project operational team, consistent with the project protocol. This guided the pharmacist recruitment process for each ACCHS.

As part of ACCHS selection, NACCHO also sought information from each service to identify the community

pharmacy(ies) with whom they had an existing relationship. PSA engaged with these local community pharmacies and invited them to nominate suitable pharmacist candidates for all sites. In addition to approaching community pharmacy, an open call for expressions of interest was conducted by PSA Coordinators to generate a database of potential pharmacists interested in working within Aboriginal Community Controlled Health Services. This was done via PSA and AACP newsletters, social media channels, the NACCHO/PSA ACCHS Leadership group and throughout the ACCHS network via NACCHO. Where these avenues of recruitment were not successful, advertising through mainstream online job seeking platforms was utilised along with active, direct scoping of candidates through known networks, hospital departments and publicly available accredited pharmacist lists.

Figure 3. Pharmacist recruitment algorithm.

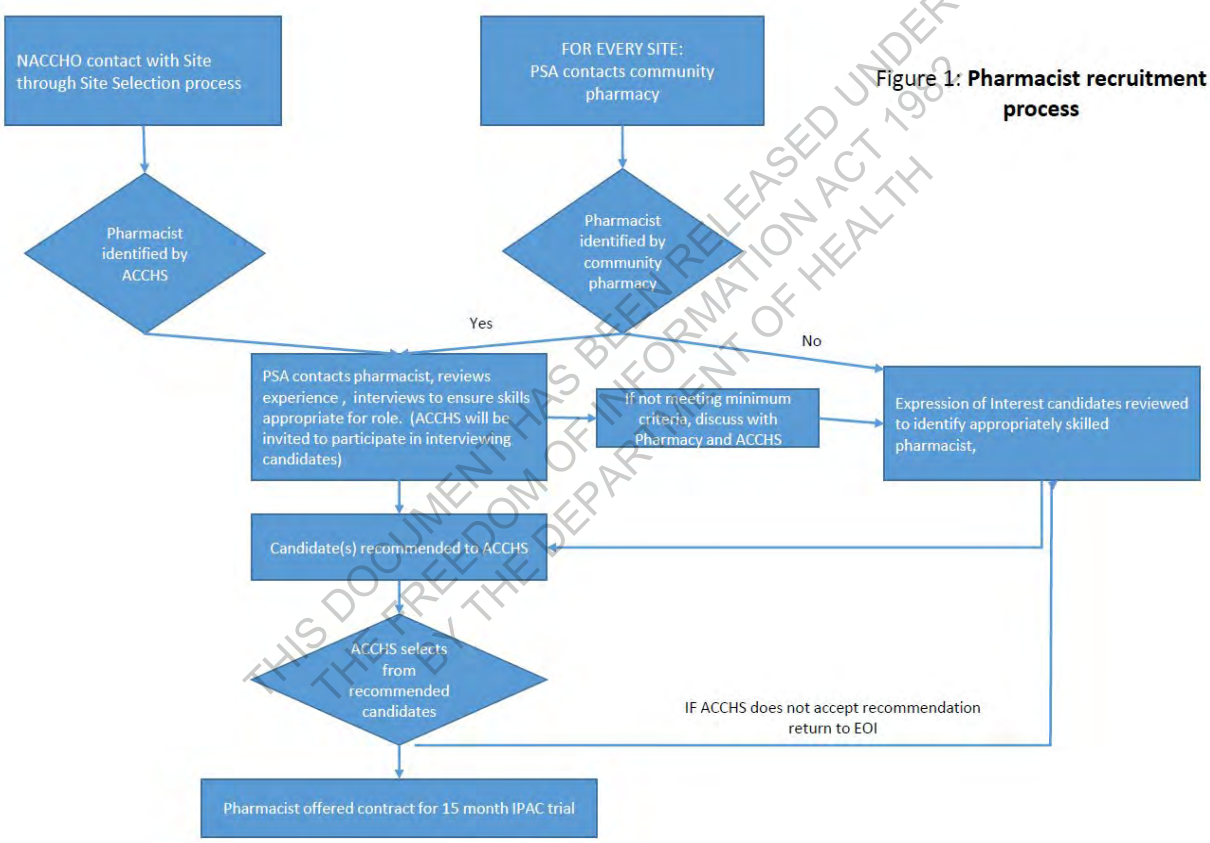


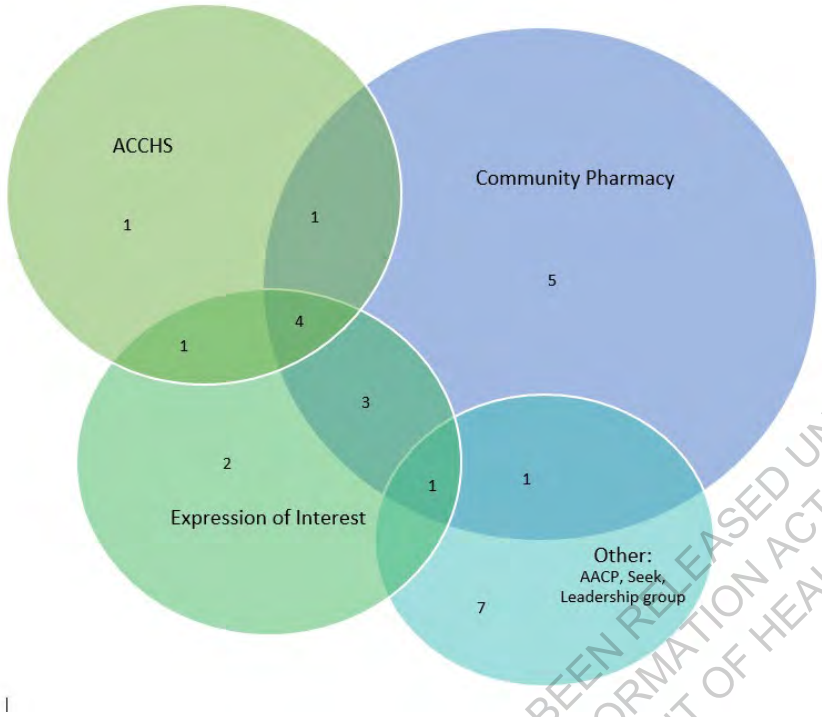
Figure 1: **Pharmacist recruitment process**

Figure 4 shows the source of nominations for the 26 pharmacists accepted to participate in the Project.

Applicants were screened by PSA Coordinators using a checklist to standardise the process to shortlist candidates for each ACCHS. Staff members from each ACCHS were invited to review applications, select candidates for interview and participate in the interviewing process. Respecting the principles of self-determination, each ACCHS was responsible for making the final decision on the appointment of the pharmacist. PSA undertook checks on pharmacists' registration status and ensured that appropriate police

clearance or working with children checks (as per state specific requirements) were sighted. Pharmacists were engaged via a subcontract through community pharmacy or an employment contract with the PSA.

Figure 4. Integrated Pharmacist Nomination Sources



PSA was responsible for the performance management of the pharmacists directly employed by PSA, and was also responsible for overseeing the delivery of the subcontracting arrangements through community pharmacy. PSA utilised regular communication with pharmacists and community pharmacy owners via phone calls and emails to provide updates regarding their activity. Site visits conducted by PSA Coordinators provided an opportunity to undertake a face to face review of pharmacist performance and offer additional support to optimise project delivery.

Recruitment of 23 pharmacists enabled initial implementation of the project at all 20 participating ACCHSs with a total of 12.5 full time equivalent (FTE) pharmacist hours distributed across the services. Pharmacist time was apportioned between 0.2 and 1.4 FTE across the ACCHSs according to patient numbers and the capacity of both the pharmacists and health service. Pharmacist FTE was reallocated throughout the project following pharmacist turnover and ACCHSs not continuing with the intervention. Reallocation of pharmacist FTE aimed to maximise data capture with the implementation phase. A total of 26 pharmacists were involved in delivering integrated services in ACCHSs resulting in overall delivery of 12.3 FTE throughout the implementation phase (Table 2).

In all sites where community pharmacy nominated a candidate for the role, a community pharmacy

nominated candidate was appointed to the role with the employment arrangement being either via a subcontract with the community pharmacy or directly with PSA as per the preference of the community pharmacy owner or, in keeping with principles of self-determination, at the request of the health service.

Seven pharmacists were employed under subcontract with community pharmacy, with the remaining 19 pharmacists employed directly by PSA. Of the 26 pharmacists employed over the duration of the IPAC project, 21 were female and 5 were male. At the time of being appointed to the role, 19 of the pharmacists were accredited to conduct medication management reviews, with another pharmacist gaining accreditation during the project. An additional two pharmacists have completed their accreditation since the end of the project, while a further two pharmacists who were not accredited have commenced studies to become Credentialed Diabetes Educators. For further information, see Appendix 19 - Pharmacist Recruitment Report (PSA).

Table 2. Number of ACCHSs and pharmacists via employment method throughout the implementation phase, by jurisdiction.

States	Final number of ACCHSs involved	FTE Allocated	Pharmacists	PSA employed	Community pharmacy subcontracted pharmacists
Northern Territory	5	4.6	8	3	5
Queensland	7	5.1	9	7	2
Victoria	6	2.6	9	9	0
Total	**18**	**12.3**	**26**	**19**	**7**

A comprehensive induction training program was facilitated by PSA Coordinators for pharmacists. It was tailored to ensure that participating integrated pharmacists would have the necessary skills to work within diverse ACCHS settings in a culturally-responsive manner to deliver the core roles and to capture relevant data for evaluation. The training involved preparatory pre-reading including components of the project protocol, learning about the 6th Community Pharmacy Agreement rules related to Aboriginal and Torres Strait Islander programs, and a series of online learning modules selected by PSA Coordinators for their relevance to chronic disease management services in Aboriginal and Torres Strait Islander primary healthcare settings and working in an integrated team environment.

Induction training was delivered through two day workshops as facilitated face to face group sessions in Sydney, Melbourne and Brisbane (Table 3). Elements of the program included cultural awareness training (delivered by experienced cultural trainers), project overview, consent process, integrated pharmacist core roles, activity work plans, use of the electronic logbook and clinical information systems, resources and lines of communication.

A small number of pharmacists who were recruited after completion of the workshops were given a full day of one-on-one project-specific training in a mutually agreed location followed by another day of pre-arranged experience alongside an ACCHS pharmacist at their place of work. For further information, see Appendix 20: Pharmacist Induction Training Report (PSA).

Table 3. Summary of IPAC Project Pharmacist Induction Training attendance.

Date of training delivery	Delivery method	Location	Number of pharmacists attending
July 2018	Workshop	Sydney	11
August 2018	Workshop	Melbourne	7
October 2018	Workshop	Brisbane	3
October 2018	Small group	Melbourne	2
September 2018	One to one	Cairns (Qld)	1
March 2019 (replacement)	One to one	Geelong (Vic)	1
April 2019 (replacement)	One to one	Gove (NT)	1
TOTAL			**26**

PSA project coordinators were primarily responsible for coordinating and managing the delivery of a multifaceted and tailored program of support for the integrated pharmacists throughout the project's implementation phase. Support methods included phone and email support from the Project Team (comprising representatives from PSA, NACCHO and JCU), as well as formal and informal mentoring by experienced Aboriginal Health Services pharmacists. Further support was provided by means of site visits by PSA Coordinators, participation in regular monthly teleconferences, inclusion in an online discussion group and contact by closed-group social media. The integrated pharmacists were also given access to a contemporary online repository of resources related to medicines use and management of chronic disease in Aboriginal and Torres Strait Islander peoples, taking into account jurisdiction-specific differences in legislation and best-practice guidelines.

Throughout the project's implementation phase, significant uptake and consistent utilisation of the various platforms of support provided to the integrated pharmacists was demonstrated. PSA Coordinators conducted twenty site visits across 16 ACCHSs, eleven monthly teleconferences were held, 91 unique topic threads were raised in the online discussion form, and 530 individual messages were posted in the social media group (using WhatsApp®). Eleven pharmacists formally participated in the Mentor Program Support and a further three pharmacists received informal support. Regular communication by phone or email occurred between PSA project coordinators and integrated pharmacists. The integrated pharmacists

contacted PSA project coordinators for support on at least a daily basis. For further information see Appendix 21: Support for Pharmacists Report (PSA).

Participant recruitment

Participant inclusion criteria comprised patients with chronic disease who had visited a participating ACCHS at least three times in the past two years relative to the recruitment date into the study (known as 'active' or 'regular' patients). Participants were aged 18 years and over and had a diagnosis of:

- Cardiovascular (CV) disease (coronary heart disease, stroke, hypertension, dyslipidaemia and any other CV disease),
- Type 2 diabetes mellitus,
- Chronic kidney disease, or
- Other chronic conditions and at high risk of developing medication-related problems (e.g. polypharmacy).

Convenience sampling kept with the pragmatic project design. Patients attending sites were invited to see the integrated pharmacist after being referred by a doctor, health worker or other healthcare provider. In accordance with ACCHSs preferred processes, pharmacists in some ACCHSs approached potentially eligible patients directly. Written consent was required from patients to participate in the project and to provide permission for information and health data to be used for project evaluation. A Master Participant Information Brief informed participant of all aspects of the project (Appendix 24). Referral and consent processes were developed in consultation with each ACCHS to ensure they were culturally appropriate for the individual site. The integrated pharmacist recorded consent in the ACCHS' clinical information system (CIS). Participants were able to withdraw from the study at any time.

Ethics approval

Ethics approval for the project was received from four ethics committees in the three jurisdictions including St Vincent's Hospital Melbourne (SVHM) Human Research Ethics Committee (HREC), Victoria (HREC/17/SVHM/280), James Cook University HREC (mutual recognition of SVHM HREC, approval HREC/H7348), Menzies School of Health Research (HREC/2018-3072) and the Central Australian HREC (HREC/CA-18-3085).

Approval from each HREC was obtained prior to the commencement of the project in their respective jurisdictions. As the project evolved and some changes were made, further approval of changes was received through the submission of amendments to each HREC. The tools used in the qualitative evaluation were approved by the HRECs prior to commencement of this component of the study. Project Information Briefs and Consent Forms for sites, pharmacists, participants and GPs are presented in Appendix 24.

Data Collection

Deidentified data was extracted from the clinical information systems (CIS) of ACCHSs pertaining to consented participants through an electronic data extraction tool known as GRHANITE™. Data included participant demographics, biomedical measures and indices for contact, and measures of health service utilization (MBS items, eg home medicines reviews). Additional deidentified data on participant interactions (such as medication management reviews, assessments of medication adherence, appropriateness and underutilisation, self-assessed health status and education) and services related to health care staff and systems (such as team-based collaborations, education, stakeholder liaison plans, contact with community pharmacies, transitional care occasions, and drug utilisation reviews) were recorded by the integrated pharmacists in an electronic logbook.

Existing tools used included the medication appropriateness index and the first question (SF1) of the Short Form (SF)-36 health related quality of life instrument to measure self-assessed health status. Existing processes and rules for Home Medicines Reviews were observed. Other data collection tools were adapted from established tools or had to be developed to meet the specific requirements of the project. These included the health systems assessment form, assessment criteria for medication underutilization and medication-related problems, a medication adherence patient survey and processes for non-home medicines reviews.

Templates were designed to collect details about follow-up to a HMR or non-HMR, team-based collaborations, provision of medicines information services, education and training, implementation of stakeholder liaison plans, contact with community pharmacy, transition care occasions and drug utilization reviews.

Data collected through all assessments, tools and templates was entered into the logbook, with the exception of the health systems assessment. Qualitative evaluation was informed through focus groups, interviews and observations undertaken through three site visits, and online surveys with CEOs, managers, general practitioners and community pharmacists from all sites. Economic analyses used participant, health services, and intervention costs data.

GRHANITE™ data extraction software

GRHANITE™ software extracted demographic, biomedical and health service utilization indices from the ACCHSs CISs.[26] ACCHSs consented to have the software installed within their server environments (via remote connection) and for regular data extractions to occur for the term of the project. ACCHSs used either Communicare or Best Practice as their CIS. Participant consent was recorded in the CIS by the integrated

pharmacists. GRHANITE™ data was copied to a JCU databank employing internationally recognised point-to-point encryption (P2PE) mechanisms to protect data in transit.

The scope of the data extractions was agreed based on IPAC-specific data requirements (approved by HRECs) and data definitions used within the Communicare and Best Practice systems, to develop an XML software interface to extract the data. Each ACCHS successfully completed 'site acceptance testing' after installation of the software that confirmed the data extracted was fit-for purpose. The integrity of the data extraction process was monitored through weekly data downloads. XML interface maintenance ensured that any vendor software upgrades to the CIS were aligned with data extract definitions. The de-identified CIS participant identification numbers in the GRHANITE™ extractions linked with participant data recorded by pharmacists in the electronic logbook.

Pharmacist Logbook

The integrated pharmacists recorded data on all ten core roles in a bespoke electronic pharmacist logbook. The logbook was a password protected, electronic database, accessible from any internet-connected device. It was designed specifically for the project and had dual functionality for data entry and reporting. Each core role had its own 'questionnaire' in the logbook to record all required data for that specific activity. An additional questionnaire recorded details of participants withdrawn from the study. The logbook design was optimised to make data collection and entry useful and efficient. The use of 'select-from' lists and multiple-choice questions was maximised were possible and free text fields only used where necessary. As part of certain core role questionnaires, pharmacists were able to upload a PDF document to support their activity entry.

Logbook system administration was managed by a JCU administrator and a data custodian. Security was paramount and all users of the logbook had to be approved by the administrator, who could manage the creation and deactivation of accounts. Pharmacists were only able to access the system when the PSA had advised JCU of their commencement and details. Individual accounts were set up and pharmacists set their own password to ensure security and integrity of the system. Using a permissions-based hierarchy meant that each pharmacist could only see their own data, whereas administrators were able to run overall data reports and view the activity of each pharmacist.

The JCU administrator, with the permission and support of the software developer, created a guidebook with step-by-step instructions and screenshots for pharmacists to help them navigate the system. Pharmacists were expected to enter data on their activity at the end of each IPAC project working day.

Raw data was downloaded from the logbook into Microsoft Excel. To facilitate the monitoring of pharmacist

activity, the JCU Team analysed high level quantitative logbook data and provided monthly reports to the project operational team on the pharmacists' levels of activity for each of the 10 core roles, including selected project targets, during the implementation phase and for the duration of the project.

Qualitative evaluation

Three main strategies were used to collect data to inform the qualitative evaluation of the project including semi-structured interviews with integrated pharmacists; mixed methods online surveys with GPs, CEO and managers and community pharmacists; and three site-visits comprising focus groups and interviews with health services staff and patients, interviews with the integrated pharmacists, and shadowing and observation. Proformas were developed to guide each data collection activity:

1. Focus groups and interviews – ACCHS staff
2. Focus groups and interviews – Patients
3. Interviews with pharmacists
4. Online survey – ACCHS staff
5. Online survey – GPs
6. Online survey – Community pharmacists
7. Observation checklist for site visits

Proformas and the online surveys were developed and distributed to the project operational team, the steering committee and the evaluation team for comment. The Project Reference Group members provided feedback on the proformas to be used with patients and ACCHS staff. All proformas were submitted and received approval from the HRECs in each jurisdiction.

The online surveys were implemented through Survey Monkey^{R} and piloted by the project operational team members and relevant members from the evaluation team. The online surveys were a combination of yes/no responses, Likert-style and 'slider' rating scales and open-ended questions. Demographic questions collected data on gender, age group, role and experience working within (or with) ACCHSs (see Appendix 14).

Economic Analysis

The economic analysis was trial-based, rather than model-based, with costs and outcomes compared in the post- and pre-intervention periods (MSAC Assessment Report, and Appendix 25). Data relating to resource use in implementing the IPAC intervention and changes in resource use were obtained directly from the trial, with unit costs also available from the trial with the exception of GP earnings (the latter obtained from official ABS data). The comparator was usual care in the pre-intervention period.

Outcome measures included biomedical indices from (i) those with T2DM with pre- and post-measures of

HbA1c and (ii) the subset of participants for whom an assessment of underutilisation was conducted (the number of potential prescribing omissions). A cost-consequence analysis was undertaken for all participants, with costs presented alongside a range of biomedical outcomes to demonstrate the full impact of the intervention, given the intervention had multiple effects and is a public health intervention with a range of health and non-health benefits that are difficult to measure in a common unit.[27] [28] For participants with a clinical diagnosis of T2DM, a cost-utility analysis was also conducted that derived lifetime quality of life changes from the decreases in HbA1c observed during the trial period and mapped the HbA1c changes to lifetime quality of life changes, based on the findings of a systematic review.[29] For further information see MSAC Assessment Report: Sections D and E.

Health Systems Assessment

Each ACCHS underwent repeated health systems assessments (HSA) to explore service characteristics and identify any systems change over the trial intervention period. There were 140 distinct items in the IPAC 140 HSA form which collected data on ACCHS details such as service size, local population, number and types of staff, access to local or visiting specialist and allied health services, budgets, services offered, quality improvement processes, medicines access information, systems for clinical management and chronic disease care, engagement with other health care providers and the quality of communication with the hospital and community pharmacies (Appendix 10 - Assessment of MAI report: Appendix B).[30] The HSA form assessed health services by exploring five (5) abbreviated domains of the chronic care model.[31]

The data was collected from ACCHSs by the NACCHO project coordinators prior to the commencement of pharmacists at each service. The collection was repeated in the final three months of the implementation phase by the respective NACCHO project coordinator who had conducted the initial HSA to ensure data collection consistency.

Medication Appropriateness Index (MAI) Audit

Medication appropriateness was measured by assigning a Medication Appropriateness Index (MAI) weighted score to each participant's medicine based on an internationally validated tool[32] [33] that assessed the potential for medicine-related risks that outweigh the benefits to the patient (prescribing quality, see Appendix 10). The MAI has 10 items investigating measures of medication appropriateness and included medication indication, effectiveness, correct dosage, correct direction, practical direction, drug–drug interaction, drug–disease interaction, drug duplication, duration of therapy, and cost. Overuse of medications, defined as participants' medications deemed to be 'unnecessary', was measured by assigning a MAI score to three items. Pharmacists reviewed each participant's medical record containing their currently prescribed medications and assigned the 10 -item ratings to each medication. Pharmacists used this medication review and other assessments related to their core role to formulate recommendations for the

prescriber. The assessed ratings were entered by pharmacists into the electronic logbook.

Assessment of Underutilisation (AoU)

All MAI subset participants were also assessed for medication underuse using ten (10) evidence-based prescribing quality categories to define clinically relevant potential prescribing omissions (PPO) for cardiovascular disease (CVD), type II diabetes mellitus (T2DM), chronic kidney disease (CKD), pneumococcal vaccination, acute rheumatic fever (ARF) and/or rheumatic heart disease (RHD) (Appendix 11). These conditions were known to contribute significantly to the burden of disease and healthcare disparities in Aboriginal peoples and Torres Strait Islanders (especially in remote Australia).[34] The use of evidence-based guidelines applicable to Aboriginal and Torres-Strait Islander peoples informed the face and content validity of the underutilisation criteria. Data from the assessments was entered into the logbook by pharmacists.

Home Medicines Reviews

Participant data for the number of HMRs (based on the number of MBS item 900 claims) completed in the pre and post-intervention period was sourced from GRHANITE™ extractions (Appendix 12). The number of HMRs completed during the study period, and related data was also recorded by pharmacists in the logbook (Appendix 16). Pharmacists were required to document the clinical indications for a HMR and if an MBS rebate claim for item 900 was generated by the health service as well as reasons for not claiming. Pharmacists were required to record if a HMR conducted during the project period was completed by an IPAC or external pharmacist. If the HMR was conducted by an accredited integrated pharmacist, the HMR was conducted either within IPAC hours or outside IPAC hours. Payment for HMRs completed by IPAC pharmacists within project hours was not claimed via the 6CPA.

Non-Home Medicines Review

For the purposes of the IPAC project, a non-HMR was defined as comprising some or all the elements of a HMR but not fulfilling all relevant HMR criteria to be eligible to claim the MBS rebate. Integrated pharmacists' conducted non-HMRs for those at risk of medicines misadventure but did not fully meet the criteria for an HMR. For example, the interview could be undertaken outside the participant's home. Thus a non-HMR was defined by eight mandatory criteria that included:

1. an interactive face-to-face or telehealth interview with the patient;
2. the collection of patient-specific data;
3. the compilation of a comprehensive medication profile;
4. education of the patient about their medications;
5. the assessment of the medication profile to identify medication-related problems;
6. prioritizing a list of medication-related problems;
7. recommendations made and documented in the ACCHS clinical information system; and

8. recommendations were discussed with the prescriber.

All completed non-HMRs fulfilled all eight criteria and were entered into the logbook by pharmacists (Appendices 12 and 16).

A non-HMR was distinct from a HMR in that a non-HMR allowed for an opportunistic medication review by a pharmacist either within or outside the patient's home; without needing a formal referral from the patient's GP; and the absence of frequency restrictions for a non-HMR whereupon a patient may have a non-HMR following a HMR, or repeat non-HMRs as deemed clinically necessary.

Follow-up to an HMR or a non-HMR

The project protocol required that an integrated pharmacist should schedule a patient follow-up as per usual clinic processes after the completion of an HMR or a non-HMR. Information regarding pharmacist's follow-up activity was collected for patients who had a HMR or a non-HMR. Pharmacists undertaking a follow-up activity were required to fulfil three criteria for each activity:

1. reinforce the HMR and non-HMR advice and recommendations provided by the pharmacist (and the GP, if appropriate);
2. assess the impact of any actions recommended from the HMR or non-HMR; and
3. determine if another HMR or non-HMR, education session or preventive intervention was needed.

Pharmacists logging the completion of participant follow-up for the IPAC study were required to confirm the assessment of all three criteria with the encounter entered into the logbook (Appendices 12 and 16).

Medication-related problems

For every HMR or non-HMR during the intervention phase, pharmacists were required to report any medication-related problems (MRPs) identified (Appendix 12). The definition of MRPs was adapted from some of the criteria in the MAI used to assess drug-related problems, supplemented by additional problems commonly reported in other studies such as if any medicine was associated with an adverse drug reaction, and if the medication dosage was sub-therapeutic or if there was an overdosage. Pharmacists could also report 'other' MRPs not included in this list, or the complete absence of a MRP. All data was recorded by pharmacists in the logbook.

Medication adherence

The extent of participant adherence to medications and the reasons for non-adherence was assessed from each participant using indirect self-reported measures at baseline and then at the end of the study. Two methods were used as part of a single survey tool – a single-item question (SIQ), and an 11-item patient

survey (NMARS, NACCHO Medication Adherence Response Scale) that was validated for the purpose of the IPAC study. The SIQ asked participants: '*How many days in the last week have you taken this medication?*' (asked for each medication the participant was taking). Pharmacists were trained to express the score as a proportion of the number of days the participant took the correct doses of the medication as prescribed in the preceding week. An 'adherent day' was defined as not missing any doses of prescribed medicines on that day. The mean number of adherent days in the preceding week ranged from 0-7 days, based on the mean score for all medications. This informed on the proportion of days with the correct number of doses taken, which is a frequent summary statistic used for reporting medication adherence.[35] If the mean number of adherent days for participants was least 6 of 7 days, this approximated medication adherence for at least 80% of the days indicated.

Content for the NMARS was based on literature review with face and content validity supported by a conceptual framework, expert panel, testing with scale and item-specific content validity indices (CVI), pre-testing with Aboriginal consumers, assessment of question properties, and initial pilot testing, that was then used with all IPAC participants. Construct validity and reliability testing was also undertaken. Scores from 8-11 indicated adherence. Pharmacists entered participant responses to both measures of adherence into the logbook and were not required to determine scores (Appendix 13).

Self-Assessed Health Status

Self-assessed health status was determined at baseline and at the end of the study using the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?'.* An extra response option – 'very poor' – was added (as in the SF-8 survey) to reduce the potential for respondents to overstate their health status. Pharmacists entered participant responses into the logbook (Appendix 13).

Team-Based Collaboration

The pharmacists were integrated within the ACCHS model of care as a member of the PHC team to improve the chronic disease management of participants. Integration meant that pharmacists had identified positions and core roles, shared access to clinical information systems, provided continuous clinical care to participants, received administrative and other supports from primary health care staff, and adhered to the governance, cultural, and clinical protocols within ACCHSs as part of their shared vision. Pharmacists recorded details of their involvement in team-based care activities in the logbook, such as the role of team members or stakeholders who were involved in the collaborative activity, the duration of the activity and whether or not it involved an IPAC consented participant (Appendix 16).

Medicines Information Service

Integrated pharmacists provided medicines-related information to clinicians and other staff within the ACCHSs including responding to PBS queries, information requests regarding dose titration, interactions, new and emerging drugs, drugs in stock and ad-hoc medicine queries. Data recorded in the logbook included the recipient of the information, how the request was received, the type of information provided and the clinical reference, and the time taken to complete the service. Evidence of an outcome was recorded in situations where the pharmacist was aware that the GP or other clinician had made a change to participant therapy based upon their advice or recommendations (Appendix 16).

Education and Training

Medication-related education sessions were provided by the integrated pharmacists for both participants and healthcare providers. The pharmacists also participated in preventive health promotion and community events. Details recorded in the logbook included the type of activity, the format in which it was provided, duration and examples of materials or resources which could be uploaded (Appendix 16).

Stakeholder Liaison Plans

A written stakeholder liaison plan aimed to support the development of relationships and networks between the ACCHS and community pharmacies, and other relevant service providers (such as local hospitals or aged care facilities) in order to facilitate communication and collaboration. It was anticipated that enhancement of communication processes with stakeholders would continue to have benefit and relevance to the ACCHSs even after completion of the project. Pharmacists were expected to develop one written plan for communication between their ACCHS and each of their local community pharmacy/ies, and any other relevant stakeholders. Data collected in the logbook included the identification of staff involved in the co-design of the plan, the key stakeholders, whether the plan had approval of the ACCHS CEO and the time take to develop the plan. A template was provided for the plan and when completed was uploaded into the logbook. Pharmacists were also able to note or upload documentation providing evidence of any outcomes (Appendix 16).

Contacts with Community Pharmacy

In addition to the development of the stakeholder liaison plans, integrated pharmacists recorded details of interactions with community pharmacy in the logbook including the reason for contact, whether contact was initiated by the IPAC or community pharmacist, and the method of contact used (Appendix 16).

Transitional Care

The transitional care core role aimed to optimize medication management for participants across the continuum of care, by relaying relevant information and improving the communication of discharge

summaries for medicines reconciliation. Integrated pharmacists reported details of each occasion of transitional care in which they participated including the agency they engaged with, the reason and mode of contact, and the duration of the activity (Appendix 16).

Drug Utilisation Reviews

Integrated pharmacists also completed one or more drug utilisation reviews (DUR) at their respective ACCHSs. The World Health Organisation defines a drug utilisation review (or drug utilisation evaluation) as 'a system of ongoing, systematic, criteria-based evaluation of drug use that will help ensure that medicines are used appropriately'.[36] Pharmacist training on DURs required reviews to be based on a priority issue nominated by the ACCHS. Best practice evidence or guidelines were to be used to support the DUR and a template was provided to pharmacists to assist the reporting process. Pharmacists uploaded the DUR report into the logbook, in addition to providing details about the initiator of the review, duration, and measures used to assess progress with this quality assurance activity within the ACCHS (Appendix 16).

Data Management and Intellectual Property

Privacy and Confidentiality

Individual patients participating in the project were not able to be identified. The GRHANITE™ software program provided an ethical and secure mechanism for the extraction of participant data that strictly conformed to variables approved by HRECs. Identifying details were not extracted and participants and were automatically allocated a unique patient identification (ID) code. When entering data in the logbook, pharmacists used the participants' ID number, and did not enter any identifying details. The participant ID numbers could be linked with those in the GRHANITE™ extracts to enable analysis. Individual ACCHSs, communities and participants were not identified in any reports, publications or conference presentations of data from this project, unless this was approved by the ACCHS. Project results were reported at an aggregate level.

Data Security

As the leading research organisation, JCU was responsible for the protection of data from loss, misuse and unauthorised access. The Data Custodian at JCU was responsible for this role. No issues were raised in relation to data security during the project. Pharmacist, participant and site consent forms and all data collected via GRHANITE™ extractions and entered into the pharmacist logbook was held electronically in a password protected computer by the Data Custodian at the JCU College of Medicine and Dentistry. Consent forms collected by project staff from sites were posted to the Data Custodian. Forms were stored in a locked filing cabinet, in a locked room at the JCU College of Medicine and Dentistry, with any other project-related paper-based data. All electronic files and paper-based data will be stored securely after the project under

the control of the Data Custodian for a period of 7 years in line with ethical requirements. After this time, all files will be deleted and papers destroyed through JCUs secure waste management services.

Quantitative Data

Data was extracted from ACCHS clinical information systems via the GRHANITE™ data extraction tool, as well as data recorded by pharmacists in the logbook. Electronic data was stored on password-protected server at JCU. Data accessed during the analysis phase was stored only in JCU-supported database applications.

Qualitative data

Qualitative data collected via interviews and focus group discussions (including zoom and teleconferences) were recorded digitally. Photographs of signs and the clinic layout were taken on a password-protected mobile phone. All electronic files (digital recordings and photos) were removed from recording devices (recorder and mobile phone) immediately once transferred to the laptop. Field notes from site visits were recorded in a notebook or electronically. Identifying information was removed from data collected immediately after transcription of the interviews and focus group discussions. Consent forms and paper notes of any identifiable project data were stored in a locked filing cabinet, in a locked room.

Online survey data collected was stored in a password-protected 'Survey Monkey' account until the end of the data collection period. At this time, the data was downloaded and removed from the online account. All electronic files were stored on password-protected computers during the project.

Intellectual Property

Intellectual property as outlined in the Funding Agreement with the Australian Government Department of Health means all copyright and rights resulting from intellectual activity but does not include moral rights (the right of attribution and/or integrity of authorship of copyright material and the right not to have authorship falsely attributed) or rights in relation to confidential material. The ownership of data and materials produced from this project is subject to the clauses in the Funding Agreement.

Intellectual property rights in materials created as arising from activity in this project (but not raw unanalysed data extracted using GRHANITE^{TM}), are vested in JCU. JCU has subsequently granted a license to the PSA. The raw (unanalysed) data extracted by GRHANITE™ and collected is acknowledged to be owned by the ACCHSs from which it was collected. ACCHSs granted the PSA (and in turn, NACCHO and JCU) a perpetual, irrevocable, royalty-free and licence fee-free, non-exclusive licence (including a right of sub-licence) to use and analyse the raw (unanalysed) extracted data that arose from participation in the IPAC Project in accordance with the Project Protocol.

Results

Registered pharmacists were integrated within the primary healthcare teams of 18 ACCHSs across 22 sites, for up to 15-months from 2nd August 2018 to 31st October 2019. Pharmacist positions were aggregated to the rate of 12.3 FTE in total.

A total of 1,733 patients were consented for the project, of which 1,456 had pre and post data and were included for analysis of participant outcomes. An overview of all pharmacist activity is presented in Table 4.

Table 4. Overview of pharmacist activity included in analysis from 02/08/2018 to 31/10/2019.

Pharmacist Core Role	Number of activities
Self-reported medication adherence survey (NMARS)	2,759
Medication Appropriateness Index (MAI) Audits / Assessments of Underutilisation (AoU)	789
Home Medicines Reviews (HMRs)	639
Non-HMRs	757
Follow-up to a HMR or Non-HMR	1,548
Team Based Collaboration (1,082 related directly to IPAC participants)	3,165
Medicines Information	1,715
Education and Training	358
Drug Utilisation Reviews	26
Stakeholder Liaison Plans	47
Stakeholder Liaison – Community Pharmacy Contact	3,233
Transitional Care	1,901

NMARS=NACCHO Medication Adherence Readiness Scale

Practice-Based Activity

Extensive collaboration and communication with other healthcare providers was evident through team-based collaboration, transitional care for participants, the development and implementation of stakeholder liaison plans and extensive contact with community pharmacy. Integrated pharmacists were pivotal as a point of contact for stakeholders with whom services worked such as community pharmacists, and staff in local hospitals, rehabilitation and dialysis units. Pharmacists also provided medicines-related information, education and advice. Drug utilisation reviews and medication management reviews facilitated improvements in prescribing quality and other supports for participants. Analysis of these activities in the IPAC project provided evidence that delivery of non-dispensing pharmacist services was feasible within

ACCHS settings and contributed to the integration between the pharmacist and other health care staff, as well as enhancing communication and collaboration with community pharmacy and other stakeholders. These activities contributed to other outcomes achieved in the project (outlined below).

For further details:
Appendix 16: Smith D, Couzos S, Biros E. Integrated pharmacists within ACCHSs: support for practice-based activities in the IPAC project. Final report to the Pharmaceutical Society of Australia for the IPAC Project, April 2020.

Clinical Endpoints Analysis

Integrated pharmacists embedded into usual care in ACCHSs provided clinically and statistically significant improvements in the control of cardiovascular disease (CVD) risk factors, glycaemic control in participants with T2DM, and reduced absolute CVD risk in Aboriginal and Torres Strait islander adults with chronic disease.[37] Analysis of 1,456 participants with pre and post data found:

- Mean age of participants ranged from 57- 58 years, most (91-94%) were Aboriginal and/or Torres Strait Islander, 65 to 76% attended health services located in inner and outer regional locations, 59% to 75.4% had T2DM, and 87.5% to 90.2% had co-morbidity.
- Statistically significant improvement in HbA1c results in participants with T2DM, with a 2.8 mmol/mol or 0.3% (unit) reduction (p=0.001, 95% CI -0.4% to -0.1%).
- Reductions in diastolic blood pressure (-0.8mmHg, p=0.008), total cholesterol (-0.15 mmol/L, p<0.001), LDL-C (-0.08 mmol/L, p=0.001), and triglyceride levels (-0.11 mmol/L, p=0.006) were significant for all participants.
- Mean calculated absolute 5-year CVD risk was significantly reduced by 1% (95% CI: -1.8% to -0.12%, p=0.027).
- Mean annual estimated glomerular filtration rate (eGFR) significantly improved with an increase of 1.9mL/min/1.73m^2 (95% CI: 0.1 to 3.7) from baseline, which is a significant slowing of eGFR decline (p<0.001). When participants with less than 6-months of follow-up were excluded, the mean annual eGFR decline was -0.2ml/min/1.73m^2 (95% CI:-2.99 to 2.7), significantly slower than the predicted and expected annual decline of -3ml/min/1.73m^2 (p=0.034, n=720) in the Aboriginal and Torres Strait Islander population.
- SBP significantly improved for younger participants (<57 years, -1.8 mmHg, SD: 12.5, p=0.004).

The observed net improvements in biomedical outcomes are clinically meaningful at a population level. Even a modest HbA1c drop may translate to a reduction in micro and macrovascular complications in people with T2DM if sustained population wide. According to the UK Prospective Diabetes Study (UKPDS) *any improvement* in HbA1c in those with T2DM reduced the risk of diabetes complications, with little evidence

of a threshold of effect. [38] Moreover, the observed net improvement in glycaemic control of participants with T2DM from baseline values was consistent with the -0.18% to -2.1% HbA1c decrease (difference between intervention and control groups) observed over a mean of 9.4 months in 24 of 26 other studies that investigated pharmacist interventions in patients with T2DM.[39]

The small but significant average DBP and SBP reductions shown for IPAC participants may also attenuate the incidence of CVD events for Aboriginal and Torres Strait islander peoples if such reductions were population-wide, particularly for those with chronic disease. The net BP reduction was observed for the IPAC cohort as a whole, irrespective of whether participants had a clinical diagnosis of hypertension. Population-wide BP reduction strategies are recommended for the primary prevention of CVD events because the benefits that accrue from BP reduction are not just limited to those with hypertension.[40] A population-wide reduction in DBP of a mere 2mmHg has been estimated to reduce the prevalence of hypertension and CHD risk by 17% and 6% respectively, and combined with BP reductions in those needing medical treatment, could double or triple the impact of medical treatment alone.[41] A mere 1 mmHg reduction in SBP may substantially reduce heart failure (with 20 fewer cases for every 100,000 African-Americans per year), as well as CHD, and stroke incidence.[42]

Any population-wide reduction in LDL-C, even if small in magnitude such as demonstrated in the IPAC study, may also have broader benefits in reducing major CVD events for Aboriginal and Torres Strait Islander peoples. For example, for those already on statins, reducing LDL-C levels by a further 0.51 mmol/l from the LDL-C at baseline over a year, can significantly reduce the residual risk for major CVD events by an additional 15% (on top of the existing 20% relative risk reduction per 1 mmol/L LDL-C reduction from statin therapy).[43] [44]

The progression of kidney disease significantly slowed as a result of the intervention for IPAC participants and this slowing may have delayed the onset of end-stage kidney disease (ESKD) and CVD events if the impact of the intervention was sustained. Moreover, without intervention, IPAC participants were at risk of a much higher rate of eGFR decline per year than the selected expected rate because their characteristics more closely matched those in the eGFR Follow-Up study who had an annual eGFR decline of -5 ml/min/1.73m^2. In an analysis from the USA involving participants from mixed ethnic groups, a decline in eGFR of -5ml/min/1.73m^2 over 2 years predicted a 1.5 and 1.2 times higher risk of ESKD and CVD events respectively.[45] The eGFR Follow-Up study involving Aboriginal Australians showed that those with a slower rate of kidney disease progression (a 5 ml/min/1.73m^2 higher eGFR) had an 18% risk reduction (hazard ratio 95% confidence interval 0.75-0.91) in combined renal endpoints over a median of 3 years (adjusted for aged, sex, and ACR) that included death from renal causes, and initiation of renal replacement therapy.[46]

The net biomedical improvements observed in the IPAC study most likely emanated from the observed targeted improvements to prescribing quality, participant medication adherence, and team-based care. Prescribing quality significantly improved following the IPAC intervention with reductions in inappropriate prescribing for BP lowering and diabetes medications,[47] a significant reduction in underprescribing of BP-lowering medications for those with T2DM and albuminuria,[48] and significant improvements in patient self-reported medication adherence.[49] Integrated pharmacists also delivered team-based care to optimise chronic disease management (such as case conferences) and attended patient group meetings to deliver preventive health messages such as advice on dietary and lifestyle improvements (Appendix 16).

The net absolute reduction in 5-year CVD risk of 1% for participants without pre-existing CVD indicates the clinically significant potential for primary CVD prevention arising from the IPAC intervention.

For further details:

Appendix 9: Couzos S, Smith D, Buttner P, Biros E. Integrated pharmacists in ACCHSs- Analysis of the assessment of clinical endpoints in Aboriginal and Torres Strait Islander patients with chronic disease (IPAC study) Report to the Pharmaceutical Society of Australia. Final Report. April 2020.

Medication Appropriateness Index (MAI) Audits

Prescribing quality improved significantly for participants following the integrated pharmacist intervention within ACCHSs. Key results included:

- 357 participants had paired MAI data and were included for analysis (median follow-up of 270 days).
- Participants had CVD, T2DM, CKD, or other chronic disease, 93% were Aboriginal and/or Torres Strait Islander with a mean age of 57 years (SD 14.4). Chronic disease co-morbidity was present in 87.4%.
- A total of 2,804 and 2,963 medications were evaluated at baseline and at the end of the study respectively. At baseline, 67.8% (n=242/357) of participants were prescribed ≥1 medications rated as inappropriate in at least one MAI criterion; 23.1% of all medications had ≥1 inappropriateness rating; the mean MAI score per participant was 6.02 (SD±23.6); and the mean MAI score per medication was 0.76 (SD±8.5). The most common reason for medication inappropriateness was incorrect dosage.
- The intervention significantly reduced mean MAI scores per participant (to 3.20, SD ±11.7, p=0.003); the mean MAI score per individual medication (to 0.39, SD±-4.4, p=0.004); the proportion of participants receiving medications rated as inappropriate (to 44.5% n=159, p<0.001), and the proportion of medications with the following prescribing risks: incorrect dosage, impractical directions, unacceptable therapy duration, drug-disease interactions; and unnecessary medications due to absent clinical indications, or lack of clinical effectiveness (all p <0.05).
- There was a 34.1% relative reduction in the number of participants with medications meeting ≥1 medication overuse criteria. Significant reductions in participant numbers prescribed medications with

an inappropriateness rating was observed for: cardiovascular (-19.9% absolute reduction, p<0.001), endocrine (-11.2%, p<0.001), and respiratory conditions (-4.5%, p=0.019).

- Prescribing quality improved for participants with medications for hypertension, diabetes and/or dyslipidaemia (absolute reductions of -5.3%, p=0.01; -9.5%, p<0.001 and -9.8%, p<0.001 respectively).

For further details:
Appendix 10: Couzos, S, Smith D, Buttner P, Biros E. Assessment of medication appropriateness using the Medication Appropriateness Index (MAI) in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community Controlled Health Services (IPAC project). Final Report to the PSA, February 2020.

Assessment of Underutilisation

Potential Prescribing Omissions (PPOs) were common in the IPAC cohort. Improvements in prescribing quality arising from pharmacists integrated within ACCHSs significantly averted PPOs to high-value pharmacotherapies. Key results were:

- 353 participants (from the MAI subset) had paired AoU data and were included in analysis (median follow-up of 266 days).
- Participants had CVD, T2DM, CKD, or other chronic disease (87.5% had co-morbidity); 93.2% were Aboriginal and/or Torres Strait Islander with a mean age of 57.2 years (SD±15.4) and a mean of 7.2 (SD±8.0) medications each.
- At baseline, 51.2% (181/353) of participants had at least one PPO from explicit and implicit criteria, totalling 256 PPOs or 0.73 (SD± 1.3) PPOs per participant. The most common PPO of the 10 criteria was for 23vPPV and blood pressure (BP) and/or lipid lowering therapy for those at high primary CVD risk. No chemoprophylactic PPOs for participants with ARF/RHD were identified. Other PPOs included symptomatic therapy for a range of chronic conditions.
- At follow-up (mean 267 days post-baseline), there was a significant (58%, p<0.001) reduction in the number of participants with potential prescription-based medication underutilisation, and a significant relative reduction in the mean number of PPOs per participant (60.3%, p<0.001).
- The PPOs that were averted were for pneumococcal vaccination, BP and/or lipid lowering medication in those clinically at high primary CVD risk, ACEI or ARB for participants with T2DM and albuminuria, and metformin for those with T2DM.

For further details:
Appendix 11: Couzos S, Smith D, Buttner P, Biros E. Assessment of medicines underutilization in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist

support within Aboriginal Community Controlled Health Services (IPAC project). Report to the Pharmaceutical Society of Australia. Final report. February 2020.

Medication Management Reviews

Within ACCHS, integrated pharmacists significantly increased access to medication management reviews (HMRs and non-HMRs), and follow-up to these reviews for Aboriginal and Torres Strait Islander adults with chronic disease. Key results were:

- There were 609 (41.8%) HMR, and 719 (49.4%) non-HMR recipients after a mean of 284 days (SD ±11.5) following study enrolment. Some recipients had multiple reviews undertaken throughout the Project.
- HMR recipients had a mean age of 58.7 years (SD ±21.9), a mean of 8 prescribed medications each, and 89% had comorbidity.
- Participants (n=1,456) had a 3.9 times ($p<0.001$) significant increase in HMR access (based on MBS claims) compared with usual care, whilst the number of HMRs (MBS claims) increased 4.1 times ($p<0.001$).
- Of non-HMRs, 91% (n=689) were conducted within the ACCHS; whilst the majority of recipients were from remote (19.8%) or very remote ACCHSs (21.4%); and had the non-HMR commonly completed for opportunistic reasons being at risk of forgoing a HMR (48.1%, n=364).
- Pharmacists delivered 1,548 follow-up assessments to HMR or non-HMR- recipients.
- Of HMR recipients, 87.9% (n=535) compared with 70.0% (n=503) of non-HMR recipients had at least one medication-related problem (MRP) ($p=0.035$).
- Non-HMR eligibility criteria, participant need for a medication review, pharmacist recommendations, and identified types of MRPs in recipients were similar to a HMR.

For further details:
Appendix 12: Couzos S, Smith D, Buttner P, Biros E. Assessment of Home Medicines Review (HMR) and non-HMR in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated support within Aboriginal Community Controlled Health Services (IPAC project). Report to the Pharmaceutical Society of Australia. Final report. February 2020.

Medication Adherence and Self-Reported Health Status

By the end of the study, integrated pharmacists significantly increased the number of participants' adherent to their medications from baseline. There were significant improvements in participant self-assessed health status during the same period.

- There were 1,103 participants with paired SIQ and NMARS data and 975 participants with paired SF1 data.
- Almost all participants were Aboriginal and/or Torres Strait Islander with a mean age at baseline of 58 (SD 29.8) years.

- Based on SIQ cut-scores, 70.8% (781/1103) of participants were adherent at baseline, 73.3% (808/1103) were adherent according to NMARS (scores 8 to 11), and 18% (175/975) had 'excellent to very good' health status according to SF1.
- There was a 12.8% (142/1103) and 10.3% (114/1103) net absolute increase in the number of participants adherent to medications at the end of the study compared with baseline (p<0.001) using NMARS and SIQ measures respectively.
- There was a 23.9% (233/975) net absolute increase in the number of participants with improved self-assessed health status (p<0.001).

For further details:
Appendix 13: Couzos S, Smith D, Buttner P, Biros E. Assessment of change in medication adherence and self-assessed health status in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community Controlled Health Services (IPAC project). Report to the Pharmaceutical Society of Australia. Final report. May 2020.

Economic Analysis

The result of the cost-consequence analysis, comparing the cost of the IPAC intervention with changes in biomedical indices for which statistically significant differences were observed, was $1,493 per participant. This cost was associated with statistically significant improvements in the following biomedical indices for participants with pre and post-intervention measures: glycated haemoglobin (HbA1c) for participants with a clinical diagnosis of T2DM, diastolic blood pressure (DBP), total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), triglycerides (TG), cardiovascular risk 5-year risk (CVD 5-year risk) and estimated glomerular filtration rate (eGFR) (Table 5).

Table 5. Statistically significant improvements in biomedical indices related to cost-consequence analysis.[1]

Variable	Mean difference in biomedical indices mean (SD, 95% CI)	p-value
HbA1c mmol/mol *[% units]* (n=539 in T2DM)	-2.8 (19.5, -4.5 to -1.0) *[-0.3% (3.9%, -0.4% to -0.1%)]*	0.001
DBP, mmHg (n=1045)	-0.8 (9.4, -1.4 to -0.2)	0.008
TC, mmol/L (n=660)	-0.15 (0.77, -0.22 to -0.09)	<0.001
LDL-C mmol/L (n=575)	-0.08 (0.48, -0.13 to -0.03)	0.001
TG mmol/L (n=730)	-0.11 (1.08, -0.20 to -0.01)	0.006
CVD 5-year risk % units (n=38)	-1.0 (2.6, -1.8 to -0.12)	0.027
eGFR (no minimum follow-up time) ml/min/1.73m^2 (n=895)	1.9 (25.7, 0.1 to 3.7)	<0.001
eGFR (6-month follow-up time) ml/min/1.73m^2 (n=895)	-0.2 (36.0, -2.99 to 2.7)	0.034

1. Data pertains to biomedical indices with mean difference that was statistically significant at the 0.05 level, as sourced from clinical endpoint report (Appendix 9) and MSAC Assessment Report.
CVD= cardiovascular disease.
DBP= diastolic blood pressure
eGFR= estimated glomerular filtration rate
HbA1C= glycated haemoglobin

LDL-C= low density lipoprotein cholesterol
TC= total cholesterol
TG= triglycerides
T2DM= type 2 diabetes mellitus

The cost-effectiveness analysis was undertaken for: (i) participants with a clinical diagnosis of T2DM with pre- and post-measures of HbA1c and (ii) participants selected for MAI assessments at baseline and at the end of the study, with potential prescribing omissions used as the relevant outcome measure.[50] For participants with a clinical diagnosis of T2DM, and with pre and post-measures of HbA1c, costs and outcomes for the IPAC intervention compared with no IPAC intervention (the comparator) found the incremental cost effectiveness ratio (ICER) of the IPAC intervention, versus no IPAC intervention was $3,769 ($753,774/200) per participant with a clinically meaningful reduction in HbA1c of at least 0.5%.[51]

For the sample of participants assessed for the underutilisation of medications (AOU), the ICER of the IPAC intervention versus no IPAC intervention was $6,809 per reduction in the number of participants with a potential prescribing omission.

A cost-utility analysis was undertaken for participants with a clinical diagnosis of T2DM, and with pre and post-measures of HbA1c, with changes in HbA1c during the trial period being mapped to lifetime quality of life changes based on the findings of a systematic review.[52] Findings of the systematic review based on multivariable regression indicated a linear relationship of every 1% decrease in HbA1c resulting in a 0.371 (95% CI 0.282-0.456) increase in quality-adjusted life years (QALYs). However, studies did not appear to include a decrease in HbA1c exceeding 3%. To be conservative, participants in the IPAC trial that were recorded to have HbA1c reductions of greater than 3% were assumed to have QALY gains corresponding to a 3% decrease. Percentage reductions in HbA1c refer to the change in measured HbA1c. For example, a change from 9% to 8% reflects a decrease of 1%.

The increase in lifetime QALYs for participants with T2DM were calculated based on the following assumptions:

1) Participants with a decrease in HbA1c of less than 1% were assigned no lifetime QALYs.
2) Participants with a decrease in HbA1c of between 1% and 3% were assigned lifetime QALY gains calculated as 0.371 multiplied by the corresponding decrease.
3) Participants with a decrease in HbA1c of more than 3% were assigned lifetime QALY gains calculated as 0.371 multiplied by 3.

Mapping changes in HbA1c over the trial period to a gain in lifetime QALYs resulted in a projected increase of 101 QALYs (95% CI 78-125) (Table 6).

Table 6 Distribution of lifetime QALY gains by changes in HbA1c for participants with T2DM

Change in HbA1c (%)	No. of participants	Lifetime QALY gains
<1%	401	0
1% to 3%	111	71.27
>3%	27	30.05
Total	**539**	**101.32**

Based on an incremental cost of the IPAC intervention of $753,774 for participants (n=539) with a clinical diagnosis of T2DM , and with pre and post-measures of HbA1c, this suggested an ICER of $7,463 (95% CI $6,030-$9,664) per QALY, assuming no lifetime costs additional to usual care are required to maintain the reduction in HbA1c.

For further details:
IPAC Project: MSAC Assessment Report. June 2020

Qualitative Evaluation

Data to inform the qualitative evaluation was collected between June and August 2019, when pharmacists had been integrated within ACCHSs for at least six months. Twenty-four (24) integrated pharmacists provided feedback on their experiences in the role and how well the project was able to be implemented within their ACCHS. The integrated pharmacists represented all health services recruited in the project (n=20). Thirteen general practitioners, 12 managers and 10 community pharmacists responded to the online survey. Three ACCHSs were visited for an in-depth assessment of implementation. One service was located in an urban area, another in a regional area, and one in a remote setting. Seven focus groups or group interviews were conducted with 17 service staff and 17 participants (patients/carers). Individual interviews were held with eight (8) health service staff and three (3) participants (patients/carers). Fieldwork included a day observing the work of the integrated pharmacist (or shadowing) and the service in general at each site, as well as observation of the community context (e.g. a visit to community pharmacies).

The qualitative evaluation of the IPAC study identified many benefits resulting from the project and demonstrated overwhelming support for non-dispensing pharmacist services integrated within the primary health care team of participating IPAC sites and in ACCHSs more broadly.[53] Participants reported numerous benefits with having a pharmacist delivering services within ACCHSs and appreciated their medications being assessed and receiving alternative or different combinations of medications or treatment regimes. Participants reported *'feeling better',* being more involved in decisions about their care, and felt empowered

to better manage their health. They better understood their conditions and why they needed to take their medications and how they worked, after receiving education from the pharmacists. Many participants indicated they were more adherent to their medications.

For health services staff, the main benefit with having a pharmacist integrated in their team was access to an *'in-house medicines expert'* who provided support and advice informally through *'corridor conversations'* as well as formally through team based collaboration and medication management reviews. Recommendations made following medication reviews were perceived to be of high quality and prescriber up-take was reported to be high. Education sessions for health services staff were perceived as valuable and staff also benefited from the pharmacists having input into their clinical team meetings and case conferences. Pharmacists contributed to medicines safety and quality assurance activities by conducting drug utilisation reviews and assisting in reviewing ACCHS medication-related policies.

Benefits from the pharmacists' perspective were the opportunity "*to sit down with the patient"* and *"spend a bit more time"* with them, and being available to see patients opportunistically. Integrated pharmacists developed meaningful relationships with participants and empowered them by developing their health literacy and knowledge about their medicines. The pharmacists' roles were designed to be predominantly patient-centred and the majority of pharmacists enjoyed this aspect of the role. Of the pharmacists asked, all indicated they would continue their employment if their IPAC role was continued as they enjoyed their role and experienced personal and professional satisfaction in the services they were providing.

Community pharmacists reported benefits from the IPAC project that included increased referrals for them to undertake HMRs and improved engagement by participants in HMRs. Community pharmacists felt that participants were more interested in their medicines and that patient knowledge of their medicines and adherence to medicines had improved since the integrated pharmacists had commenced in the ACCHSs. Integrated pharmacists worked together with community pharmacists to problem solve, access discharge summaries, confirm the patient's medication history, undertake medication reconciliation by correcting errors and creating current medication lists, and facilitate provision of dose administration aids for health service patients. Community pharmacists reported that the integrated pharmacist role was very helpful and useful to them and it facilitated communication between the community pharmacy and GPs within the ACCHS. All seven community pharmacists who responded to the question believed that there was a role for an IPAC-type (non-dispensing) integrated pharmacist within ACCHSs.

<u>Enablers and Challenges</u>

Various enablers and challenges to implementing the project were identified in the qualitative evaluation. Having a pharmacist with the right *'organizational fit'* and personality was just as important as possessing

good clinical skills, while the ability to communicate, collaborate with internal and external stakeholders and practice in a culturally responsive way was essential for effective integration. ACCHSs provided access to clinical information systems, uniforms and consulting room space, as well as assistance with promotion of the pharmacist services, which were reported as enablers to effective service delivery. Aboriginal Health Workers and Practitioners supported pharmacists' integration into the services and the local community. Referrals from GPs enabled pharmacists to consult with patients and undertake recruitment for the project.

Service readiness for the project was a challenge for some ACCHSs. Whilst some services were well prepared for the pharmacist and understood the nature of the role and its potential value, staff in other services needed time to further understand the role and learn how to best utilise the pharmacists' expertise. Initially this impacted upon the rate of referrals and recruitment. The majority of the pharmacists felt accepted and well-integrated within the PHC team at the time of their interview (after approximately six months of practice in their service). Other challenges reported included the irregular attendance of participants, those with chronic diseases being overwhelmed with appointments, transience, language barriers and 'sorry business'. Other project-related challenges were the complexity of the participant consent process and the need for written consent from the patient. This was particularly challenging where participants had low health literacy or where English was not their first language. Another challenge within the project was the time it took for pharmacists to enter research data for the quantitative analysis.

For further details:
Appendix 14: Preston R, Smith D, Drovandi A, Morris L, Page P, Swain L, Couzos S. Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) to improve Chronic Disease Management (IPAC) Project: Qualitative Evaluation Report to the PSA. Final report. February 2020

Health Systems Assessment

There was little change in health systems within participating sites from baseline to the end of the study that might otherwise explain improvements (such as from non-IPAC related service activity). Moreover, the health system changes that were observed were most likely explained by improvements generated by integrated pharmacist activity. For example, ACCHSs had more accessible on-site pharmacists at the end of the trial than at baseline, which is explained by integrated pharmacists working within sites. By the end of the trial, six services received community pharmacy support for educational sessions, but no services reported this activity at baseline. The local community pharmacy employed the integrated pharmacists in five of these six services which likely explains this increased activity. The remaining service reported increased collaborative activity with community pharmacy as a result of the project. Other perceptions of community pharmacy support to ACCHSs did not change during the study.

For further details:

Appendix 10: Couzos, S, Smith D, Buttner P, Biros E. Assessment of medication appropriateness using the Medication Appropriateness Index (MAI) in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community Controlled Health Services (IPAC project). Final Report to the PSA, February 2020.

Discussion

Analysis of participant data and integrated pharmacist activities collected through the IPAC project demonstrated that integrated pharmacists significantly improved a range of intermediate clinical outcomes for adult Aboriginal and Torres Strait Islander participants with chronic disease attending ACCHSs. Participants had significantly improved control of CVD risk factors, glycaemic control in participants with T2DM, and reduced absolute CVD risk. Moreover, the observed net improvements in biomedical outcomes are clinically meaningful at a population level. A nearly four-fold increase in HMRs indicates that pharmacists integrated within ACCHSs are well placed to deliver medication management reviews to participants who experience substantial barriers in accessing HMRs under current program rules, especially for participants who would otherwise forgo a medication review. Prescribing quality improved significantly for participants following assessments of medication appropriateness and underutilisation. Medication adherence and self-assessed health status improved significantly indicating that integrated pharmacists can help to overcome some of the many difficulties this population faces with taking medications.

Economic analysis has revealed that the total cost of implementing the IPAC intervention was $1,493 per participant in order to achieve all outcomes for participants including statistically significant improvements in biomedical measures mentioned above. The IPAC intervention represented good value for money. Included in this cost of implementing the IPAC intervention, participants, health service staff and internal and external stakeholders also received numerous other benefits from the pharmacists' provision of education and training, medicines information and advice, and contribution to chronic disease care through case conferences, care planning, and other team-based activity. Integrated pharmacists were well placed to minimize medication errors whilst facilitating transitions of care. Stakeholder liaison plans were developed and implemented, and integrated pharmacists were the key point of contact for communication and contact with community pharmacies and other stakeholders. Communication and collaboration were important functions for integrated pharmacists. As the project progressed and the pharmacists' capabilities were recognised, professional relationships grew and trust developed. Pharmacists became integrated and respected members of primary health care teams and the services more broadly.

Qualitative evaluation of the IPAC project facilitated feedback from participants, GPs, other health services staff, community pharmacists, and the integrated pharmacists themselves and provides context around the core roles and their the impact.[54] Health services staff identified that the pharmacists built and maintained relationships and integrated with the primary health care team and more broadly within ACCHSs. Education sessions and medicines information provided by the pharmacist was found valuable and knowledge levels of staff had increased as a result. ACCHS staff felt communication and services from external stakeholders had been enhanced by integrating a pharmacist into the ACCHS, such as relationships with community

pharmacists. Benefits for patients from interactions with the pharmacists resulted in them feeling better. Patients reported being more adherent to taking their medicines as a result of having a better understanding of their conditions, including what their medicines were for, how they worked, and why they needed to take them, which was explained to them by the integrated pharmacist. The significant improvement in participant self-assessed health status supports the overall improvements in health status reported by participants themselves in qualitative analysis.

The qualitative evaluation of the IPAC project demonstrated there was overwhelming support from the vast majority of participants including patients, health services staff, community pharmacists and the integrated pharmacists, for non-dispensing pharmacist services to be integrated within the PHC team of participating IPAC sites and in ACCHSs more broadly.

While the IPAC project did not monitor utilisation of health care and other services beyond its focus on primary medical services (including medications), the improvement in biomedical indices is expected to be associated with a reduction in the utilisation and corresponding costs of other government funded health services including emergency department presentations and hospital admissions. For example, preliminary analysis of the outcomes of the Western Sydney integrated care program targeting patients with chronic disease, including people with type 2 diabetes, chronic obstructive pulmonary disease and coronary artery disease or congestive cardiac failure found statistically significant reductions as follows: 34% in the number of hospital admissions, 37% in potentially preventable hospitalisations; 32% in emergency department presentations; and 25% in unplanned admission length of stay.[55] The IPAC model shares the main objective of integrated care programs, namely to improve overall care for patients and achieve a better coordinated journey. An umbrella review of systematic reviews of integrated care programs found that more than half of reviews found a statistically significant improvement in at least one outcome measure, with improvements of the following order of magnitude: reductions in emergency admissions, 15-50%; all-cause readmissions, 10-30%; condition-specific readmissions, 15-50%; reported length of stay of 1 to 7 days; and lower emergency department presentations, 30-40%.[56]

Pharmacists are increasingly becoming integrated into general practices internationally and in Australia.[57] [58] There is evidence that the delivery of multifaceted interventions and interprofessional collaboration through face-to-face communication is most effective.[59] [60] A recent study undertaken in Australia found the role of practice pharmacists (defined as those integrated within mainstream general practices), included undertaking HMRs and medication reconciliation, providing medicines information, patient counselling, monitoring medication adherence, and providing advice on complementary and alternative medicines. In addition, education for staff and patients was provided, as well as medication use evaluations (internal audits of prescribing patterns of specific medications), support for clinical audits and the transition of patients from

hospital back into the community, and for a small number of sites, the supply of medication in remote Aboriginal Health services.[61] The study found that medication reviews by the practice pharmacists were highly valued and led to better outcomes in relation to addressing inappropriate prescribing and patient adherence. The Indigenous Medication Review Service (IMeRSe) study currently being conducted in Australia also recognises the value of medication reviews and aims to evaluate the feasibility of a culturally appropriate medication management service delivered by community pharmacists in collaboration with Aboriginal health workers.[62]

Benson et al describes seven GP pharmacist role sub-categories including medication management, patient examination and screening, chronic disease management, drug information and education, collaboration and liaison, audit and quality assurance and research.[63] Other studies have also reported that pharmacists in general practices conduct a variety of clinical and non-clinical roles related to medicines, notably excluding dispensing.[64] [65] In comparison to the seven roles described by Benson et al,[66] in the IPAC project, medication adherence was identified as a distinct function or core role of the integrated pharmacist so that integrated pharmacists could assess adherence to medications and support all patients they were encountering whilst focusing on a comprehensive medication management review (like a HMR) for those that needed it most. The activity of transitional care was also identified to be a different function to stakeholder liaison which was defined in the IPAC project as pertaining to communication and partnerships with community pharmacy as well as other stakeholders.

The generalizability of the 10 core IPAC roles for integrated pharmacists in Australian settings is further corroborated by other and emerging studies. The Integrating Models of Pharmacists across Care Teams (IMPACT) Framework identifies six domains to guide PHC services in readiness for the integration of pharmacists.[67] The six domains identify enabling factors and include the characteristics, skills and experience of the pharmacist; relationships; scopes of practice; connectivity; localisation; and sustainability. The framework's domains have similarities with the protocol for the IPAC project.[68] Medication management reviews (i.e. HMRs and non-HMRs), medicines information and education; liaison with stakeholders; and drug audits are also common features of integrated pharmacist roles in other Australian studies undertaken predominantly in mainstream settings. [69,70,71] As observed in the IPAC project, the services provided by integrated pharmacists were also highly valued by health service staff, external stakeholders and also patients in these other Australian studies. The IPAC project provided evidence that the implementation of similar non-dispensing pharmacy services were well received and valuable for Aboriginal peoples and Torres Strait Islanders attending ACCHSs in urban, regional and remote settings.[72] This evidence supports the generalisability of implementation of the integrated pharmacist core roles more broadly, and future expansion of non-dispensing pharmacists working in Aboriginal primary health care settings. While the scope of practice of an integrated pharmacist working in these settings may have similarities to the general practice

pharmacist, the roles have unique features such as working in ways that are culturally acceptable and consistent with a holistic model of care.

An international pilot study of pharmacists working within general practices recommended that pharmacists be employed at least 2 days a week, with a preference for 3 days or more, to assist with successful integration[73]. A minimum FTE allocation was suggested acknowledging smaller practices may take a longer time to realise the benefits of a pharmacist within a general practice. Given that seven of the ACCHSs participating in the IPAC project had a pharmacist allocation of 0.4 FTE or less, a 15-month timeframe may not have allowed sufficient time to demonstrate the full benefit that can be achieved by having an integrated pharmacist as part of the team. This suggests that the statistically significant and clinically meaningful clinical endpoint and other quality outcomes improvements reported from the IPAC trial may underestimate these benefits to the target population. Ultimately, the acceptability and effectiveness of this model and the delivery of the key activities was supported empirically by extremely low patient attrition, low site attrition, positive findings in the qualitative evaluation, feedback provided to the PSA project coordinators[74], and feedback from the participating services through the PRG and from Affiliates.

The recommendation for the broader expansion of integrated pharmacists within ACCHSs arising from this evaluation has an existing policy context. In principle, the Pharmacy Guild of Australia (PGA) supports the non-dispensing role of pharmacists in general practice however have emphasized that communication with community pharmacy is critical to the role. In particular the relationship between community pharmacies and GPs, and that between patients, community pharmacies and GPs must be maintained and strengthened.[75] Evaluation findings from the IPAC trial support the PGA as findings clearly demonstrated the strengthened relationship between community pharmacies and ACCHSs arising from integrated pharmacist roles. Community pharmacists involved in the qualitative evaluation affirmed that relationships between ACCHSs and community pharmacies were further strengthened as a result of the IPAC project, referrals for HMRs had increased and there was improved participation by patients in HMRs. They felt that patients were more interested in their medicines and that patient knowledge of their medicines and adherence had improved since the integrated pharmacists had commenced in the ACCHSs. Integrated pharmacists worked together with community pharmacists to problem solve, access discharge summaries, confirm the patient's medication history, undertake medication reconciliation by correcting errors and medication lists, and facilitate provision of dose administration aids for health service patients. Community pharmacists concluded that the integrated pharmacist role was very helpful and useful to them and it facilitated communication between the community pharmacy and GPs. Integrated pharmacists were found to have interacted with community pharmacists on a daily basis with more occasions logged for such interactions than any other IPAC activity undertaken by integrated pharmacists.[76]

Several leading Australian leading bodies including the PGA, RACGP, AMA support pharmacists in general practices.[77] [78] [79] The PSA promotes pharmacists working in Aboriginal settings[80] [81] and in 2017 the Federal Health Minister committed to supporting a trial of integrated pharmacists into Aboriginal Health Services that led to the IPAC trial.[82] Whilst eligible Aboriginal and Torres Strait Islanders living with or at risk of chronic disease can access free or low cost medicines through the Section 100 Remote Area Aboriginal Health Services program and Closing the Gap PBS Co-payment measure,[83] support from an integrated pharmacist can complement such schemes and go further to address a multitude of barriers to the quality use of medicines experienced by Aboriginal and Torres Strait Islanders. The IPAC trial has demonstrated significant positive impacts of pharmacists being integrated into primary health care teams of ACCHSs on health services staff and internal and external stakeholders.

Ultimately, funding mechanisms may drive the employment structure of pharmacists and the integration model to provide services to ACCHS. Underpinning any program rules for the expansion of integrated pharmacists is the acknowledgement of the needs and preferences of individual ACCHSs and their representative bodies to guide the integration model. ACCHSs are founded on the principle of 'Aboriginal Health in Aboriginal Hands'.[84] Upholding the principle of self-determination is necessary to enable a culturally acceptable mode of delivering effective and sustainable primary health care services to Aboriginal peoples and Torres Strait Islanders. Having a pharmacist with the right *'organizational fit'* and personality was just as important as their skills and experience according to qualitative evaluation findings from the IPAC trial. ACCHS staff made the ultimate decision on pharmacist selection for their service and it was acknowledged that some participating services had a preference for a particular employment model, highlighting the necessity for this consideration in future programs.

Based on the experiences in the IPAC trial, this evaluation recommends that future programs should consider adapting the support activities, resources and tools developed from the IPAC trial, which contributed to its effective execution. The NACCHO in collaboration with its Affiliates demonstrated that they are well placed to support ACCHSs to introduce the integrated pharmacist role within their services. This is evidenced by low site and participant attrition and positive ACCHS feedback in qualitative evaluation. While service readiness for the role was a challenge for some ACCHSs as they'd had little or no experience with non-dispensing pharmacists prior to the project, this was ultimately not a barrier as NACCHO supported ACCHSs to understand the nature of the role and its potential value. Ongoing support was also provided by Affiliates who worked closely with ACCHSs within their jurisdictions. In addition to direct NACCHO facilitated ongoing communication through a peer support network and support from project staff. The PSA have developed processes for recruitment of pharmacists interested in working in ACCHSs and developed/sourced resources for training pharmacists to prepare for working in Aboriginal health settings and to upskill them in topics relevant to a non-dispensing clinical role and medication management for those with chronic diseases.

Furthermore the PSA developed a comprehensive and multimodal program of support for pharmacists integrated within ACCHSs, acknowledging that placing pharmacists into ACCHSs without adequate support may limit the uptake and effectiveness of this service. JCU have developed or sourced numerous tools to evaluate the IPAC project which can be used or adapted to monitor the implementation and progress of future programs. The electronic logbook was a research tool that effectively collected data for the project from participating pharmacists in one central database. The ongoing monitoring and assessment of a broader integrated pharmacist roll-out within ACCHSs may utilize this type of tool to ensure that the program is meeting its stated objectives, identify any issues affecting implementation, and address these in a timely manner. However, administration time for data entry or reporting, should be included in roles, if required.

A fundamental premise of the pragmatic, community-based and participatory IPAC trial was that the IPAC intervention would be generalisable to all ACCHSs. The IPAC trial has delivered significant benefits to the 18 participating ACCHSs and it is proposed that this model be extended to all ACCHSs across Australia. A model outlining anticipated costs for 140 ACCHSs across Australia based on the integrated model of care for pharmacists investigated in the IPAC Trial is presented in the MSAC Assessment Report – Section E. The program cost incorporates pharmacist training and salary, support for ACCHSs and pharmacists to ensure successful expansion of the intervention, and ongoing program monitoring and evaluation. The cost per annum for five years is estimated to be $13,846,142 for the first year reducing to approximately $13 million per year for the following years, is comparable with other federally funded Aboriginal and Torres Strait Islander medicines initiatives and will help to close the gap in Aboriginal and Torres Strait Islander underutilization of nation-wide Australian pharmaceutical measures, such as the PBS and other Community Pharmacy Agreement related programs. Furthermore, this is a timely and impactful intervention to improve medication use for this under-served population, considering the Health Minister's national prioritization of medicines safety.[85]

Any challenges related to implementation of the IPAC trial were not insurmountable, and considering the overwhelming support for the integrated pharmacist role, successful implementation of the trial in urban, regional and remote settings, the very low patient withdrawal rate and low site attrition observed, the trial demonstrates the feasibility of expansion in Aboriginal health service settings across Australia.

Highlights

Support for the integrated pharmacist role

The key highlight from the trial was the overwhelming support from nearly every participant involved in the qualitative evaluation of the trial for integrated pharmacist roles to continue, and for further expansion into other Aboriginal health services. The majority of participants in the qualitative evaluation strongly supported

the intervention and it's continuation, which was corroborated by feedback received by the NACCHO project coordinators (Appendix 22) and unsolicited comments received by PSA project coordinators (Appendix 18). Upon hearing the integrated pharmacist trial was concluding one patient stated: *"you get a program and it works and bugger me dead if they don't pull the plug on it."* (focus group, case study 2, Appendix 14)

Patients reported numerous benefits from their interactions with the integrated pharmacists. The majority of patients reported that the integrated pharmacist had been able to look at their medications and suggest alternative or different combinations of medications, or regimes that resulted in them *'feeling better'*. Integrated pharmacists took a holistic approach to patient care, listened to patients and better understood their lives. Some patients reported being more involved in decisions about their care with the support they received from the pharmacists. Pharmacists sometimes sat in on consultations with the patient and their GP. Patients felt they were empowered to better manage their health conditions through better understanding their condition, why they needed to take their medications and how these medications worked. Many patients indicated they were more adherent to their medications. In addition to feeling better, patients also reported other benefits as a result of medication changes such as losing weight, being motivated to do more exercise and engaging with other support groups in the community.

The integrated pharmacists and other health services staff concurred that patients' management of the health conditions (and adherence to medications) had improved, as had their biomedical test results, particularly the HbA1c level. This matched the findings of the analysis of patients' biomedical data where a range of intermediate clinical outcomes for adult Aboriginal and Torres Strait Islander participants with chronic disease had improved. Participants had significantly improved control of CVD risk factors, glycaemic control in participants with T2DM, and reduced absolute CVD risk. One patient explained how the integrated pharmacist had helped them improve their glycaemic control:

> *"Before I was on different medications that was just not working at all. And then she [IPAC pharmacist] recommended some medications and I've recently just started the insulin and it's already been life changing. I've gone from having continuous hypers to normal sugar levels for once in my life and everything is just starting to go back on track for me since she's been here, so it's been absolutely helpful.*

> *"She's basically explained everything to me. She will even show me diagrams and she will print out the information and highlight everything, circle what I need to know and any questions that I have she'll answer them spot on, and she explains it so damn well, that I am just like 'Oh wow, I did not know this before'. And the insulin that I was first put on I was actually allergic to and I did not know that because I was injecting myself and I would get, it was burning sensations, severe bruising and like my stomach*

would go purple and whatnot and she's like 'you're allergic to it'. I'm like 'oh am I?'. She's like 'yes, we need to start you on something else.' So she's helped me so much with changing the medications and adjusting their units to what it needs to be. And I've gone from having high sugar levels from like 30 to 29 every single day, down to ten to eight … It's brilliant." (patient, focus group, case study 3, Appendix 14)

Health services staff benefited from having access to an *'in-house medicines expert'*. Integrated pharmacists provided support and advice to health services staff informally such as through *'corridor conversations'* as well as formally through team based collaborations and medication management reviews. Both the integrated pharmacists and GPs reported that recommendations were commonly made by the integrated pharmacists following medication reviews that were perceived to be of high quality with reportedly high prescriber up-take of the recommendations. Provision of education sessions for health services staff, including GPs, nurses and Aboriginal Health Workers and Practitioners were perceived as valuable, as was pharmacists input into their clinical team meetings and case conferences. GPs reported having the integrated pharmacist as part of the PHC team saved them time as medication queries were answered quickly, and they could refer patients to the pharmacist for education about their clinical conditions where it was thought the pharmacists could better explain to the patient how their medications worked. Time was also saved for some GPs as they could make referrals for medication reviews to the integrated pharmacist.

One general practitioner commented:

"As a locum, I feel this service has improved safety for patients around medication management, compliance, and avoidance of medication errors. I feel quite supported in my clinical work with this team holistic approach. [integrated pharmacist] is an awesome resource with tricky pharmacological queries and medication interaction[s] particularly in an AMS service with so much chronic disease, where patients are on multiple medications, with much potential for interactions. In addition, [integrated pharmacist] has been able to spend time with the patients fully explaining their medication, and reasons for this, this improves compliance, and clients do seem more interested in the reasons they are taking medications. It saves the doctor so much time too. I really hope this service will continue in the future." (general practitioner, testimonial 10, Appendix 18)

The pharmacists also contributed to medicines safety and quality assurance activities by conducting drug utilisation reviews and assisting in reviewing ACCHS medication-related policies.

Community pharmacists reported the integrated IPAC pharmacist role was very helpful and useful to them and it facilitated communication between the community pharmacy and GPs. Participating community

pharmacists believed that there was a role for an IPAC-type (non-dispensing) pharmacists within ACCHSs.

Support from ACCHSs

ACCHSs supported the integrated pharmacists by allowing them to access their clinical information systems, which enabled the pharmacist to conduct clinical assessments of patients and medication reviews using comprehensive patient information about medications history, disease conditions, pathology results and other information regarding the patient's social history. Integrated pharmacists documented their recommendations and interactions with the patient into the CIS which enabled their integration into the primary health care team.

Most integrated pharmacists had a 'go-to person' or project champion within their ACCHS who assisted with their integration. Support from GPs and Aboriginal Health Workers were enablers to the integration of the IPAC pharmacist and the referral of patients. ACCHSs also supported the integrated pharmacists through provision of a uniform if available and space with a consulting room, as well as assisting the pharmacist to promote their services.

Financial in-kind contributions

ACCHSs and sub-contracted community pharmacies strongly supported the trial and some were prepared, where required, to contribute their own funds to support the work of the integrated pharmacist. Costs covered included travel to and from the IPAC site; local travel (air and land) within the IPAC site service area; accommodation; resources and equipment such as computers; other staff members' time (salary), to work with the pharmacist; and other expenses.

These financial in-kind contributions were tracked, collected through the health system assessment and incorporated into the economic analysis of the trial.

Working with community pharmacy

The health systems assessment of participating ACCHSs found that many already had strong relationships with their local community pharmacies at the commencement of the project, particularly through the Section 100 arrangements for remote-area Aboriginal Health Services and the Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander People (QUMAX) program. Relationships between ACCHSs and community pharmacies were further strengthened as a result of the IPAC project.

While there are documented concerns that general practice pharmacists may reduce the supply of dispensing pharmacists in regional and remote areas,[86] the experience within the IPAC Project suggests this is not necessarily the case. The project identified a cohort of pharmacists who were seeking alternate career

pathways and willing to relocate to regional and remote locations for these positions. Therefore rather than perceiving these roles as a drain on stretched staffing models, opportunities could be created for more pharmacists to be employed within discrete geographical locations, thereby increasing opportunities for professional support, collaboration and additional workforce capacity to staff community pharmacies 'after hours' on evenings and weekends. Some of the pharmacists who worked full time hours within the IPAC project elected to work additional hours within community pharmacies where they were located. In multiple locations, community pharmacies that did not have capacity to provide pharmacists to undertake the roles advised PSA project coordinators that they could offer hours of employment to supplement the integrated pharmacist's role. Where integrated pharmacists worked part-time in the IPAC project, the remaining time could be used to support community pharmacy.

Community pharmacists reported many benefits from working with the integrated pharmacist and commented that the role was very helpful and useful to them. All participating community pharmacists felt there was a role for an IPAC-type (non-dispensing) integrated pharmacist within ACCHSs.

Proportion of patient-level activities

A core requirement from the funding body was that integrated pharmacists spend 75% of their time directed towards patient-level activities (defined in the funding agreement as medication management reviews and assessments of adherence and appropriateness).[87] Patient-level activities in this project comprised 62.5% of activities recorded including medication reviews and assessments, but also included direct service delivery to patients through education and preventive health care, and team-based collaborations identified as being patient-related as defined in the Logic Model for Evaluation (Appendix 4). This approximates the expected division of pharmacist roles, especially given that significant underreporting of actual patient-related activity occurred as consequence of project requirements for data collection. For example, patient education and team-based collaboration activities (such as case conferences) although categorised for the purpose of the evaluation as practice-based activities, were critical to direct patient care as well as to the practice. Furthermore, transitional care occasions and a proportion of contacts with community pharmacy were also expected to have been related to the care of individual patients. However, the categorisation of this activity as purely practice-based also underestimated the proportion of time that pharmacists spent delivering patient-based care. In addition, time taken for patient-based activities may have been underestimated as the time able to be recorded in the logbook for these activities was limited to 180 minutes. In all, the activities undertaken by integrated pharmacists during the IPAC project closely approximated the division of core roles that were expected by the funding body.

It is important to note that whilst the project protocol defined 10 core roles for pharmacists which formed the foundation for the project and the evaluation, in line with community-based participatory research

principles, each participating ACCHS also had the flexibility to utilise the services of the pharmacist according to service and client priorities at the local level.

Involvement of Aboriginal people and Torres Strait Islanders

The project adopted a community-based participatory research (CBPR) design, to ensure clear benefits to project sites and ensure acceptability and sustainability of the intervention within ACCHSs and ultimately, transferability to other PHC services. The CBPR model is defined as: *"a partnership approach to research that equitably involves, for example, community members, organizational representatives, and researchers in all aspects of the research process and in which all partners contribute expertise and share decision making and ownership*".[88]

Aboriginal people and Torres Strait Islanders and their representative bodies were involved throughout the design, establishment, implementation and analysis stages of the IPAC Project. The project protocol was developed through input from project partners including the NACCHO who were a key partner in the project and provided Aboriginal governance, leadership, and coordinated communication with the NACCHO Board, Affiliates and ACCHSs.

The NACCHO project coordinators facilitated a Project Reference Group (PRG), which was the primary governance body representing participating Aboriginal and Torres Strait Islander organisations, leaders and patients. The PRG comprised representatives from NACCHO, the Affiliates, representatives from all participating ACCHSs, and the project coordinators. The PRG provided oversight and feedback to the project operation team. PRG teleconferences were held approximately three-monthly; forums were convened at the 2018 and 2019 NACCHO national conferences; electronic updates were circulated; and numerous instances of ad hoc communication occurred between NACCHO project coordinators and PRG members via phone or email.

The evaluation team led by JCU, comprised project partners, researchers, expert advisors, Aboriginal Academics and representatives from the NACCHO Affiliates - the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); the Queensland Aboriginal and Islander Health Council (QAIHC), and the Aboriginal Medical Services Alliance in the Northern Territory (AMSANT), and a representative from an ACCHS.

An example of a change grounded in community-based participatory research principles was the simplification of the four-page Patient Information Brief. Following the commencement of the integrated pharmacists, feedback was provided that ACCHS staff felt the 4-page brief was too long and needed to be simplified so that patients could better understand it. The JCU Team acted upon this feedback and simplified

the document, reducing its length to 2-pages. The edited document was approved by the HRECs. In addition, tools and questionnaires developed for collecting quantitative and qualitative data for the IPAC project were reviewed by members of the operational and evaluation teams. The interview and focus group proformas for patient participants and ACCHS staff as part of the qualitative evaluation were also distributed to PRG members to ensure they were appropriate for research with Aboriginal patients and staff. PRG members provided comments and endorsed these tools.

For the qualitative evaluation the JCU Team liaised with ACCHS site staff (after introduction from the NACCHO project coordinators) and the integrated pharmacists to plan and conduct the site visits. Staff advised on the timing of the visits, recruitment of participants and scheduling of activities to minimise disruption to the health service. Through the site visits, Aboriginal and Torres Strait Islander staff and participants have provided feedback on the project and interactions with the integrated pharmacist.

All reports were sent to members of the operational and evaluation teams for feedback. A plain language summary of the results from the trial will be available to participants, with the permission of the funding body.

Difficulties

ACCHS Challenges

In the initial project stages, ACCHS staff experienced some confusion regarding who would manage the integrated pharmacists, as they were not their employees. This issue was largely overcome by regular communication between ACCHS representatives and project coordinators from NACCHO and PSA. For a broader program roll-out pharmacist recruitment to integrated roles within ACCHSs will be influenced by the financing models. The employment of pharmacists by the PSA (which was the dominant model used in the IPAC trial) will not be applicable for future program expansion.

The qualitative evaluation found staff turnover was a challenge faced by ACCHSs, and consequently the integrated pharmacists. NACCHO project coordinators were dedicated to supporting the continuity of the project in services and assisted to inform new ACCHS staff about the project and the role. A PRG was established to facilitate communication with participating ACCHSs at key times in the project (at the request of members, rather than regularly) through information updates by email and meetings of project participants at conferences. Participation by ACCHS staff in PRG meetings was infrequent, although there were no specific criticisms of the meeting format or methods.

Pharmacist Service Delivery

Community Pharmacy Challenges

Some challenges were experienced by community pharmacy in delivering their subcontracted hours due to competing interests in ensuring community pharmacies remained adequately staffed including at times of ill health. In recognition of the need for pharmacists to build rapport and trust with ACCHS patients and to integrate effectively into the primary health care team, the subcontracts specified participation by individual pharmacists rather than a service that could be delivered by any pharmacist employed within the community pharmacy. This restricted the community pharmacy from covering times of pharmacist absence with another staff member. Some of the participating pharmacists were long term employees of community pharmacy, and as such backfilling these staff members with replacement staff required additional effort from the community pharmacy owner to maintain their core operation. Despite these challenges, community pharmacy participants were able to deliver 89% of their contracted hours, demonstrating their ongoing commitment to the project. Community pharmacies who have well developed and respectful relationships with ACCHSs are well placed to identify pharmacists to perform integrated roles.

Remoteness

To accommodate challenges involved in delivering part time roles in remote locations in the IPAC Project, blocks of activity were conducted in six ACCHSs. At one ACCHS, a pharmacist appointed to a 0.4 FTE position delivered a 2-week block of activity at regular intervals, rather than 2 days per week, while in another setting the pharmacist spent 2 week blocks at one of the clinics that involved charter flights for access. Based upon this experience, blocks of activity should be considered in future programs as an appropriate method of delivering integrated pharmacist services to ensure that smaller and more remote ACCHS are not excluded. Another challenge due to the location of a few ACCHSs was road conditions and difficulty travelling to clinic sites during the wet season.

Salary

Pharmacist salary for the IPAC project was budgeted at $50 per hour based on the study design and project budget. For some pharmacists this rate was an increase on what they had been receiving prior to IPAC, while for others the rate was lower than the pay rate in their role immediately prior to IPAC. Hourly rates for employment within community pharmacy vary significantly depending on the market forces in place for specific roles and geographic areas, while salary rates within public health systems can influence pay conditions within ACCHSs in the same jurisdictions. For example, comparative rates within the NT public hospital system NT at the time of the project were $45 - $59/hour with 6 weeks' annual leave provisions[89]. These comparative rates highlight that participating pharmacists were committed to supporting the project's aims and objectives and was primary motivation for participating in IPAC, rather than seeking high levels of

remuneration.

Patient population size and remoteness are factors that also need to be considered with pharmacist FTE allocation and salary. Studies have demonstrated that health costs increase with decreasing population size.[90] For this reason, the proposed methodology for future expansion of the IPAC model provides a baseline 0.2FTE for all ACCHSs, regardless of their size, before allowing for the estimated patient population. The Workforce Incentive Program (WIP) Practice Scheme incorporates rural loadings of between 20-50% to incentive payments to practices located in MMM 3-7, with the greater loading skewed to more remote locations.[91] In the IPAC Project, integrated pharmacists were supported in some remote ACCHSs with additional funding sourced from the project budget, ACCHSs in-kind support, and community pharmacy contributions towards travel, housing and allowances.

Scope of Practice

Pharmacists' ability to work to their full scope of practice within an ACCHS can be limited by legislative barriers at a State or Territory level. An example of these legislative barriers identified through the IPAC project included pharmacists in the Northern Territory being able to provide an immunisation service when working within the community pharmacy, however they were unable to immunise when working as a pharmacist (employed by the community pharmacy) within the ACCHS. Ongoing efforts need to be undertaken by peak bodies such as PSA, to identify and advocate for changes to legislation to enable pharmacists to work to their full scope of practice within an ACCHS.

Role Implementation Challenges

Practical challenges to integrating a pharmacist within the PHC team were identified through the qualitative evaluation. Prior to the IPAC project there were few pharmacists working in general practices or ACCHSs nationally, and there was very little understanding of the role of an integrated pharmacist in the primary health care practice setting. At commencement, an initial lack of understanding of the integrated pharmacist role led to some pharmacists being underutilised, with referrals to the pharmacists from other ACCHS health professionals being low.

A few ACCHSs in the project had worked closely with pharmacists providing HMRs for their patients, and staff at these services had a slightly better understanding of the value a pharmacist could add to patient care. However, service readiness for the project was a challenge for some services. All ACCHSs received support and a site visit by NACCHO project coordinators as part of the recruitment process. Some services were well prepared for the pharmacist and understood the nature of the role and its potential value. However, staff in other services needed time to fully understand the role and learn how to utilise the pharmacists' expertise. More discussion and education with ACCHS staff may have assisted with preparation of services before the

pharmacist commenced. It is expected that over time, with increased awareness of what the role can achieve, the need for this education and support will diminish.

Some services needed to develop policies and procedures in order to guide ACCHS medicine-related activity so that the integrated pharmacist could assist with these activities and establish their role within the service. This was burdensome for some ACCHSs. In addition, the need for pharmacist induction into the service, the reality of staff turnover, and other service priorities were challenges.

At the time of their qualitative interview (after approximately six months of practice in their service) the majority of the integrated pharmacists felt accepted and well-integrated within the PHC team. The provision of education to staff on how an integrated pharmacist could contribute to the PHC team and their ability to improve health outcomes for participants' facilitated better understanding of their role, developed relationships, and helped the pharmacist to integrate into the team. Over time, these factors contributed to more patients being referred to the pharmacist.

Many of the pharmacists and health services staff reported that the irregular attendance of participants at ACCHSs presented challenges. When participants did present, this often resulted in them being seen by many health professionals within the one visit in order to deliver opportunistic care. Participants with chronic disease, especially those with kidney disease also had many appointments with clinical staff and were often overwhelmed, meaning they may not have wanted to spend additional time for a pharmacist consultation. Other issues that presented challenges for the pharmacists to organise follow-up appointments with participants included transience, difficulty contacting patients, language barriers and 'sorry business'. Several integrated pharmacists commented that participants often visited their homelands or family, meaning they were not readily available for follow up.

Research-related challenges

The NACCHO reported that a few ACCHSs expressed concern about data extraction processes. Other research-related challenges included the complexity of the participant consent process and the need for written consent from the patient which was an issue where patients had low health literacy or where English was not their first language. Some pharmacists reported entering research data for the quantitative analysis was quite time-consuming.

Generally, ACCHSs were accepting that research projects have inherent additional requirements beyond a health care program or intervention, and ACCHSs and the integrated pharmacists were accommodating of these challenges. In an expansion of the integrated pharmacist role more broadly research challenges would be eliminated, with reporting limited to the monitoring requirements of the funding body.

The majority of participants in the qualitative evaluation strongly supported the intervention and its continuation, which was corroborated by feedback received by the NACCHO and PSA project coordinators. Upon hearing the integrated pharmacist trial was concluding one patient stated: *"you get a program and it works and bugger me dead if they don't pull the plug on it."* (focus group, case study 2, Appendix 14). Research projects such as the IPAC trial which are considered by participating ACCHSs and patients to be acceptable, culturally safe and effective, but which are completed without ongoing funding to maintain the new service throughout analysis and evaluation phase, contribute to the existing research fatigue reported by Aboriginal people and Torres Strait Islanders.[92] Future trials involving Aboriginal people and Torres Strait Islanders should consider inclusion of a contingency for continuance of successful services and programs.

Conclusion and Recommendations

The IPAC trial provided evidence that integrated pharmacists in ACCHSs significantly improved quality of care outcomes for adult Aboriginal and Torres Strait Islander patients with chronic disease through the provision of superior quality of care when compared to pre-intervention. The trial demonstrated that appropriate funding for integrated pharmacist services within ACCHSs leads to superior health service utilisation (towards equity) compared to utilisation pre-intervention. This report has summarized the outcomes of the IPAC trial and clearly demonstrates that both clinical claims were achieved.

Analysis of participant data and integrated pharmacist activities collected through the IPAC trial demonstrated that integrated pharmacists significantly improved a range of intermediate clinical outcomes for adult Aboriginal and Torres Strait Islander participants with chronic disease. Significant improvements in the control of CVD risk factors, glycaemic control in participants with T2DM, and reduced absolute CVD risk were observed in participants attending ACCHSs. Medication adherence and self-assessed health status improved significantly indicating that integrated pharmacists can help to overcome the barriers Aboriginal patients face with taking medications.

Prescribing quality improved significantly for participants following assessments of medication appropriateness and underutilisation, in particular for participants taking medications for hypertension, diabetes and/or dyslipidaemia. At the end of the study there was a significant reduction in the number of participants with potential prescription-based medication underutilisation, and a significant relative reduction in the mean number of PPOs per participant. Potential omissions prevented were for pneumococcal vaccination, BP and/or lipid lowering medication in those clinically at high primary CVD risk, ACEI or ARB for participants with T2DM and albuminuria, and metformin for those with T2DM.

A nearly four-fold increase in HMRs and significant uptake of the non-HMR model by both accredited and non-accredited pharmacists indicates that pharmacists integrated within ACCHSs are well placed to deliver medication management reviews to participants who experience substantial barriers in accessing HMRs under current program rules, especially for participants who would otherwise forgo a medication review if not conducted opportunistically.

The IPAC trial has demonstrated improved quality of care outcomes for patients and more equitable health service utilisation through the successful implementation of integrated pharmacists in 18 ACCHSs located in urban, regional and remote settings across three jurisdictions within Australia. Data collected through the health systems assessment found there were few other changes within health services during the implementation phase, which supports attribution of trial results to the integrated pharmacist intervention.

The outcomes from the intervention are generalisable to the broader adult Aboriginal and Torres Strait Islander patient population with chronic disease who are at risk of developing medication related problems and attending ACCHSs in urban, rural and remote geographical locations. The evidence for generalisability was demonstrated for all outcome measure investigated in the project (see Appendices 9-14, and the MSAC Assessment Report - Section C). The IPAC participants were usual patients accessing ACCHSs, and the intervention was tested within usual clinical settings involving the ACCHS sector. IPAC participants were identified using methods identical to those that would be used under usual conditions within the proposed health services, which is consistent with the pragmatic study design.[93] The delivery of the intervention was also flexible, and follow-up reflected the usual mechanisms in healthcare settings which are also hallmarks of pragmatic study design.

Given the relative novelty of the integrated pharmacist role in Aboriginal health settings in Australia, future roll-out or expansion of programs should be supported with strategies similar to those used in the IPAC trial. Sector-specific training is important for integrated pharmacists to understand the nature of holistic care delivered by ACCHSs and how the pharmacist can best integrate into the primary health care team to improve chronic disease management and optimise quality of care outcomes for Aboriginal Australians and Torres Strait Islanders. As evidenced in the IPAC Project, training must be comprehensive and include integrated pharmacist core roles as well as an understanding of contributors to the disparity in health outcomes experienced by Aboriginal Australians and Torres Strait Islanders, including social determinants of health.

Ongoing support for integrated pharmacists is essential and should involve multi-modal strategies to take into account accessibility, ease of utilisation and responsiveness of available platforms. Provision of adequate training and support, along with the creation of a community of practice for pharmacists working with Aboriginal people and Torres Strait Islanders will enable sharing of sector knowledge and expertise with the aim of increased uptake, up-skilling and retention of pharmacists working in the ACCHS sector.

NACCHO and their Affiliates are well placed to support ACCHSs to promote readiness for the integrated pharmacist role, to ensure staff fully understand the value of the role and learn how to utilise the pharmacists' expertise to best suit the needs of the service and their patients. Based on experiences in the IPAC trial, substantive and considered program support is needed for ACCHS staff to undertake a change management process to introduce the role, develop work plans, and adapt workflow to incorporate the new integrated pharmacist services. There is a risk that integrating pharmacists into ACCHSs without adequate support may limit uptake and effectiveness of an integrated pharmacist program.

Principles of self-determination must enable ACCHSs to lead, or be actively involved, in the design of the

integrated pharmacist model of care for their service, to ensure a culturally acceptable mode of delivering effective and sustainable services to Aboriginal peoples and Torres Strait Islanders is achieved. ACCHSs must also make the ultimate decision on pharmacist selection for their service and consider preferences for employment models.

Ongoing monitoring and assessment is essential for any future expansion of an integrated pharmacist program more broadly to ensure that the program is meeting its stated objectives, identify any issues affecting implementation, and address these in a timely manner. As JCU led the evaluation of the IPAC trial, it would be well placed to collaborate with the Australian Department of Health, NACCHO, the PSA and other stakeholders to design and implement an evaluation framework for broader program rollout. The pharmacist logbook used in the trial could be adapted and tailored to report on key pharmacist activity measures (such as medication reviews, follow-up assessments, contact with community pharmacy, etc), as agreed to by the business rules for the program.

The IPAC Project has delivered significant benefits to patients, health services staff, community pharmacists and other stakeholders across the 18 ACCHSs participating in the IPAC trial. The economic cost of implementing the program across 140 ACCHSs is comparable with other federally funded Aboriginal and Torres Strait Islander medicines initiatives and may help to close the gap in Aboriginal and Torres Strait Islander underutilization of nation-wide Australian pharmaceutical measures, such as the PBS and other Community Pharmacy Agreement related programs. It is therefore proposed that this model be extended to all ACCHSs across Australia.

Table 7 summarises recommendations for future policy and implementation of integrated pharmacists in ACCHSs.

Table 7. Recommendations for future policy and implementation of integrated pharmacists in ACCHSs.

Suggested actions for sector development	**Owner and key partners**	**Potential pathways to implementation**	**Intended industry impacts** Implementing the recommendation will lead to:
1. **Support policy to integrate the role of an integrated pharmacist within ACCHSs across Australia.**	**Federal Government**	1.1 Funding to enable ACCHSs to implement the integrated pharmacist role within their service is recommended. 1.2 The program must be patient-focused to synergise with other pharmacy activities and medicines programs such as relevant community pharmacy programs, Home Medicines Reviews, QUMAX and s100 Support Allowance. 1.3 The specific challenges related to remoteness must be considered in a national program, e.g. remote ACCHSs require a higher level of funding for	• Enhanced quality of care outcomes for Aboriginal Australians and Torres Strait Islanders with chronic disease • Continuity of care provided by pharmacists integrated into the team • Improved prescribing quality • Improved cost effectiveness • Improved medication adherence • Increased Home Medicines Reviews

Suggested actions for sector development	Owner and key partners	Potential pathways to implementation	Intended industry impacts Implementing the recommendation will lead to:
		additional implementation costs such as salary loading, travel and accommodation. 1.4 Legislative barriers (i.e. immunization) that inhibit an integrated pharmacist from practicing to their full scope of practice within an ACCHS should be identified and overcome.	• Improved self-assessed health status
2. Advocacy and support to ACCHSs to facilitate processes for integrating pharmacists	**NACCHO and Affiliates**	2.1 NACCHO and Affiliates should be supported to assist ACCHSs and staff to be informed of the value of having a pharmacist as part of their primary health care team, support change management processes to introduce and embed the pharmacist within the service, develop referral processes, and adapt workflow to incorporate the new service. 2.2 NACCHO and Affiliates should be supported to develop processes and resources for ACCHSs considering the ten core roles of the IPAC project and the six domains of the Integrating Models of Pharmacists across Care Teams (IMPACT) Framework[55] to assist ACCHSs prepare for the integrated pharmacist role.	• Improved staff awareness of value and benefits of the role to facilitate the integration of the pharmacist into the primary health care team • ACCHSs are prepared for the integrated pharmacist role
3. ACCHSs lead co-design of the integrated pharmacist role to ensure it meets the needs of the their patients	**ACCHSs,** NACCHO and PSA, PGA	3.1 Policy guiding the implementation of the integrated pharmacist role should allow ACCHSs the flexibility to use the role to best meet the needs of the health service. 3.2 ACCHSs should be actively involved in the co-design of the integrated pharmacist role to ensure it suits their needs and seek support from NACCHO and their Affiliate where necessary. 3.3 Integrated pharmacist recruitment should be flexible and be led by ACCHSs so that pharmacists have the 'right organisational fit'. 3.4 ACCHSs should be supported to provide pharmacists with induction to the service and the local community including introduction to staff members in key roles and cultural orientation to the local population. 3.5 ACCHSs should be supported to develop the capacity of Aboriginal Health Workers, Practitioners and Outreach Workers to facilitate referral for patients needing support from the integrated pharmacist.	• Integrated pharmacist services are tailored to meet the needs of the local ACCHS and their patients
4. Training and support to prepare pharmacists for a	**PSA,** NACCHO, and ACCHS, pharmacist training	4.1 Pharmacists should be supported to develop career pathways for integrated pharmacist roles.	• Pharmacists are prepared and effectively deliver patient-centred care to Aboriginal

Suggested actions for sector development	Owner and key partners	Potential pathways to implementation	Intended industry impacts Implementing the recommendation will lead to:
non-dispensing, integrated role within ACCHSs	providers, PGA	4.2 Strategies are required to assist with the recruitment of integrated pharmacists that includes the maintenance of a register of pharmacists interested in working within the ACCHS sector and generic templates for position descriptions including the ten core roles from the IPAC trial. 4.3 Prepare pharmacists for integrative roles within ACCHSs through the development of a tailored induction training program. 4.4 Facilitate opportunities for pharmacists to undertake cultural safety training responsive to their place of practice prior to commencing activity within ACCHSs. 4.5 Facilitate relevant continuing professional development for pharmacists working in the ACCHS sector. 4.6 Facilitate a program of ongoing support and a community of practice network to enable knowledge sharing and peer support amongst integrated pharmacists. Mentors can assist with clinical and/or cultural aspects of integrated practice and development of career pathways.	peoples and Torres Strait Islanders • Pharmacists receive ongoing support from mentors, professional development and peer support through a community of practice network
5. Funding for evaluation of integrated pharmacist programs to enhance roll-out across Australia	**Federal Government,** Academic Institutions, NACCHO, and affiliates, ACCHSs, PGA	5.1 Funding of a program is needed to monitor the implementation of integrated pharmacist programs to facilitate the continuous quality improvement of prescribing quality and the quality use of medicines within ACCHSs. 5.2 Quality improvement programs involving integrated pharmacists need to allow a lead-in time to enable integrated pharmacists to develop relationships with staff and patients and develop a deeper understanding of the local community and health service culture. 5.3 Some tools and resources created from the IPAC project such as the PSA templates used to guide stakeholder liaison plan development and promotional materials commissioned by NACCHO may be adapted for use by program developers to support future roll-out.	• Monitoring of the quality of the integrated pharmacist role within ACCHSs • Improved evidence base around the integrated pharmacist role in Aboriginal health settings

ACCHS – Aboriginal Community Controlled Health Services
NACCHO – National Aboriginal Community Controlled Health Organisation
PGA – Pharmacy Guild of Australia
PSA – Pharmaceutical Society of Australia
QUMAX - Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander People (QUMAX) program

Media, Conference or Promotional Material

- IPAC Poster for use within ACCHS
- IPAC Brochure for use within ACCHS
- IPAC Promotional Video's for use within ACCHS (Feb 2019)
- Conference Presentation – PSA July 18 Conference
- Conference Presentation - Are You Remotely Interested (July 18)
- Conference Presentation – Community Pharmacy Stakeholder Forum (Sept 2018)
- Conference Presentation – NACCHO Annual Conference (Nov 18)
- Conference Presentation – Hot North Workshop (13 June 2019)
- Conference Presentation – PSA 19 Conference (26 July 2019)
- Conference Presentation – NACCHO Annual Conference (Nov 19) (video link provided at the time)
- Conference Presentation – PSA/SHPA Collaborative Research Showcase (15 Feb 2020)
- *Media Release* – Enlisting pharmacists to Close the Gap (5 Sept 2018)
- *Media Release* – Pharmacists can help to Close the Gap (9 Feb 2018)
- Annual Report – PSA 17/18
- Annual Report – PSA 18/19
- Annual Report – NACCHO 17/18
- Annual Report – NACCHO 18/19
- ABC Interview – RN Interview Medicines Week 22/8/2019 – Angela Madden Danila Dilba
  Available at: https://www.abc.net.au/radionational/programs/lifematters/tackling-aboriginal-chronic-disease-through-grass-roots-pharmacy/11435412
- Australian Pharmacist article – June 2019.
  Available at: https://www.australianpharmacist.com.au/rural-health-pharmacist/

The presentations given during the trial period were small in number in keeping with the contractual obligations of the project.

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Couzos S, Smith D, Stephens M, Preston R, Hendrie D, Loller H, Tremlett M, Nugent A, Vaughan F, Crowther S, Boyle D, Buettner P, Biros E. Integrating pharmacists into Aboriginal community controlled health services (IPAC Project): Protocol for an interventional, non-randomised study to improve chronic disease outcomes. Research into Social and Administrative Pharmacy, 2020. In Press. https://doi.org/10.1016/j.sapharm.2019.12.022

Appendices

Appendix 1 **Published IPAC Protocol**

Appendix 2 **Full IPAC Protocol**

Appendix 3 **IPAC Trial Theory of Change**

Appendix 4 **IPAC Trial Logic Model**

Appendix 5 **Clinical Algorithm 1 - Proposed Service**

Appendix 6 **Clinical Algorithm 2 - Usual Care Service**

Appendix 7 **Literature Review- Cost Effectiveness Analysis**

Appendix 8 **Umbrella Review- Integrated Pharmacists (Primary Health Care)**

Appendix 9 **Assessment of clinical endpoints report**

Appendix 10 **Assessment of Medication Appropriateness Index Report**

Appendix 11 **Assessment of Medication Underutilisation Report**

Appendix 12 **Assessment of Home Medicines Review and Non-Home Medicines Reviews**

Appendix 13 **Assessment of Medication Adherence and Self-Reported Health Status Report**

Appendix 14a **Qualitative Evaluation Report**

Appendix 14b **Qualitative Evaluation Report Appendices**

Appendix 15 **Net Cost to the PBS of Medication Changes from the IPAC Trial**

Appendix 16 **Support for practice-based activities report**

Appendix 17 **Methodology for a model for extending a program**

Appendix 18 **Feedback received by PSA coordinators (PSA)**

Appendix 19 **Pharmacist recruitment report (PSA)**

Appendix 20a **Pharmacist induction training (PSA)**

Appendix 20b **Pharmacist induction training (PSA) Appendices**

Appendix 21 **Support for pharmacists report (PSA)**

Appendix 22 **ACCHS Support (NACCHO)**

Appendix 23 **List of People Involved in the Assessment Report**

Appendix 24 **Information Briefs and Consent Forms**

Appendix 25 **Economic Analysis (Stand-alone) Report**

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IPAC Project

Integrating Pharmacists within Aboriginal Community Controlled Health Services to Improve Chronic Disease Management

Final Report to the Australian Government, Department of Health.

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MSAC application no. XXXX

Assessment Report

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The technical information in this document is used by the Medical Services Advisory Committee (MSAC) to inform its deliberations. MSAC is an independent committee which has been established to provide advice to the Minister for Health on the strength of evidence available on new and existing medical technologies and procedures in terms of their safety, effectiveness and cost effectiveness. This advice will help to inform government decisions about which medical services should attract funding under Medicare.

MSAC's advice does not necessarily reflect the views of all individuals who participated in the MSAC evaluation.

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ACRONYMS AND ABBREVIATIONS

ACCHS	Aboriginal community-controlled health service
ACR	Albumin-creatinine ratio
AHW/Ps	Aboriginal Health Workers/Practitioners
AIHW	Australian Institute of Health and Welfare
CI	confidence interval
CVD	cardiovascular disease
FFS	fee-for-service
HDL-C	high density lipoprotein cholesterol
HMR	Home Medicines Review
ICER	incremental cost-effectiveness ratio
JCU	James Cook University
LDL-C	low density lipoprotein cholesterol
MBS	Medicare Benefits Schedule
MSAC	Medical Services Advisory Committee
NACCHO	National Aboriginal Community Controlled Health Organisation
NHMRC	National Health and Medical Research Council
NMARS	NACCHO Medication Adherence Response Survey
PASC	PICO Confirmation Advisory Sub-Committee of the MSAC
PHC	Primary health care
PICO	Population, Intervention, Comparator, Outcomes
PSA	Pharmaceutical Society of Australia
QALY	Quality adjusted life year
SIQ	Single-item question
TC	Total cholesterol
TG	Triglycerides
T2DM	Type 2 diabetes mellitus

EXECUTIVE SUMMARY

Main issues for MSAC consideration

- *Aboriginal and Torres Strait Islander people with chronic diseases are particularly prone to medication-related problems and associated health complications. The Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) to improve Chronic Disease Management (IPAC) trial demonstrated that integrating a registered pharmacist as part of the primary health care (PHC) team within ACCHSs led to significant improvements in health outcomes, access to medication-related services, and the quality of the care received by Aboriginal and Torres Strait Islander adults with chronic diseases.*
- *The IPAC trial found relatively low costs to be associated with increases in the utilisation of medications and primary health care services. The observed improvement in biomedical indices is expected to be associated with a reduction in the utilisation and corresponding costs of other government funded health services including emergency department presentations and hospital admissions.*
- *This proposal recommends funding for the Australia-wide integration of registered pharmacists within ACCHS settings (the proposed service) given that these settings facilitate unique, accessible, culturally safe and holistic care provision to people who are Aboriginal and/or Torres Strait Islander. For Aboriginal and Torres Strait Islander people (proposed population), implementation of such a program would lead to significant benefits from improvements in biomedical and pharmacological indices such as better glycaemic control of those with diabetes, improvements in the control of cardiovascular disease risk factors, slowing of decline in kidney function, marked improvements in prescribing quality with the reduction in inappropriate prescribing and medication underutilisation, markedly improved access to medication management reviews (such as Home Medicines Review and other types of review), and improvements in patient adherence to medications, as well as their self-assessed health status.*
- *The IPAC Trial was the largest clinical, non-randomised, interventional study conducted to date to investigate the impact of integrated pharmacists with regard to Aboriginal and Torres Strait Islander adults with chronic diseases. The Trial was supported by the Pharmaceutical Society of Australia (PSA), the National Aboriginal Community Controlled Health Organisation (NACCHO), in conjunction with James Cook University (JCU) undertaking the evaluation.*
- *The proposed service would reduce the disparity in access to the PBS, whilst enhancing the Quality Use of Medicines for Aboriginal people and Torres Strait Islanders within ACCHSs and lead to superior health service utilisation (towards equity).*

Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) to improve Chronic Disease Management (IPAC) Trial

This submission-based assessment outlines the findings of the evaluation of the IPAC Trial. The project was a non-randomised, prospective, pre and post quasi-experimental community-based, participatory, and pragmatic trial that integrated a registered pharmacist within Aboriginal Community Controlled Health Services (ACCHSs) in Queensland, the Northern Territory and Victoria for a period of up to 15 months. This assessment provides evidence to support public funding for the integration of non-dispensing pharmacists within Aboriginal Community Controlled Health Services (ACCHSs).

The IPAC project explored if integrating a registered pharmacist as part of the primary health care (PHC) team within ACCHSs (the intervention) led to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples with chronic diseases, when compared with prior (usual) care. Integration within ACCHSs meant that pharmacists had identified positions and core roles, shared access to clinical information systems, provided continuous clinical care to patients, received administrative and other supports from primary health care staff, and adhered to the governance, cultural, and clinical protocols within ACCHSs as part of their shared vision.

Pharmacists acted within 10 core roles that included patient-related activities and staff and service-level activities. Through these 10 roles, pharmacists supported study participants by conducting medication management reviews (to resolve identified medication-related problems and optimise prescribing quality), assessed adherence and medication appropriateness, provided medicines information and education and training, collaborated with health care teams, delivered preventive care, liaised with stakeholders such as community pharmacy, provided transitional care, and undertook a drug utilisation review to support quality improvement within the ACCHS. Medication management reviews comprised either a Home Medicines Review (HMR) or a non-HMR which was defined as a comprehensive medication management review comprising some or all of the elements of a HMR, but not fulfilling all relevant HMR criteria stipulated by the Medicare Benefits Schedule (MBS). Pharmacists did not dispense medication.

Based on the evidence presented in this submission, the proposed population for integrated pharmacist support are Aboriginal and Torres Strait Islander patients attending ACCHSs, who have a clinical need for pharmacist support (irrespective of age) either because of chronic disease and/or being at high risk of developing medication related problems. This proposal also recommends that the proposed service should not preclude other Aboriginal and Torres Strait Islander patients of ACCHSs in need of medication management support from having access to the proposed integrated pharmacist services, given the holistic nature of primary health care service delivery.

This proposal recommends funding the integration of registered pharmacists within ACCHS settings Australia-wide as this will lead to significant improvements in the quality of care received by the proposed population. In particular, the proposed population will significantly benefit from improvements in biomedical indices that are known cardiovascular disease risk factors, significant improvements in the glycaemic control of those with diabetes, significant slowing of decline in kidney function, significant improvements in prescribing quality with the reduction in inappropriate prescribing and medication underutilisation, significantly improved access to medication management reviews (such as Home Medicines Review and other types of review), and significant improvement in adherence to medications and self-assessed health status. Economic analysis has reported the cost-effectiveness of the intervention. The intervention was also considered acceptable and implementable by participants, ACCHSs and stakeholders. These benefits have been summarised in this report with full technical analyses included as appendices. The protocol for the IPAC Trial was published (Appendix 1), and the full protocol is included (Appendix 2).

ALIGNMENT WITH AGREED PICO CONFIRMATION

This submission-based assessment of the integration of pharmacists within ACCHSs addresses all of the PICO[1] elements that were pre-specified. The reference standard was the test as set out in the approved Trial Protocol and the case for the economic evaluation is based on a trial-based evaluation.

A minor change from the original PICO proposed at the time of the PTP Trial funding application was accepted by the Department of Health and incorporated in the funding contract and project protocol.

[1] Population, Intervention, Comparator, Outcomes

The change altered the target population from patients 'of any age' to adults ≥ 18 years. This change was made prior to PTP Trial funding and was agreed at the time contracts were finalised (see section A).

PROPOSED MEDICAL SERVICE

The proposed service is the integration of a non-dispensing pharmacist as part of the primary health care team of ACCHSs to provide care to Aboriginal and/or Torres Strait Islander patients (considered 'regular' clients) with chronic disease, irrespective of age. The services to be delivered by the integrated pharmacist include both patient-related and practice-related activities through the following core roles: providing medication management reviews, assessing and supporting medication adherence, providing medicines information and education and training, collaborating with health care teams, delivering preventive care, liaising with stakeholders such as community pharmacy including developing stakeholder liaison plans, providing transitional care, and undertaking quality improvement activity such as a drug utilisation review.

The integration of a non-dispensing pharmacist within ACCHSs means the following (based on the key features of pharmacists working to deliver IPAC services):

- Pharmacists supported as team members within ACCHSs with identified positions;
- with shared access to clinical information systems;
- providing rational and continuous clinical care to patients;
- receiving administrative and other supports from primary health care staff within ACCHSs, and
- adhering to governance, cultural, and clinical protocols within ACCHSs as part of their shared vision.

These features are consistent with the dimensions of 'integration' reported by other studies investigating the integration of pharmacists within primary health care settings.[2] The integration processes listed above are described as the 'IPAC integration model' in this submission.

The integration of non-dispensing registered pharmacists within ACCHSs is not currently funded nor reimbursed within private or public settings in Australia for the proposed patient population to deliver the proposed core roles. Some public funding can be sourced by ACCHSs through the Workforce

[2] Hazen ACM, de Bont AA, Boelman L, et al. The degree of integration of non-dispensing pharmacists in primary care practice and the impact on health outcomes: A systematic review. Res Social Adm Pharm. 2018; 14(3):228-240. doi: 10.1016/j.sapharm.2017.04.014. Epub 2017 Apr 22.

Incentive Program (WIP, Practice Stream), but this funding is mostly utilised by ACCHSs Australia-wide for nursing or Aboriginal health worker/practitioner or other allied health supports (see below and also Section A7).

PROPOSAL FOR PUBLIC FUNDING

This proposal is for baseline plus pro-rata public funding (depending on the health service client load and episodes of care) of a non-dispensing pharmacist within ACCHSs to provide the services outlined in this proposal within an integrated model of care.

While a mixed model encompassing baseline funding plus a fee-for-service (FFS) methodology may be considered for future program rollout, block funding is likely to be more appropriate to enable integrated pharmacists to most effectively meet the unique needs of Aboriginal and Torres Strait Islander peoples. A block funding approach aligns with other Commonwealth funding approaches for ACCHSs (such as the Indigenous Australians' Health Programme); accommodates patient non-attendance at scheduled clinic appointments that occurred in some ACCHSs during the IPAC Trial; and allows for the significant variation in preference for pharmacist services (including clinical governance, education and training, and patient-directed care) observed across ACCHSs in the IPAC Trial. On this basis an MBS item descriptor is not being suggested as it would encourage a FFS funding arrangement for pharmacists' services which is inconsistent with the integration model being proposed. An MBS item descriptor may not deliver the necessary integration of pharmacists required for them to provide services consistent with the proposed core roles within ACCHSs.

Currently, pharmacists are not supported to deliver integrated and non-dispensing services within these primary health care service settings through existing Australian Government of State and territory programs, except notionally through the WIP. The WIP is intended for rural and remote Australia and provides financial incentives to support general practices to engage the services of nurses and other allied health staff. Many ACCHSs are currently already accessing the WIP to employ practice nurses and/or Aboriginal health practitioners/workers. This means there are no remaining WIP program funds to support the proposed medical service. The quantum of funding from the WIP is insufficient to also support the integration of a non-dispensing pharmacist within ACCHSs, especially for services with a large chronic disease subpopulation. Furthermore, non-dispensing pharmacists remain unable to claim MBS item fees for chronic disease management (CDM) services provided in a primary care setting, and therefore cannot supplement the maximum incentive payment available under the WIP.

POPULATION

The IPAC trial delivered integrated pharmacist services to adult Aboriginal and Torres Strait Islander patients attending ACCHSs as regular clients. The conditions for the receipt of pharmacist services were for patients with chronic disease who had visited a participating ACCHS site at least three times

in the past two years (known as 'active' or 'regular' patients). Patients were aged 18 years and over and had a diagnosis of:

- Cardiovascular (CV) disease (coronary heart disease, stroke, hypertension, dyslipidaemia and any other CV disease),
- Type 2 diabetes mellitus,
- Chronic kidney disease, or
- Other chronic conditions and at high risk of developing medication-related problems (e.g. polypharmacy).

The proposed patient population for the broader translation of the integrated pharmacist intervention are Aboriginal and Torres Strait Islander patients (irrespective of age) who have a clinical need for pharmacist support because of chronic disease and/or being at high risk of developing medication related problems. The recommendation to extend the proposed service to patients irrespective of age is outlined in Section C of this submission.

Aboriginal peoples and Torres Strait Islander people experience a significantly higher burden of chronic disease than non-Indigenous Australians.[3] For example, 80% of the mortality gap between Indigenous and other Australians aged 35–74 years is due to chronic diseases. Of the gap due to chronic disease, the main contributors are: ischaemic heart diseases (22%) diabetes mellitus (12%); chronic lower respiratory diseases (mainly chronic obstructive pulmonary disease); and (6%) cerebrovascular diseases (5%).[4] In the 2012-13 Aboriginal and Torres Strait Islander Health Survey, 35% of Aboriginal and Torres Strait Islander adults had cardiovascular disease (CVD), diabetes or chronic kidney disease (CKD). Of all Indigenous adults with these conditions, 38% had 2 or more conditions together, 11% had all 3 conditions together.[5]

These chronic conditions are more prevalent in the Aboriginal and Torres Strait Islander population than other Australians and rely heavily on medications to manage them and to reduce potential hospitalisations and premature mortality. For example, diabetes was recorded as the principal and/or additional diagnosis in around 1 million hospitalisations of Australians in 2015–16 and accounted for

[3] Bainbridge R, McCalman J, Clifford A, Tsey K. Cultural competency in the delivery of health services for Indigenous people. Issues paper no. 13. Produced for the Closing the Gap Clearinghouse. In. Edited by Welfare AIoHa, vol. 13. Canberra: Australian 2015.
[4] Australian Institute of Health and Welfare 2010.Contribution of chronic disease to the gap in adult mortality between Aboriginal and Torres Strait Islander and other Australians. Cat. No. IHW 48. Canberra: AIHW.
[5] Merone L, Burns J, Poynton M, McDermott, R. Review of cardiovascular health among Aboriginal and Torres Strait Islander people. Perth, WA: Australian Indigenous HealthBulletin 19(4), 2019.

10% of all hospitalisations in Australia. The prevalence of diabetes is 3-6 times higher in the Aboriginal and Torres Strait Islander population than non-Indigenous Australians.[6]

In Australia, Aboriginal peoples and Torres Strait Islanders are five times more likely to die from chronic disease before the age of 75 years (premature mortality) than other Australians (2011-15).[7] The rate of potentially avoidable hospitalisations for Aboriginal and Torres Strait Islander people is almost 5 times the rate for other Australians with over half of these related to chronic conditions.[8] This profound health disparity has generated many policies and programs to encourage better chronic disease prevention and management within primary healthcare services. Yet, despite these programs, their higher burden of disease, medication underutilisation, and inappropriate use of medications by Aboriginal peoples and Torres Strait Islanders persists when assessed within primary health care settings.[9] [10] [11] There are many reasons for this including health system factors such as poorer access to primary health care services,[12] culturally unsafe pharmaceutical support,[13] lack of health service integration,[14] disease profiles inconsistent with medicines listed on the PBS,[15] and suboptimal prescribing quality.[16] Patient factors include insufficient health literacy for optimal self-management

[6] Australian Institute of Health and Welfare 2018. Australia's health 2018. Australia's health series no. 16. AUS 221. Canberra: AIHW.
[7] Australian Health Ministers' Advisory Council. Aboriginal and Torres Strait Islander Health Performance Framework 2017 Report, AHMAC, Canberra, 2017.
[8] Australian Institute of Health and Welfare 2011. Access to health services for Aboriginal and Torres Strait Islander people. Cat. No. IHW 46. Canberra: AIHW https://www.aihw.gov.au/reports/indigenous-australians/access-to-health-and-services-for-aboriginal-and-t/contents/table-of-contents
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[13] Swain L, Barclay L. Medication reviews are useful, but the model needs to be changed: Perspectives of Aboriginal Health Service health professionals on Home Medicines Reviews. BMC Health Serv Res. 2015;15:366-.
[14] Thompson SC, Haynes E, Woods JA, et al. Improving cardiovascular outcomes among Aboriginal Australians: Lessons from research for primary care. SAGE Open Med. 2016;4:2050312116681224. Published 2016 Nov 29. doi:10.1177/2050312116681224
[15] Couzos S. PBS medications. Improving access for Aboriginal and Torres Strait Islander peoples. Aust Fam Physician. 2005; 34 (10):841-4.
[16] Peiris DP, Patel AA, Cass A,et al. Cardiovascular disease risk management for Aboriginal and Torres Strait Islander peoples in primary health care settings: findings from the Kanyini Audit. Med J Aust. 2009 21;191(6):304-9.

of disease,[17] distrust of health services,[18] family and community obligations,[19] and belief in traditional medicines,[20] whilst condition-related factors include disproportionately high multimorbidity.[21] Socioeconomic factors may also affect the personal management of medicines such as adherence and storage.[22]

It is worth emphasising that Aboriginal and Torres Strait Islander people's access to primary health services remains disproportionately low particularly when considering their higher burden of chronic disease[23] and PBS medicines continue to be underutilised compared with non-Indigenous Australians.[24] Less is spent on medications and medical services for Indigenous Australians than for non-Indigenous Australians.[25] For years, the Indigenous Australians per person expenditure for medicines through the Pharmaceutical Benefits Scheme (PBS) has been a fraction (33% in 2013-14) of the expenditure for non-Indigenous Australians.[26] This problem is often compounded by more complex medicine regimens and more co-morbidities seen in Aboriginal and Torres Strait Islander patients.[27]

Together with changes to lifestyle factors, long term treatment with medications is usually needed to prevent or reduce disease progression and thereby mitigate outcomes of ill health. Social determinants of health and population-based disparities in this regard, impact on medication adherence to prescribed medicines and this is associated with adverse health outcomes in all population groups.[28] Social circumstances, deficiencies in health services and systems mean Aboriginal people often experience

[17] Rheault H, Coyer F, Jones L, Bonner A. Health literacy in Indigenous people with chronic disease living in remote Australia [published correction appears in BMC Health Serv Res. 2019 Aug 14;19(1):566]. BMC Health Serv Res. 2019;19(1):523. Published 2019 Jul 26. doi:10.1186/s12913-019-4335-3

[18] Hamrosi K, Taylor S, Aslani P. Issues with prescribed medications in Aboriginal communities: Aboriginal Health Workers' perspectives. Rural and Remote Health 2006; 6: 557. Available: www.rrh.org.au/journal/article/557

[19] Kingsley J, Townsend M, Henderson-Wilson C, Bolam B. Developing an exploratory framework linking Australian Aboriginal peoples' connection to country and concepts of wellbeing. Int J Environ Res Public Health. 2013;10(2):678-98. Published 2013 Feb 7. doi:10.3390/ijerph10020678

[20] Senior K, Chenhall R. Health Beliefs and Behavior. Medical Anthropology Quarterly 2013 27: 155-174. doi:10.1111/maq.12021

[21] Randall DA, Lujic S, Havard A, Eades SJ, Jorm L. Multimorbidity among Aboriginal people in New South Wales contributes significantly to their higher mortality. Medical Journal of Australia, 2018 209: 19-23. doi:10.5694/mja17.00878

[22] de Dassel JL, Ralph AP, Cass AA. systematic review of adherence in Indigenous Australians: an opportunity to improve chronic condition management. BMC Health Serv Res. 2017 Dec 27;17(1):845. doi: 10.1186/s12913-017-2794-y.

[23] Australian Institute of Health and Welfare: Australia's health 2014. Australia's health series no.14. In., vol. Cat.no.AUS178. Canberra: AIHW; 2014.

[24] Australian Health Ministers' Advisory Council. Aboriginal and Torres Strait Islander Health Performance Framework 2017 Report. AHMAC, Canberra, 2017.

[25] Australian Institute of Health and Welfare 2018. Op. Cit.

[26] Australian Health Ministers' Advisory Council. Op. Cit.

[27] Swain L: Guide to providing pharmacy services to Aboriginal and Torres Strait Islander people. In. Canberra, ACT, Australia: Pharmaceutical Society of Australia, 2014

[28] World Health Organisation. Adherence to long term therapies; evidence for action. WHO, Switzerland, 2003. http://www.who.int/chp/knowledge/publications/adherence_full_report.pdf?ua=1 {accessed 8 October 2018].

even greater challenges in medication management than non-Indigenous Australians. Social and emotional wellbeing issues may deeply pervade the lives of many Aboriginal people and may diminish the value that individuals place upon medications and the potential for these to improve their quality of life.[29] It has been said that "Australia's mainstream medical model focuses on compliance with medical advice and often ignores the complex historical and sociocultural influences that shape patients' responses to their health and health care."[30]

A whole of health system response is needed to tackle these factors which is why the IPAC trial explored the potential for integrated pharmacists within primary health care multidisciplinary teams for patients and teams to receive better medication management support, direct care from a pharmacist, and a more joined-up experience of care. This strategy was intended to compliment and extend the services provided as usual care by community pharmacists.

Increasingly, studies are reporting that the addition of pharmacists to healthcare teams enhances quality prescribing,[31] biomedical outcomes,[32] [33] and reduces hospitalisation.[34] [35] Co-location of pharmacists within general practice appears to enable greater communication, collaboration and relationship building among health professionals.[36] [37] However, the impact of integrated pharmacists on health outcomes for Aboriginal and Torres Strait Islander patients with chronic disease has never been evaluated in general practice or Aboriginal health settings.

[29] Emden C, Kowanko I, De Crespigny C, et al. *Better medication management for Indigenous Australian: findings from the field*. Aust J Prim Health 2005;11:80–90.
[30] Pharmaceutical Society of Australia. *Guide to providing pharmacy services to Aboriginal and Torres Strait Islander people.* Jul 2014. http://www.psa.org.au/download/guidelines/Guide-to-providing-pharmacy-services-to-Aboriginal-and-Torres-Strait-Islander-people.pdf
[31] Clyne B, Fitzgerald C, Quinlan A, Hardy C, Galvin R, Fahey T, et al. Interventions to address potentially inappropriate prescribing in community dwelling older adults: a systematic review of randomized controlled trials. J Am Geriatr Soc. 2016, 64: 1210–1222. doi: 10.1111/jgs.14133
[32] Martínez-Mardones F, Fernandez-Llimos F, Benrimoj SI, et al. Systematic Review and Meta-Analysis of Medication Reviews Conducted by Pharmacists on Cardiovascular Diseases Risk Factors in Ambulatory Care. *J Am Heart Assoc.* 2019;8(22):e013627. doi:10.1161/JAHA.119.013627
[33] Pousinho S, Morgado M, Falcão A, Alves G. Pharmacist Interventions in the Management of Type 2 Diabetes Mellitus: A Systematic Review of Randomized Controlled Trials. J Manag Care Spec Pharm. 2016 22:5: 493-515
[34] Gillespie U, Alassaad A, Hammarlund-Udenaes M, et al. Effects of pharmacists' interventions on appropriateness of prescribing and evaluation of the instruments' (MAI, STOPP and STARTs') ability to predict hospitalization--analyses from a randomized controlled trial. *PLoS One*. 2013;8(5):e62401. Published 2013 May 17. doi:10.1371/journal.pone.0062401
[35] Milosavljevic A, Aspden T, Harrison J. Community pharmacist-led interventions and their impact on patients' medication adherence and other health outcomes: a systematic review. *Int J Pharm Pract*. 2018; 26: 387-397. doi:10.1111/ijpp.12462.
[36] Tan ECK, Stewart K, Elliott RA, George J. Integration of pharmacists into general practice clinics in Australia: the views of general practitioners and pharmacists. Int J Pharm Pract 2014;22(1):28–37.
[37] Shaw C. Integration of general practice pharmacists into primary healthcare settings for chronic disease management. Issues Brief for the Deeble Institute for Health Policy Research. Australian Healthcare & Hospitals Association, May 2020. https://ahha.asn.au/system/files/docs/publications/deeble_issues_brief_no._35_integration_of_general_practice_pharmacists_into_primary_healthcare_settings.pdf

The IPAC trial targeted Aboriginal and Torres Strait Islander adults with chronic disease, within settings that were culturally appropriate such as Aboriginal community-controlled health services (ACCHSs), in order to evaluate the impact of integrated pharmacists on quality use of medicine outcomes.

COMPARATOR DETAILS

The proposed service will supplement the usual care provided to Aboriginal and Torres Strait Islander patients of existing ACCHSs.

The comparator used for the evaluation of the IPAC trial was 'usual care' provided to the enrolled participants within participating ACCHSs in the 12 months preceding their enrolment into the study. Usual care was defined as usual primary healthcare service provision to Aboriginal and Torres Strait Islander patients *without* the presence of an integrated pharmacist within the health service.

Usual care varies across ACCHS contexts. In the absence of integrated pharmacists' services, usual care provides limited medication adherence support to Aboriginal and Torres Strait Islander patients of ACCHSs. Access to this support is often ad hoc and if it is sourced by the target population, it is accessed via community pharmacy which may not be integrated into the ACCHS model of care or adequately responsive to the specific needs of the ACCHS. Medication management reviews (if sourced) are accessed via community pharmacies, or independent accredited pharmacists, with delivery and content strictly guided by Program Rules.[38] Education and training is currently provided to ACCHS staff (and some patients in the target population) by community pharmacy such as from the S100 Support Allowance for Remote Area Aboriginal Health Services, and some arrangements with ACCHSs have contracted community pharmacy to provide this support through the QUMAX Program. However, the following services which were provided by integrated pharmacists in the IPAC trial, have not been generally and routinely available as part of usual care to healthcare providers and the target population within ACCHSs:

- Opportunistic patient follow up;
- Team-based collaboration activity;
- Preventive health care delivery specifically targeting the Aboriginal and Torres Strait Islander population;
- Medicines information service on-site, including opportunistic advice;
- Stakeholder liaison services;
- Transitional care support;
- Quality improvement activity (such as a drug utilisation review).

[38] Pharmacy Programs Administrator. Program Rules. Home Medicines Review. Australian Government, Department of Health, Canberra, July 2019.

CLINICAL MANAGEMENT ALGORITHM(S)

The theory of change model for the IPAC Trial (Appendix 3) proposed that if pharmacists were integrated within ACCHSs that provide comprehensive primary health care to Aboriginal peoples and Torres Strait Islanders, pharmacists would support prescribers and other members of the primary healthcare team to better access medication-related expertise at the clinical point of care, compared with usual care. When that access is coupled with more direct pharmacist to patient engagement within the clinic, and more collaboration with stakeholders such as community pharmacy and hospitals, it was proposed that this would result in improved patient access to medication management reviews, reduced suboptimal prescribing, increased medicines utilisation, enhanced communication for transitional care, and improvements in chronic disease outcomes for the target population. This model was tested in the IPAC Trial and all technical analyses support these associations and outcomes as having been achieved.

The theory of change model outlined factors influencing the impact of an integrated pharmacist and the underpinning assumptions, such as conditions outside the control of individual healthcare professionals, and also to some extent, outside the control of healthcare services. These assumptions included: that prescribers are supportive and receptive to pharmacists' recommendations; the recognition that many barriers to optimal medication use are socially determined and outside the control of the patient and healthcare team; and that community pharmacy is sufficiently engaged, adequately remunerated and has the capacity to support change.

The logic model developed for evaluation of the IPAC Trial acts as a clinical management algorithm for the purpose of this submission-based assessment. It depicts the context of the proposed service where a non-dispensing pharmacist integrated within an ACCHS functions to deliver clinical care to individual Aboriginal and Torres Strait Islander patients and to improve the overall integration of care for the patient. Pharmacists integrated within the ACCHS can themselves facilitate a 'joined-up' and more coordinated journey for the patient. This is achieved through medicines reconciliation when patients are hospitalised or discharged and supporting their transition in care; through liaison with community pharmacy to support the patient and general practitioner; through consultations at time and place that suit the patient; and through improved record-keeping and team-based care. Integrated pharmacists can enhance health systems by supporting quality prescribing and quality improvement within the ACCHS context.

The proposed clinical management algorithm that depicts the context of the intended use of the proposed medical service following public funding for the service is shown in **section A6**. This is identical to Appendix 4 (IPAC logic model). The proposed clinical management algorithm (Appendix 5) is formatted to be comparable to the usual care algorithm (without an integrated pharmacist within ACCHSs) (Appendix 6).

KEY DIFFERENCES IN THE DELIVERY OF THE PROPOSED MEDICAL SERVICE AND THE MAIN COMPARATOR

The main differences between the proposed service and the main comparator (usual care) are summarised in **section A7**. The main differences pertain to a more integrated, coordinated, collaborative, and expansive set of medication- related services being introduced than is able to be currently provided through usual care systems within primary health care settings. This means that with the proposed medical service, Aboriginal and Torres Strait Islander patients with chronic disease (who are particularly vulnerable to disjointed care), will have a more 'joined-up' experience of care with regard to medication management within the ACCHS setting than is currently available or possible. Integration into the ACCHSs' model of care allows the pharmacist to be more culturally responsive and their activities to be aligned with ACCHSs' core priorities based on self-determination.

The proposed medical service was evaluated in the IPAC trial and demonstrated superior health outcomes for Aboriginal and Torres Strait Islander patients with chronic disease, compared with usual care arrangements (**Section B**). Study participants benefited from the service in ways they would not have otherwise benefited through usual care mechanisms.

CLINICAL CLAIM

As set out in the PICO for this project, the clinical claim was as follows:

- Aboriginal and/or Torres Strait Islander adult patients with chronic disease receiving pharmacist services that are integrated within ACCHSs, will experience superior quality of care outcomes compared to usual care.

- Services provided by pharmacists within ACCHSs are likely to lead to superior health care service utilization (towards equity) by patients with chronic disease compared to usual care.

APPROACH TAKEN TO THE EVIDENCE ASSESSMENT

Primary research

The IPAC Trial investigated the effectiveness of non-dispensing pharmacists integrated within ACCHSs during 2018-2019. The trial was a pragmatic, non-randomized, prospective, pre and post quasi-experimental interventional study that was community-based and participatory (*Trial Registration Number and Register: ACTRN12618002002268*). The intervention was the integration of a registered pharmacist within the ACCHS primary healthcare team for up to a 15-month period. There were 22 ACCHS sites (18 ACCHSs) that participated in the project until the end, across three jurisdictions: Victoria, Queensland and the Northern Territory to ensure a sampling frame that best informed external validity of the outcomes across varied services and patient populations. Pharmacist positions were aggregated to represent approximately 12.3 full time equivalent (FTE) positions. All eligible ACCHS sites that participated received the intervention, and a total of 26 pharmacists were trained and integrated within the ACCHSs.

The primary expected clinical endpoint outcomes were an improvement in quality of care indicators (including systolic and diastolic blood pressure, glycated haemoglobin (HbA1c), lipids, estimated absolute cardiovascular disease (CVD) risk, and albumin-creatinine ratio (ACR) in patients with chronic disease. Secondary outcomes included improvements in:

- estimated glomerular filtration rate (eGFR);
- prescribing indices (medication appropriateness, overuse, underuse, and medication-related problems);
- patient use of medicines (medication adherence, self-assessed health status, and patient experience);
- health service utilization indices (Medicare Benefits Schedule claims for: home medicines reviews, and other MBS items likely to be related to pharmacist activities), and other comprehensive medication management reviews (non-HMRs); and
- stakeholder perceptions (ACCHSs staff; community pharmacies; pharmacists).

An economic evaluation of the IPAC Trial also undertook a cost- consequence analysis, estimation of the incremental cost-effectiveness ratio, and a cost-utility analysis (extrapolated for participants with T2DM) of the integrated pharmacist intervention in relation to usual practice (at baseline) to assess whether the IPAC Trial represents value for money from a health system perspective.

Secondary research

Two systematic reviews were undertaken or sourced:

1) A systematic review of published literature was undertaken as part of the IPAC Trial to explore cost-effectiveness analyses of integrated models of care involving pharmacists (Appendix 7) in the absence of existing reviews;

2) A recently completed umbrella review of systematic reviews was sourced and included in this report, with permission granted from the authors[39] (Copyright James Cook University, in-confidence, Appendix 8). This umbrella review synthesised several systematic reviews that

[39] Shaw C, Couzos S. Integration of non-dispensing pharmacists into primary healthcare services: an umbrella review and narrative synthesis of the effect on patient outcomes. James Cook University, January 2020.

have been published exploring patient-related outcomes from integrated pharmacist interventions within primary health care settings. **Please note that permission to release this report in the public domain has not been granted.**

CHARACTERISTICS OF THE EVIDENCE BASE (LITERATURE REVIEW AND PRIMARY RESEARCH)

For the results of the IPAC Trial (primary research evidence) - please see Section B (and Appendices 9 to 16). The key features of the studies that were explored in the two literature reviews (secondary research) is shown in Table 1.

Table 1 Key features of the included studies sourced in the literature reviews (secondary research)

Type of evidence	Description	Number
Literature review of cost-effectiveness studies[40]	Synthesis of published literature on cost-effectiveness studies exploring pharmacist services integrated or co-located within general practices/primary health care services for adults with chronic disease.	n=13 studies
Umbrella review of systematic reviews[41]	Synthesis of published literature exploring outcomes from pharmacist services integrated or co-located within general practices/primary health care services for adults with chronic disease.	n=5 studies

The main findings of these literature reviews are presented as Appendices 7 and 8 and in Section B. The evidence presented in the review of cost-effectiveness studies is not directly applicable to the context of the proposed medical service due to the absence of relevant published studies. The evidence presented in the umbrella review of systematic reviews has some application to the context of the proposed medical service.

RESULTS

The results of the IPAC trial (primary research evidence) are summarised here as well as the literature reviews.

Effectiveness *(secondary research outcomes from literature reviews, and primary research outcomes)*

The secondary research outcomes are presented first in accordance with the submission template as literature reviews (a) and (b). The effectiveness outcomes from the two systematic reviews of the

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[40] **Johnstone K, Smith D, Couzos S. Literature review on the cost-effectiveness of non-dispensing pharmacist services integrated within primary health care. James Cook University, February 2020.**

[41] Shaw C, Couzos S. Integration of non-dispensing pharmacists into primary healthcare services: an umbrella review and narrative synthesis of the effect on patient outcomes. James Cook University, January 2020.

literature are summarised in Table 2 and Table 3. This section also outlines the primary research outcomes from the conduct of the IPAC Trial.

a) Literature review for economic analyses

The economic analyses literature review (Appendix 7)[42] did not reveal any studies that had analysed the cost-effectiveness of interventions involving a pharmacist integrated within primary health care services such as ACCHSs in Australia. Furthermore, no cost-effectiveness studies were identified involving clinical pharmacist services to Indigenous peoples through Indigenous health services or any other type of primary health care service from any country in the world. Only one study, set in the United States, commented on the participation of minority populations.

Given the lack of cost-effectiveness studies that were directly relevant to the IPAC Trial, the cost-effectiveness studies included in the review had a broader focus involving general practice or other primary health care settings and involving collaborative care between a pharmacist and a general practitioner (GP).

Direct effectiveness

Table 2 shows a narrative synthesis of the findings of this literature review.

The literature review for studies assessing the cost-effectiveness of integrated pharmacist interventions within primary health care settings found only two studies that explicitly mentioned the co-location of the pharmacist within the primary health care facility. However, it was not clear if the pharmacists in these studies were co-located solely for the purposes of the intervention or if they were existing staff at the facility.[43] [44] The remaining studies involved community pharmacists, clinical pharmacists or research pharmacists and again it was unclear if they were co-located at the primary health care facility for the intervention period (Table 2).

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[42] **Johnstone K, Smith D, Couzos S. Literature review on the cost-effectiveness of non-dispensing pharmacist services integrated within primary health care. James Cook University, February 2020.**

[43] Kulchaitanaroaj, P., Brooks, J. M., Ardery, G., Newman, D. & Carter, B. L. (2012). Incremental costs associated with physician and pharmacist collaboration to improve blood pressure control. Pharmacotherapy, 32(8):772-780.

[44] Kulchaitanaroaj, P., Brooks, J. M., Chaiyakunapruk, N., Goedken, A. M., Chrischilles, E. A., & Carter, B. L. (2017). Cost-utility analysis of physician-pharmacist collaborative intervention for treating hypertension compared with usual care. Journal of Hypertension, 35(1), 178-187.

Table 2 Summary of systematic literature review findings of cost-effectiveness analyses from randomised controlled trials that explored pharmacist interventions within primary health care settings

Author, year, setting, study design	Participants	Pharmacist intervention	Follow-up duration	Control	Outcome measure	Cost-effectiveness outcome
Avery et al, 2012. UK, general practice, Pragmatic Cluster randomised trial e.g. Quality of life	General practices	Simple computerised feedback plus pharmacist-led interventions with practice team	12 months	Simple computerised feedback	Patients identified with potential medication error. Cost per additional medication error avoided due to the intervention at 12 months.	95% probability is cost effective if the decision-maker's ceiling willingness to pay reached £85 per error avoided (at 12 months).
Bojke et al, 2010. UK General practice. Randomised multiple interrupted timeseries.	>=75 years with polypharmacy	Pharmacist moderated drug management in collaboration with doctor, patient and carer.	12 months	Usual care	Mean incremental cost per additional QALY	78%-81% probability that pharmaceutical care is cost-effective at a threshold between £20,000 and £30,000 per QALY.
Cowper et al, 1998. USA Randomised control trial	>=65 years (males) with polypharmacy	Pharmacist medication review for prescribing appropriateness (MAI)	12 months	Nurse review of prescriptions.	Cost per 1 unit change in MAI	Cost was $7.50 per 1-unit change in MAI. Excluding drug costs, the ratio was $30/1 unit change in MAI.
Elliott et al, 2014, UK. General Practice Pragmatic cluster randomised trial	General practices	Simple computerised feedback plus pharmacist-led interventions with practice team	12 months	Simple computerised feedback	Cost per additional QALY	59% probability of being cost-effective at a threshold ceiling willingness-to-pay for a QALY of £20,000.
Kulchaitanaroaj et al, 2012, and 2017, USA Community-based clinics. Combined data from two prospective cluster-randomised controlled clinical trials	>=21 years with hypertension	Pharmacists co-located with physicians. In-person recommendations to address suboptimal drug regimens and educate physicians as needed.	6 months	Physician management only.	Cost for one additional patient to achieve blood pressure control Cost per QALY gained	Cost for one additional patient to achieve blood pressure control was $1338.05. $36.25 per additional 1mmHg reduction in systolic blood pressure and $94.32 per additional 1mmHg reduction in diastolic blood pressure. $26,807.83 per QALY gained
Obreli-Neto et al, 2015. Brazil Primary health care unit. Randomised controlled trial	>= 60 years, diagnosed with diabetes or hypertension receiving medications	Pharmacist follow-up of patients every 6 months, compliance checks; patient and family education; and physician recommendations	36 months	Usual care (3 monthly physician visits without a pharmacist)	Incremental cost-effectiveness ratio per QALY, based on patients reaching clinical outcome goals.	Incremental cost-effectiveness ratio per QALY was estimated at $53.50. The intervention did not significantly increase health care cost and significantly improved health outcomes.
Polgreen et al, 2015. USA. Primary care Offices.	>= 18 years with uncontrolled hypertension	Pharmacist collaboration with physicians with pharmacist care	9 months	Usual care – no pharmacist involvement	Cost to lower blood pressure by 1mmHg.	Cost to lower BP by 1mmHg was $33.27 for systolic and $69.98 for diastolic.

Author, year, setting, study design	Participants	Pharmacist intervention	Follow-up duration	Control	Outcome measure	Cost-effectiveness outcome
Cluster randomised controlled trial	defined as SBP>140mmHg or DBP >90 mmHg or SBP >130 mmHg and DBP >80 mmHg in diabetes and chronic kidney disease	plans and regular patient visits.				Comparing rates in the intervention and control groups, the cost to increase BP control by 1 percentage point was $22.55.
Simpson et al, 2015. USA. Primary care clinic Randomised controlled trial	Patients with Type 2 diabetes	Pharmacist visits with patients with medication review and physical examination including blood pressure measurement; pharmacist recommendations to the physician; and patient follow-up by pharmacist.	12 months	Usual care – no pharmacist involvement	Cost to reduce annualised cardiovascular 10-year risk by 1%	95% probability that intervention is cost-effective at level of about $4,000 per 1% reduction in annualised cardiovascular risk.
Sorensen et al, 2004. Australia. General practice, Randomised controlled trial	Patients at risk of medication misadventure	GPs coordinated linking up of pharmacists. Patient home visit by the pharmacist for medication review, with prescriber recommendations	6 months	Usual care	Cost-saving per intervention patient	There was a net cost saving per intervention patient (marginal cost benefit) of AUS$54 per patient relative to controls. No significant difference was demonstrated in health-related quality of life, patient satisfaction, or clinical outcomes.

In summary, this review did not identify cost-effectiveness evaluations of pharmacist's interventions that were directly relevant to the proposed service (consistent with the IPAC Trial). There was considerable heterogeneity in health systems and the measurement of health gains between the included studies. The cost-effectiveness of the interventions could only be interpreted by considering and understanding the context of each individual setting. Nevertheless, most authors concluded that the pharmacist intervention was cost-effective. These findings therefore highlight the importance of the IPAC Trial to inform on the cost-effectiveness of integrated pharmacist interventions as regards the health of Indigenous Australians.

b) Umbrella review- Integrated pharmacists within primary health care settings

This umbrella review[45] (Appendix 8) aimed to determine the effectiveness of integrated non-dispensing pharmacists within primary health care settings on patient outcomes such as biomedical markers, prescribing quality, and patient-reported outcomes. Integration was defined broadly as any intervention that involved co-location of pharmacists within PHC settings, and/or pharmacists who worked as part of multidisciplinary healthcare teams using a range of integrative processes.

The umbrella review of systematic reviews did not reveal any systematic reviews nor any primary research studies that had investigated quantitative outcomes from pharmacist integration within Aboriginal health settings. The review revealed five systematic reviews- one of which was conducted in Australia exploring pharmacist integration within general practice.[46] None of the included studies identified if participants were from marginalised groups such as Indigenous peoples or peoples residing in remote geographical locations.

Direct effectiveness

Table 3 provides a narrative synthesis of the findings of this Umbrella Review.

Eligible publications were assessed for methodological quality using the critical appraisal tool for systematic reviews and research syntheses developed by The Joanna Briggs Institute.[47] A total of 161 studies were assessed across the five reviews, and included randomised controlled trials (RCTs), non-randomised controlled trials (non-RCTs), quasi RCTs, cohort studies, controlled before and after studies and pretest-posttest studies. Approximately 60% (97 of 161) of the studies were conducted in the USA. The studies were heterogenous in regard to 'integration' of non-dispensing pharmacists into primary health care teams. All studies primarily examined interprofessional collaboration between pharmacists and GPs. Across the included studies patients were either categorised according to a particular chronic disease; or were considered more broadly as patients prescribed multiple medications, those at risk of an adverse health issue or those at risk of a medication-related adverse event. All reviews except one stipulated that the comparison group was usual care or no intervention. Outcomes examined across the included studies were also heterogenous.

Outcomes assessed in reviews were classified broadly as changes in biomedical markers (blood pressure, HbA1c, cholesterol, lipids, Framingham risk score), changes in prescribing practices or

[45] Shaw C, Couzos S. Integration of non-dispensing pharmacists into primary healthcare services: an umbrella review and narrative synthesis of the effect on patient outcomes. James Cook University, January 2020.
[46] Tan ECK, Stewart K, Elliot RA, George J. Pharmacist services provided in general practice clinics: a systematic review and meta-analysis. *Res Social Adm Pharm*. 2014;10: 608-622.

[47] Aromataris E, Fernandez R, Godfrey C et al. Summarizing systematic reviews: methodological development, conduct and reporting of an umbrella review approach. Int J Evid Based Healthc. 2015;(13)3:132-140.

appropriateness (prescribing quality, reduction of inappropriate prescribing), and patient-reported outcomes (quality of life, patient satisfaction).

In summary, the aggregated results from the included reviews suggest that the integration of a non-dispensing pharmacist in PHC settings can improve patient outcomes and the quality of care relative to usual care. Biomedical markers, such as HbA1c, blood pressure and cholesterol improved with pharmacist intervention across a number of trials. Pharmacist intervention also improved the quality use of medications and reduced inappropriate prescribing. There was no effect on the quality of life of patients. There were no published studies to inform on the impact of this intervention on the Aboriginal and Torres Strait Islander population with chronic disease. These findings therefore highlight the importance of the IPAC Trial to inform on clinical endpoint and quality use of medicines outcomes from services provided by pharmacists when they are integrated within ACCHS or other relevant primary healthcare settings.

Table 3 Characteristics of included studies – Umbrella Review of integration of non-dispensing pharmacists into primary health care services (copyright: James Cook University, 2020) [48]

Author, year, journal	Objectives	Outcomes	Type of review	Participants	Patient characteristics	Setting	No. of data-bases searched	Date range of database searching	Publication date range	No. and types of studies, country of origin	Conclusions
Fish et al. 2002 **The International Journal of Pharmacy Practice**	Effect and cost of practice-based pharmaceutical services	Changes in prescribing practices Prescribing quality Cholesterol BP Medication compliance QoL	Systematic review	Physicians/GPs Pharmacists/ Pharmaceutical prescribing advisors	Adults with chronic disease (hypercholesterolaemia, hypertension, polypharmacy, COPD) Patients at risk of medication-related errors	GP practice Community health centre	5	Jan 1980-March 2001	1983-2000	16 studies RCTs UK Australia Sweden Canada US	Educational outreach visits, medication reviews and patient specific prescribing advice were effective in achieving desired outcomes There is insufficient evidence to generalise about cost-effectiveness of the interventions
Tan et al. 2014 **Research in Social and Administrative Pharmacy**	Effectiveness of clinical pharmacist services delivered in primary care general practice clinics	HbA1c BP Cholesterol Framingham risk score	Systematic review and meta-analysis	GPs Pharmacists	Adults with chronic disease (CVD, diabetes, depression, metabolic syndrome, pain, COPD, menopause) or polypharmacy	GP practice	4	1966-2013	1996-2013	38 studies RCTs US UK Canada Brazil Chile Japan Thailand Jordan	Pharmacist co-location in GP clinics delivered a range of interventions with favourable results in chronic disease management and quality use of medications

[48] Shaw C, Couzos S. Integration of non-dispensing pharmacists into primary healthcare services: an umbrella review and narrative synthesis of the effect on patient outcomes. James Cook University, January 2020.

					Patients at risk of medication-related errors Patients at risk of adverse health problem						
Riordan et al. 2016 **SAGE Open Medicine**	Effect of pharmacist-led interventions in optimising prescribing	Change in prescribing appropriateness: Beers criteria STOPP/START MAI Clinical or patient-reported outcomes eg QoL or patient satisfaction	Systematic review	Pharmacists Physicians Nurses	Community-dwelling older adults (>65 years) with polypharmacy, drug-related problems	GP practice Family medicine clinic Veterans Affairs medical centre	11	Inception-Dec 2015	1996-2010	5 studies RCTs Quasi-RCTs Controlled before and after studies Interrupted time series US UK New Zealand	Pharmacist-led interventions involving access to medical notes and medication reviews conducted in physician practices with feedback to physicians may improve prescribing appropriateness
Fazel et al. 2017 **Annals of Pharmacotherapy**	Impact of pharmacist interventions as part of the health care team on diabetes therapeutic outcomes in ambulatory care settings	HbA1c Systolic BP LDL-C	Systematic review and meta-analysis	Pharmacists	Adults with Type 1 or Type 2 diabetes mellitus	Hospital-based outpatient clinics Community pharmacies Primary care physician offices Community clinics	9	1995-Feb 2017	1996-2016	42 studies (Systematic review = 42 studies Meta-analysis = 35 studies) RCTs Non-RCTs Pretest-posttest studies US Australia Iran Jordan Thailand	Pharmacists' interventions as part of the patient's health care team improved diabetic therapeutic outcomes by significantly reducing HbA1c, SBP, LDL-C

Hazen et al. 2018 **Research in Social and Administrative Pharmacy**	Impact of degree of integration of a non-dispensing pharmacist on medication related health outcomes in primary care	Real clinical health outcomes eg mortality Surrogate clinical health outcomes eg HbA1c, lipids, BP Patient reported outcomes eg QoL Proxies of health outcomes eg quality of care performance indicators	Systematic review	Pharmacists GPs	Adults with chronic disease (diabetes, hypertension, dyslipidaemia, metabolic syndrome, heart failure, depression, cardiovascular disease, osteoporosis)	Primary care practice	2	1966-June 2016	1996-2015	60 studies RCTs Two group cohort studies One group cohort study US UK Brazil Canada Hong Kong Jordan Australia Sweden	Full integration of a non-dispensing pharmacist into a primary health care setting adds value to patient-centred (heterogeneous patients such as those with multimorbidity and polypharmacy), but not disease-specific (patients with specific chronic conditions), clinical pharmacy services

BP = blood pressure, SBP = systolic blood pressure, LDL-C = low-density lipoprotein C, HbA1c = haemoglobin A1c, CVD = cardiovascular disease, COPD = chronic obstructive pulmonary disease, QoL = quality of life, GPs= general practitioners, RCT = randomised controlled trial, STOPP/START = Screening Tool for Older Persons Prescriptions/Screening Tool to Alert doctors to Right Treatment, MAI = Medication Appropriateness Index

Primary research outcomes – the IPAC Trial

The IPAC Trial was the first interventional study to investigate the impact of integrating a non-dispensing pharmacist within Aboriginal community-controlled health services (ACCHSs) on the health of Indigenous Australians. The primary and secondary outcomes from the trial are summarised in Table 4, Table 5 and Appendices 9 to 14.

A total of 1,733 patients were consented for the project, of which 1,456 had pre and post data and were included for analysis. A brief summary of outcomes and activities is given below**.**

Clinical Endpoints

Integrated pharmacists embedded into usual care in ACCHSs, significantly improved the control of cardiovascular disease (CVD) risk factors, glycaemic control in patients with T2DM, and reduced absolute CVD risk in Aboriginal and Torres Strait islander adults with chronic disease.[49] The following was reported:

- Significant improvement in HbA1c results in participants with T2DM, with a 2.8 mmol/mol or 0.3% (unit) reduction (p=0.001, 95% CI -0.4% to -0.1%).
- Reductions in diastolic blood pressure (-0.8mmHg, p=0.008), total cholesterol (-0.15 mmol/L, p<0.001), LDL-C (-0.08 mmol/L, p=0.001), and triglyceride levels (-0.11 mmol/L, p=0.006) were significant for all participants.
- Mean calculated absolute 5-year CVD risk was significantly reduced by 1% (95% CI: -1.8% to -0.12%, p=0.027).
- Mean annual estimated glomerular filtration rate (eGFR) significantly improved with an increase of 1.9mL/min/1.73m^2 (95% CI: 0.1 to 3.7), from baseline, which is a significant slowing of eGFR decline (p<0.001). When participants with less than 6-months of follow-up were excluded, the mean annual eGFR decline was -0.2ml/min/1.73m2 (95% CI:-2.99 to 2.7), significantly slower than the predicted and annual decline of -3.0 ml/min/1.73m^2 (p<0.034, n=720) in the Aboriginal and Torres Strait Islander population.
- SBP significantly improved for younger participants (<57 years, -1.8 mmHg, SD: 12.5, p=0.004).

The observed net improvements in biomedical outcomes are clinically meaningful at a population level. Even a modest HbA1c drop may translate to a reduction in micro and macrovascular complications in people with T2DM if sustained population wide. According to the UK Prospective

[49] Couzos S, Smith D, Biros E. Integrated pharmacists in ACCHSs- Analysis of the assessment of clinical endpoints in Aboriginal and Torres Strait Islander patients with chronic disease (IPAC study). Draft Report to the PSA, April 2020.

Diabetes Study (UKPDS) *any improvement* in HbA1c in those with T2DM reduced the risk of diabetes complications, with little evidence of a threshold of effect.[50] Moreover, the observed net improvement in glycaemic control of participants with T2DM from baseline values was consistent with the -0.18% to -2.1% HbA1c decrease (difference between intervention and control groups) observed over a mean of 9.4 months in 24 of 26 other studies that investigated pharmacist interventions in patients with T2DM.[51]

The small but significant average DBP and SBP reductions shown for IPAC participants may also attenuate the incidence of CVD events for Aboriginal and Torres Strait islander peoples if such reductions were population-wide, particularly for those with chronic disease. The net BP reduction was observed for the IPAC cohort as a whole, irrespective of whether participants had a clinical diagnosis of hypertension. Population-wide BP reduction strategies are recommended for the primary prevention of CVD events because the benefits that accrue from BP reduction are not just limited to those with hypertension.[52] A population-wide reduction in DBP of a mere 2mmHg has been estimated to reduce the prevalence of hypertension and CHD risk by 17% and 6% respectively, and combined with BP reductions in those needing medical treatment, could double or triple the impact of medical treatment alone.[53] A mere 1 mmHg reduction in SBP may substantially reduce heart failure (with 20 fewer cases for every 100,000 African-Americans per year), as well as CHD, and stroke incidence.[54]

Any population-wide reduction in LDL-C, even if small in magnitude such as demonstrated in the IPAC study, may also have broader benefits in reducing major CVD events for Aboriginal and Torres Strait Islander peoples. For example, for those already on statins, reducing LDL-C levels by a further 0.51 mmol/l from the LDL-C at baseline over a year, can significantly reduce the residual risk for major CVD events by an additional 15% (on top of the existing 20% relative risk reduction per 1 mmol/L LDL-C reduction from statin therapy).[55] [56]

The progression of kidney disease significantly slowed as a result of the intervention for IPAC participants and this slowing may have delayed the onset of end-stage kidney disease (ESKD) and CVD events if the impact of the intervention was sustained. Moreover, without intervention, IPAC participants were at risk of a much higher rate of eGFR decline per year than the selected expected

[50] Stratton IM, Adler AI, Neil HAW, Matthews DR, Manley SE, Cull CA, Hadden D, Turner RC, Holman RR. Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): Prospective observational study. BMJ 2000; 321:7258: 405-412.
[51] Pousinho S, Morgado M, Falcão A, Alves G. Pharmacist Interventions in the Management of Type 2 Diabetes Mellitus: A Systematic Review of Randomized Controlled Trials. J Manag Care Spec Pharm. 2016 22:5: 493-515
[52] Hardy ST, Loehr LR, Butler KR, et al. Reducing the Blood Pressure-Related Burden of Cardiovascular Disease: Impact of Achievable Improvements in Blood Pressure Prevention and Control. *J Am Heart Assoc*. 2015;4(10):e002276. Published 2015 Oct 27. doi:10.1161/JAHA.115.002276
[53] Cook NR, Cohen J, Hebert PR, Taylor JO, Hennekens CH. Implications of small reductions in diastolic blood pressure for primary prevention. Arch Intern Med. 1995;155:701–709.
[54] Hardy ST, Loehr LR, Butler KR, et al. Op. Cit.
[55] Cholesterol Treatment Trialists' (CTT) Collaboration. Efficacy and safety of more intensive lowering of LDL cholesterol: a meta-analysis of data from 170 000 participants in 26 randomised trials. Lancet 2010; 376: 1670–81.
[56] Collins R, Reith C, Emberson J, et al. Interpretation of the evidence for the efficacy and safety of statin therapy. Lancet 2016; 388: 2532–2561.

rate because their characteristics more closely matched those in the eGFR Follow-Up study who had an annual eGFR decline of -5 ml/min/1.73m^2. In an analysis from the USA involving participants from mixed ethnic groups, a decline in eGFR of 5ml/min/1.73m^2 over 2 years predicted a 1.5 and 1.2 times higher risk of ESKD and CVD events respectively.[57] The eGFR Follow-Up study involving Aboriginal Australians showed that those with a slower rate of kidney disease progression (a 5 ml/min/1.73m^2 higher eGFR) had an 18% risk reduction (hazard ratio 95% confidence interval 0.75-0.91) in combined renal endpoints over a median of 3 years (adjusted for aged, sex, and ACR) that included death from renal causes, and initiation of renal replacement therapy.[58]

The net biomedical improvements observed in the IPAC study most likely emanated from the observed targeted improvements to prescribing quality, participant medication adherence, and team-based care. Prescribing quality significantly improved following the IPAC intervention with reductions in inappropriate prescribing for BP lowering and diabetes medications,[59] a significant reduction in underprescribing of BP-lowering medications for those with T2DM and albuminuria,[60] and significant improvements in patient self-reported medication adherence.[61] Integrated pharmacists also delivered team-based care to optimise chronic disease management (such as case conferences) and attended patient group meetings to deliver preventive health messages such as advice on dietary and lifestyle improvements (Appendix 16).

The net absolute reduction in 5-year CVD risk of 1% for participants without pre-existing CVD indicates the clinically significant potential for primary CVD prevention arising from the IPAC intervention.

Medication Management Reviews

Within ACCHSs, integrated pharmacists significantly increased access to medication management reviews (HMRs and non-HMRs), and provided follow-up to these reviews for Aboriginal and Torres Strait Islander adults with chronic disease.[62] Key results were:

- Participants (n=1,456) had 3.9 times (p<0.001) significant increase in HMR access (based on MBS claims) compared with usual care whilst the number of HMRs (MBS claims) increased 4.1 times (p<0.001). There were 609 (41.8%) HMR, and 719 (49.4%) non-HMR recipients after a mean of 284 days (SD ±11.5) following study enrolment.

[57] Ku E, Xie D, Shlipak M, et al. Change in Measured GFR Versus eGFR and CKD Outcomes. J Am Soc Nephrol. 2016;27(7):2196–2204. doi:10.1681/ASN.2015040341
[58] Maple-Brown LJ, Hughes JT, Ritte R, Barzi F, et al. Op. cit.
[59] Couzos S, Smith D, Buttner P, Biros E. Assessment of medicines underutilisation in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC project). Op. Cit.
[60] Couzos S, Smith D, Buttner P, Biros E. Assessment of medicines underutilisation in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC project). Op. Cit.
[61] Couzos S, Smith D, Buttner P, Biros E. Assessment of change in medication adherence and self-assessed health status in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal community -controlled health services (IPAC Project): Report to the Pharmaceutical Society of Australia. Draft Report, May 2020.
[62] Couzos S, Smith D, Buttner P, Biros E. Assessment of Home Medicines Review (HMR) and non-HMR in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC Project). Final report to the Pharmaceutical Society of Australia. February 2020.

- HMR recipients had a mean age of 58.7 years (SD ±21.9), a mean of 8 prescribed medications each, and 89% had comorbidity.
- Of non-HMRs, 91% (n=689) were conducted within the ACCHS; whilst the majority of recipients were from remote (19.8%) or very remote ACCHSs (21.4%); and had the non-HMR commonly completed for opportunistic reasons being at risk of forgoing a HMR (48.1%, n=364).
- Pharmacists delivered 1,548 follow-up assessments to HMR or non-HMR- recipients. Of HMR recipients, 87.9% (n=535) compared with 70.0% (n=503) of non-HMR recipients had at least one medication-related problem (MRP) (p=0.035).
- Non-HMR eligibility criteria, participant need for a medication review, pharmacist recommendations, and identified types of MRPs in recipients were similar to a HMR.

Medication Appropriateness Index (MAI) Audits

Prescribing quality improved significantly for participants following the integrated pharmacist intervention within ACCHSs.[63] Nearly two-thirds of participants were prescribed a medication that was rated as inappropriate pre-intervention. Key results included:

- A total of 2,804 and 2,963 medications were evaluated at baseline and at the end of the study respectively. At baseline, 67.8% (n=242/357) of participants were prescribed ≥1 medications rated as inappropriate in at least one MAI criterion; 23.1% of all medications had ≥1 inappropriateness rating; the mean MAI score per participant was 6.02 (SD±23.6); and the mean MAI score per medication was 0.76 (SD±8.5). The most common reason for medication inappropriateness was incorrect dosage.
- The intervention significantly reduced mean MAI scores per participant (to 3.20, SD ±11.7, p=0.003); the mean MAI score per individual medication (to 0.39, SD±-4.4, p=0.004); the proportion of participants receiving medications rated as inappropriate (to 44.5% n=159, p<0.001), and the proportion of medications with the following prescribing risks: incorrect dosage, impractical directions, unacceptable therapy duration, drug-disease interactions; and unnecessary medications due to absent clinical indications, or lack of clinical effectiveness (all p <0.05).
- There was a 34.1% relative reduction in the number of participants with medications meeting ≥ 1 medication overuse criteria. Significant reductions in participant numbers who were prescribed

[63] Couzos, S, Smith D, Buttner P, Biros E. Assessment of medication appropriateness using the Medication Appropriate Index (MAI) in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC project). Final Report to the PSA, Feb 2020.

medications with an inappropriateness rating was observed for: cardiovascular (-19.9% absolute reduction, p<0.001), endocrine (-11.2%, p<0.001), and respiratory conditions (-4.5%, p=0.019).

- Quality prescribing improved for participants with medications for hypertension, diabetes and/or dyslipidaemia (absolute reductions of -5.3%, p=0.01; -9.5%, p<0.001 and -9.8%, p<0.001 respectively).

Assessment of Underutilisation Results

Potential Prescribing Omissions (PPOs) were common in this cohort.[64] Improvements in prescribing quality arising from non-dispensing pharmacists integrated within ACCHSs significantly averted PPOs to high-value pharmacotherapies. Key results included:

- At baseline, 51.2% (181/353) of participants had at least one PPO from explicit and implicit criteria, totalling 256 PPOs or 0.73 (SD± 1.3) PPOs per participant. The most common PPO of the 10 criteria was for 23vPPV and blood pressure (BP) and/or lipid lowering therapy for those at high primary CVD risk. No chemoprophylactic PPOs for participants with ARF/RHD were identified. Other PPOs included symptomatic therapy for a range of chronic conditions.
- At follow-up (mean 267 days post-baseline), there was a significant (58%, p<0.001) reduction in the number of participants with potential prescription-based medication underutilisation, and a significant relative reduction in the mean number of PPOs per participant (60.3%%, p<0.001). The PPOs that were averted were for pneumococcal vaccination, BP and/or lipid lowering medication in those clinically at high primary CVD risk, ACEI or ARB for participants with T2DM and albuminuria, and metformin for those with T2DM.

Medication Adherence Patient Survey and Self-Reported Health Status

Integrated pharmacists embedded into ACCHSs significantly improved the medication adherence of participants, as well as their self-assessed health status.[65] The NACCHO Medication Adherence Response Scale (NMARS) tool was developed for the project and was a valid and reliable research tool when used to evaluate the extent of medication adherence and reasons for medication non-adherence in the context of this study. Results included:

- Participants with paired single-item (SIQ) and NMARS data (n= 1,103) and paired SF1 data (n=975)

[64] Couzos S, Smith D, Buttner P, Biros E. Assessment of medicines underutilisation in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC project). Final report to the Pharmaceutical Society of Australia. February 2020.

[65] Couzos S, Smith D, Buttner P, Biros E. Assessment of change in medication adherence and self-assessed health status in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC project). Report to the Pharmaceutical Society of Australia for the IPAC project. Final Report, May 2020.

had a median of 213 (IQR: 134-303) and 201 (IQR: 126-279) days between assessments, respectively.

- Almost all participants were Aboriginal and/or Torres Strait Islander with a mean age at baseline of 58 (SD 29.8) years.
- At baseline, 70.8% (781/1103) of participants were adherent according to SIQ (scores 6 or 7), and 18% (175/975) had 'excellent to very good' health status according to SF1.
- There was a 12.8% (142/1103) and 10.3% (114/1103) net absolute increase in the number of participants adherent to medications at the end of the study compared with baseline ($p<0.001$), using NMARS and SIQ measures respectively, and a 23.9% (233/975) net absolute increase in the number of participants with improved self-assessed health status ($p<0.001$).
- NMARS content and construct validation procedures affirmed acceptable validity for the newly developed tool. Cronbach's alpha was 0.66 indicating the upper limit for validity and acceptable internal consistency for the purpose of the study. PCA analysis supported unidimensionality of the tool. Pharmacists reported the NMARS and single-item question (SIQ) self-reporting tools for assessing the extent of adherence and the reasons for non-adherence were useful to stimulate conversation relating to adherence.

Economic Evaluation

The IPAC intervention found relatively low costs to be associated with increases in the utilisation of medications and primary health care services, the latter having the potential to contribute to more equitable, needs-based health care expenditure for the Aboriginal and Torres Strait Islander population.[66] Results included:

- In the cost-consequence analysis, the net costs of delivering the intervention of $1,493 per person was associated with statistically significant improvements in the following biomedical indices for participants with pre and post-intervention measures: glycated haemoglobin (HbA1c) (for participants with a clinical diagnosis of T2DM), diastolic blood pressure (DBP), total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), triglycerides (TG), cardiovascular risk 5-year risk (CVD 5-year risk) and estimated glomerular filtration rate (eGFR).
- In the cost-effectiveness analysis, for participants with a clinical diagnosis of T2DM, the ICER of the IPAC intervention versus no intervention was $3,769 per participant with a clinically

[66] Hendrie D, Smith D, Couzos S. Economic evaluation of the Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) to improve Chronic Disease Management (IPAC Project). Final Report, May 2020.

meaningful reduction in HbA1c of at least 0.5%.

- For the subset of participants selected for MAI assessments, the corresponding ICER was $6,809 per reduction in the number of participants with a PPO.
- For participants with a clinical diagnosis of T2DM, the cost-utility analysis yielded an ICER of $7,463 (95% CI $6,030–9,664) per gain in quality adjusted life years (QALYs), assuming no lifetime costs additional to usual care were required to maintain the reduction in HbA1c.
- On an annual basis, the extended IPAC intervention was estimated to cost $13.2 million.
- The corresponding annual increase in utilisation of medications and primary health care services associated with better medication management support was $5.1 million. However, cost savings were also likely to be achieved from the improvement in health outcomes, for example, from a reduction in the utilisation and corresponding costs of emergency department presentations and hospital admissions. Under different scenarios, these cost savings were assessed as falling between $0.6 and $1.9 million per annum, varying according to the expected decrease in utilisation achieved.

In summary, integrating a non-dispensing pharmacist within ACCHSs led to significant and clinically relevant improvements (relative to usual care) in a range of primary and secondary clinical endpoints and quality of care outcomes for Aboriginal and Torres Strait Islander peoples with chronic disease attending ACCHSs. The intervention significantly improved glycaemic control in participants with T2DM and also brought about improvements in diastolic BP, total cholesterol, LDL-C, triglycerides, mean annual eGFR, and mean calculated absolute 5-year CVD risk in all study participants. Systolic BP significantly improved in those younger than 57 years of age. These improvements were clinically meaningful and evident in a population with a substantial chronic disease burden that occurred at a relatively younger age than other Australians.

Improvements were evident for prescribing quality indicators reflective of significant reductions in suboptimal prescribing, reductions in the use of medications that were unnecessary, and reductions in underprescribing of high-value pharmacotherapies. There were significant and substantial increases in participant access to HMRs (based on item 900 MBS claims), and other medication management reviews indicating that services provided by pharmacists within ACCHSs relative to usual care, led to superior health care service utilization (towards equity) by Aboriginal and Torres Strait Islander participants with chronic disease . There were significant improvements in adherence to medications for participants who enrolled to receive pharmacist services, as well as significant improvements in their self-assessed health status. Qualitative evaluation indicated that patients, integrated pharmacists, community pharmacists, and ACCHS staff reported that the intervention had improved quality of care outcomes and found the intervention to be acceptable and feasible.

Economic analysis reported relatively low costs to be associated with increases in the utilisation of medications and primary health care services, the latter having the potential to contribute to more equitable, needs-based health care expenditure for the Aboriginal and Torres Strait Islander population. Additionally, the modelled cost-utility analysis conducted for patients with T2DM found that, based on commonly used reference ICERs for the Australian health system, the ICER of $7,463 represented good value for money.

Table 4 Summary of the IPAC Trial findings- primary and secondary outcomes.

Population	Outcome measure	Number of participants (n)	Median length of stay in the study (days)	Baseline (usual care)	End of study (follow-up)	Difference	p-value ^
Clinical endpoints (Appendix 9), (SD, 95% CI)							
Participants with a clinical diagnosis of T2DM	HbA1c*, mmol/mol [%units]	539	284	66.8 (37.2) *[8.3% (5.5%)]*	64.0 (39.5) *[8.0% (5.8%)]*	-2.8 (19.5, -4.5 to -1.0) *[-0.3% (3.9%, - 0.4% to - 0.1%]*	0.001
All participants	SBP, mmHg	1103	266	132.7 (33.2)	132.0 (29.9)	-0.7 (16.6, -1.7 to 0.4)	0.16
	DBP, mmHg	1045	268	80.0 (35.6)	79.2 (29.1)	-0.8 (9.4, -1.4 to -0.2)	**0.008**
	TC, mmol/L	660	314	4.51 (1.80)	4.35 (2.06)	-0.15 (0.77, -0.22 to -0.09)	**<0.001**
	LDL-C, mmol/L	575	295	2.35 (1.20)	2.27 (1.20)	-0.08 (0.48, -0.13 to -0.03)	**0.001**
	HDL-C, mmol/L	622	294	1.05 (0.5)	1.06 (0.5)	0.01 (0.25, -0.02 to 0.03)	0.32
	TG, mmol/L	730	296	2.39 (2.43)	2.29 (2.21)	-0.11 (1.08, -0.20 to -0.01)	**0.006**
	ACR, mg/mmol*	475	301	57.9 (183.1)	61.7 (224.5)	3.8 (102.4, -6.32 to 13.83)	0.42
	CVD 5-year risk, %units	38	255	11.9 (7.2)	10.9 (5.4)	-1.0 (2.6, -1.8 to -0.12)	**0.027**
	eGFR* (no minimum follow-up time), ml/min/1.73m^2	895	296	49.1 (159.2)	48.4 (160.4)	1.9 (25.7, 0.1 to 3.7)**	**<0.001**
	eGFR* (6-month minimum follow-up time), ml/min/1.73m^2	720	317	49.6 (140.6)	48.1 (145.4)	-0.2 (36.0, -2.99 to 2.7)**	**0.034**
Prescribing quality according to the Medication Appropriateness Index (MAI, Appendix 10)- appropriateness of medications							
MAI subset of participants	Mean MAI score per participant	357	329	6.02 (SD 23.6)	3.20 (SD 11.7)	↓46.8%	**0.003**
	Mean MAI score per medication	357	329	0.76 (SD 8.5)	0.39 (SD 4.4)	↓48.7%	**0.004**
	Number of medications with ≥1 inappropriateness rating (n, %)	357	329	647/2804 (23.1%)	357/2963 (12.1%)	-11.0%	**0.008**
	Mean number of medications per participant with ≥1 inappropriateness rating (n, %)	357	329	1.8 (SD 5.3)	1.0 (SD3.6)	↓44.4%	**0.001**
	Number of participants with at least one inappropriate medication rating (n, %)	357	329	242 (67.8%)	159 (44.5%)	-23.3%	**<0.001**
Prescribing quality according to the Medication Appropriateness Index (MAI, Appendix 10)- overuse of medications (n,%)							
MAI subset of participants	Number of participants with any medications that met ≥1 overuse criterion	357	329	132 (37.0%)	87/377 (24.4%)	-12.6%	**<0.001**

Population	Outcome measure	Number of participants (n)	Median length of stay in the study (days)	Baseline (usual care)	End of study (follow-up)	Difference	p-value ^
	Number of medications that met ≥1 overuse criterion	357	329	249/2804 (8.9%)	147/2963 (5.0%)	-3.9%	**0.017**
Prescribing quality according to the Medication Appropriateness Index (MAI, Appendix 10)- medications meeting MAI risk criteria (n,%)							
MAI subset of participants	Drug not indicated	357	329	156/2804 (5.6%)	97/2963 (3.3%)	-2.29%	**0.033**
	Medication is ineffective for the condition	357	329	103/2804 (3.7%)	51/2963 (1.7%)	-1.95%	**0.010**
	Dosage incorrect	357	329	194/2804 (7.0%)	92/2963 (3.1%)	-3.81%	**<0.001**
	Directions incorrect	357	329	88/2804 (3.1%)	65/2963 (2.2%)	-0.94%	0.107
	Directions Impractical	357	329	89/2804 (3.2%)	16/2963 (0.5%)	-2.63%	**0.001**
	Significant drug-drug interactions	357	329	144/2804 (5.1%)	58/2963 (2.0%)	-3.18%	0.059
	Significant drug-disease interactions	357	329	72/2804 (2.6%)	38/2963 (1.3%)	-1.29%	**0.008**
	Unnecessary duplication of drugs	357	329	83/2804 (3.0%)	46/2963 (1.6%)	-1.41%	0.066
	Unacceptable therapy duration	357	329	164/2804 (5.9%)	98/2963 (3.3%)	-2.54%	**0.029**
	Most expensive drug	357	329	41/2804 (1.5%)	33/2963 (1.1%)	-0.35%	0.447
Prescribing quality according to the Medication Appropriateness Index (MAI, Appendix 10) - medications with an inappropriateness rating by medication type (n,%)							
MAI subset of participants	Cardiovascular medications [a]	357	329	164/1014 (16.2%)	77/1056 (7.3%)	-8.9%	**0.013**
	Endocrine medications [b]	357	329	136/593 (22.9%)	64/615 (10.4%)	-12.5%	**0.002**
Prescribing quality according to the Medication Appropriateness Index (MAI, Appendix 10) - participants with medications with an inappropriateness rating by medication type (n,%)							
MAI subset of participants	Cardiovascular medications [a]	357	329	117/357 (32.8%)	46/357 (12.9%)	-19.9%	**<0.001**
	Endocrine medications [b]	357	329	91/357 (25.5%)	51/357 (14.3%)	-11.2%	**<0.001**
Prescribing quality according to the Medication Appropriateness Index (MAI, Appendix 11)- underuse of medications							
AoU subset of participants	Number of participants assessed with AoU, who had at least one potential prescribing omission (PPO) (n,%)	353	330	181/353 (51.3%)	76/353 (21.5%)	-29.7%	**<0.001**
	Number of PPOs/participant	353	330	0.73 (SD 1.3)	0.29 (SD 0.9)	↓60.3%	**<0.001**
Home Medicines Reviews by MBS item 900 (Appendix 12) (n/100 person years, 95%CI)							
All participants	Number of participants with ≥1 Home Medicines Reviews (HMR) based on MBS item 900 claims	1456	285	10.0 (5.2-18.0)	38.7 (29.6-49.3)	↑3.9 times (rate ratio)	**<0.001**
	Number of MBS item 900 rebate claims	1456	285	10.2 (5.5-18.0)]	41.6 (32.2-52.3)	↑4.1 times (rate ratio)	**<0.001**
Medication management reviews (Appendix 12) (n,%)							

Population	Outcome measure	Number of participants (n)	Median length of stay in the study (days)	Baseline (usual care)	End of study (follow-up)	Difference	p-value ^
All participants	Number of participants with HMR (from the logbook)	1456	285	na	609/1456 (41.8%)	↑639 reviews	na
	Number of participants with ≥1 'medication related problems' that were identified following a HMR	1456	285	na	535/609 (87.9%)	na	na
	Number of participants with a non-HMR[c]	1456	269	na	719/1456 (49.4%)	↑757 reviews	na
	Number of participants with ≥1 'medication related problems' that were identified following a non-HMR	1456	269	na	503/719 (70.0%)	na	na
	Number of assessments that were a follow-up to a HMR or non-HMR[d]	1456	285/269	na	na	↑1,548 reviews	na
Medication adherence and self-assessed health status (Appendix 13) (n,%)							
All participants	Number of participants adherent to medications (NMARS)	1103	294	808/1103 (73.3%)	950/1103 (86.1%)	12.8%	**<0.001**
	Number of participants adherent to medications (SIQ)	1103	294	781/1103 (70.8%)	895/1103 (81.1%)	10.3%	**<0.001**
	Number of participants with 'very good to excellent' self-assessed health status	975	281	175/975 (18.0%)	303/975 (31.1%)	23.9%	**<0.001**
Qualitative analysis -the patient experience and stakeholder perceptions (See **Appendix** 14)							

Bold p-values imply statistically significant change at the 0.05 level. SD = cluster-adjusted standard deviation (ACCHS cluster). 'na' refers to 'not applicable'.
^p-values are cluster adjusted (ACCHS), however the adjustment may have also been conducted at the patient level – see analyses described in each individual report for the method used for each outcome measure.
↑Refers to a relative increase in the outcome measure (baseline compared with end of study).
↓Refers to a relative reduction in the outcome measure (baseline compared with end of study).
*Refers to last observation pre-enrolment and at follow-up. Unit conversion from IFCC (International Federation of Clinical Chemistry, mmol/mol) to DCCT (Diabetes Control and Complications Trial, %) units using the https://www.diabetes.co.uk/hba1c-units-converter.html units converter. eGFR reference range: Normal or Stage 1: CKD >89, Stage 2: 60-89 Stage 3A: 45-59, Stage 3B: 30-44, Stage 4: 15-29, Stage 5:<15. (Units in ml/min/1.73m^2), sourced from the National Guide (3rd Edn).[67] Albumin:creatinine ratio normal reference range: >2.5 mg/mmol for males and >3.5mg/mmol for females. Macroalbuminuria is defined as >25mg/mmol in males and >35 mg/mmol in females. Absolute CVD 5-year risk sourced from the National Guide (3rd Edn).[68]

[67] NACCHO and RACGP. National Guide to a preventive health assessment for Aboriginal and Torres Strait Islander people. 3rd Edn. RACGP, Melbourne, 2018
[68] NACCHO and RACGP. Op. Cit.

Mean annualised difference. P-value (paired data) were derived from the cluster-adjusted (ACCHS cluster) comparison of annualised differences against -3, as this is equivalent to a paired t-test. The value of -3 is the expected mean annual eGFR (ml/min/1.73m2) linear decline in Aboriginal and Torres Strait Islander adults (*see* ***Appendix 9*).

[a] Medications for: heart failure, angina, hypertension, arrhythmia, dyslipidaemia, pulmonary hypertension, other.

[b] Medications for: adrenal insufficiency, bone, diabetes, thyroid disorders, other.

[c] Based on logbook entries. A non-HMR was defined as a comprehensive medication management review comprising some or all the elements of a HMR, but not fulfilling all relevant MBS HMR criteria. The most common reason given by pharmacists for a non-HMR was to opportunistically provide a medication management review because the patient was at risk of forgoing a HMR. The other most common reasons for a non-HMR were because of limited patient access to an accredited pharmacist, and patient preference.

[d] A follow-up to a HMR or non-HMR was defined as a participant follow-up 3-6 months after the completion of an HMR or a non-HMR. Each activity involved reminder about the HMR and non-HMR advice and recommendations provided by the pharmacist (and the GP, if appropriate), assessment of the impact of any actions recommended from the HMR or non-HMR, and if another HMR or non-HMR or education session or preventive intervention was needed.

ACR= albumin-creatine ratio
AoU= Assessment of underutilisation
BP= blood pressure;
CVD= cardiovascular disease.
DBP= diastolic blood pressure
eGFR= estimated glomerular filtration rate
HbA1C= glycated haemoglobin
HDL-C= high density lipoprotein cholesterol
HMR= Home Medicines Review
LDL-C= low density lipoprotein cholesterol
MAI= Medication Appropriateness Index. The MAI score increases with increasing medication inappropriateness.
MBS = Medicare Benefits Schedule
NMARS = NACCHO medication adherence response scale for the reasons for non-adherence
PPO= potential prescribing omission
SBP= systolic blood pressure
SIQ = Single-item question for the extent of medication adherence
TC= total cholesterol
TG= triglycerides
T2DM= type 2 diabetes mellitus

Table 5 Summary of the IPAC Trial findings- economic analysis.

Economic Analysis (Section D)							
Type of economic evaluation	**Population**	**Outcome measure**	**Number of participants (n)**	**Mean length of stay in the study (days)**	**Incremental cost**	**Incremental outcomes**	**ICER**
Cost-consequence analysis	All participants	Various biomedical indices	1,456	284	$2,173,981	Various[1]	$1,493 per participant to achieve improvements in multiple biomedical indices[1]
Cost-effectiveness analysis	Participants with a clinical diagnosis ofT2DM	Number of participants with a clinically meaningful reduction in HbA1c	539	287	**$753,774**	**200**	$3,769 per participant with a clinically meaningful reduction in HbA1c of at least 0.5%
Cost-effectiveness analysis	Participants assessed for the underutilisation of medications	Number of potentially preventable omissions (PPO)	353	326	$714,959[2]	105	$6,809 per reduction in the number of participants with a PPO
Cost-utility analysis	Participants with a clinical diagnosis of T2DM	QALYs	539	287	$753,774	101	$7,463 per QALY

[1] Statistically significant improvements in the following biomedical indices for participants with pre and post-intervention measures: glycated haemoglobin (HbA1c) (for participants with a clinical diagnosis of T2DM), diastolic blood pressure (DBP), total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), triglycerides (TG), cardiovascular risk 5-year risk (CVD 5-year risk) and estimated glomerular filtration rate (eGFR).

[2] Includes (i) cost of PBS medicines and (ii) participants in trial for an average of 326 days.

Economic Analysis (Section E)						
Cost item	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total – 5 years**
Total intervention costs to extend IPAC model to all ACCHSs	$13,846,142	$13,273,542	$13,141,042	12,876,292	$12,851,292	$66.0 million
Total costs of additional health services from extending IPAC model to achieve more equitable use of PBS medicines and HMRs	$5,139,777	$5,139,777	$5,139,777	$5,139,777	$5,139,777	$26.0 million
Potential reduction in costs from fewer ED presentations and hospital admissions[1]	$633,532-$1,900,597	$633,532-$1,900,597	$633,532-$1,900,597	$633,532-$1,900,597	$633,532-$1,900,597	$3.17 million – $9.5 million

[1] Range based on assumption as to potential reduction in ED presentations and hospital admissions.

TRANSLATION ISSUES

The IPAC trial investigated the integration of a non-dispensing pharmacist within ACCHS settings delivering services expected within their current scope of practice. The pragmatic study design enabled the evaluation of real-world outcomes expected in this setting for Aboriginal and Torres Strait Islander adults with chronic disease. The study involved a large sampling frame of 18 services of varying sizes and geographic locations (across 22 sites in Queensland, Victoria, and the Northern Territory), as the goal was to evaluate real-life outcomes affecting an unselected population with chronic disease to enhance the external validity of the quality improvements expected from the intervention.[69] The IPAC trial had a large sample and analysed data from 1,456 enrolled Aboriginal and/or Torres Strait Islander participants. This suggests that the trial enrolled and evaluated the impact of the intervention using a sample large enough to adequately represent the population for whom the broader roll-out of the intervention is proposed.

The outcomes from the intervention are generalisable to the broader adult Aboriginal and Torres Strait Islander patient population with chronic disease who are at risk of developing medication related problems and attending ACCHSs in urban, rural and remote geographical locations. The evidence for generalisability has been demonstrated for every outcome measure investigated in the project (see Appendices 9-14**, and Section C**). The IPAC participants were representative of the proposed population, and were usual patients accessing ACCHSs, and the intervention was tested within usual clinical settings involving the ACCHS sector.

IPAC participants were identified using methods identical to those that would be used under usual conditions within the proposed health services, which is consistent with the pragmatic study design.[70] The delivery of the intervention was also flexible, and follow-up reflected the usual mechanisms in healthcare settings which are also hallmarks of pragmatic study design. Where prescribing outcomes from subsets of the population were investigated, analysis subsequently showed that the characteristics of this subset (n=357) was similar to the remaining broader IPAC cohort that did not have MAI assessments (n=1099, Appendix 10). Similarities were observed in age, sex, Aboriginality, geographical location, pensioner status, number of medications, CTG script eligibility, Health Care Homes enrolment, prior HMR, self-assessed health status, clinical diagnoses, type of chronic disease, degree of comorbidity or multimorbidity, obesity, glycaemic control, or prevalence of eGFR levels. The

[69] Øvretveit J, Leviton L, Parry G. Increasing the generalisability of improvement research with an improvement replication programme *BMJ Quality & Safety* 2011;20:i87-i91
[70] Ford I, Norrie J. Pragmatic Trials. N Engl J Med 2016; 375:454-463.

proportion of participants who self-reported as adherent to medications was also similar between cohorts (**Appendix 13).**

Table 6 provides a summary of the factors relevant to the translation of the IPAC intervention to ACCHSs and the proposed population more broadly. The proposed population for integrated pharmacist services delivered within ACCHSs are Aboriginal and Torres Strait Islander patients (irrespective of age) who have a clinical need for pharmacist support because of chronic disease and/or being at high risk of developing medication related problems because of their chronic disease. It is recommended that the intervention also target the broader ACCHS population including children who are also at high risk of developing medication related problems (irrespective of chronic disease).

The evaluation of pharmacist services as part of the IPAC Trial was restricted to adults over 18 years, mainly because of the ethics requirements for research associated with children providing informed consent. Chronic disease such as T2DM emerges at younger ages in the Aboriginal and Torres Strait Islander population than the general Australian population which means that arbitrary age-based criteria (set for evaluation purposes) is logistically restrictive in real-world settings for others who need medication support. There is a clear clinical need for services to support medication use in children, which is within the scope of practice of pharmacists to provide.

Table 6 Summary of factors relevant to the translation of the IPAC intervention to Aboriginal community-controlled health services more broadly

Factor	Translation issues	Implications for translation
General (implementation)	The IPAC trial used data from 1,456 participants making it one of the largest interventional studies involving individually consented Aboriginal and Torres Strait Islander adults with chronic disease ever conducted in Australia. The trial was a pragmatic, non-randomized, prospective, pre and post quasi-experimental study that was community-based and participatory.	The large sample size, the broad geographical distribution of involved ACCHSs, and the study design supports the transferability of the study findings to other ACCHS settings and the proposed population. The IPAC study evaluated real-life outcomes within ACCHS settings arising from the intervention (integrated pharmacists within ACCHSs).
Proposed population	IPAC participant criteria were: adult (18 years and over) patients with chronic disease who had visited a participating ACCHS site at least three times in the past two years relative to the recruitment date into the study	The proposed patient population for the broader translation of the integrated pharmacist intervention includes all adult Aboriginal and Torres Strait Islander patients who have a clinical need for pharmacist

Factor	Translation issues	Implications for translation
	(known as 'active' or 'regular' patients). Patients had a diagnosis of: • Cardiovascular (CV) disease (coronary heart disease, stroke, hypertension, dyslipidaemia and any other CV disease), • Type 2 diabetes mellitus, • Chronic kidney disease, or • Other chronic conditions and at high risk of developing medication-related problems (e.g. polypharmacy).	support because of chronic disease and/or being at high risk of developing medication related problems. The economic evaluation has been outlined the financial implications for this roll-out (**Section D and E**). The intervention is likely to benefit a broader ACCHS population including children (who would only make up a very small portion of pharmacist patients). Broader roll-out of the intervention needs to meet the needs of all ACCHS patients using medication, and this more flexible approach aligns with the principle of ACCHS self-determination.
Consumer impact	Qualitative evaluation involved twenty-four (24) integrated pharmacists who provided feedback on their experiences in the role and how well the project was able to be implemented within their ACCHS. Thirteen general practitioners, 12 managers and 10 community pharmacists responded to an online survey. Three ACCHSs were visited for an in-depth assessment of implementation.	Consumer impact reports from the qualitative evaluation (**Appendix 14)** support transferability of the intervention to the broader ACCHS sector.
Participant satisfaction	Several focus groups with participants revealed the benefits and challenges of the intervention and were overwhelmingly positive. There was increased knowledge and engagement of participants in their own health care through increased engagement with the health service. (Appendix 14).	Qualitative evaluation (**Appendix 14**) support transferability of the intervention to the broader ACCHS sector.
ACCHS inclusion criteria	Each ACCHS underwent a health systems assessment (HSA) to explore service characteristics and identify any systems change over the trial intervention period. There was little change in health systems assessment within participating sites from baseline to the end of the study that might otherwise explain prescribing improvements (such as from non-IPAC related service activity). ACCHSs were also required to meet site inclusion criteria for the project and are reported in the published protocol (Appendix 1). For example, making sure that ACCHS have	The intervention (integrated pharmacist) is transferable to ACCHSs that meet site inclusion criteria consistent with the core success factors of the IPAC trial. The proposed health service criteria that have been modified for transferability are shown in Table 10.

Factor	Translation issues	Implications for translation
	the physical space to support clinical consultations between the patient and pharmacist, to have a GP prescriber employed within the service, and pharmacist access to patient medical records (clinical information systems) and team-based care, are essential. (Appendix 14)	
	ACCHSs involved in the IPAC Trial were representative of other ACCHSs within their jurisdiction (reported by *NACCHO Affiliates*).	The intervention (integrated pharmacist) is transferable to ACCHSs that meet site inclusion criteria shown in Table 10.
Integration model within ACCHSs	Pharmacists were integrated within ACCHSs with: identified positions and core roles; had shared access to clinical information systems; provided continuous clinical care to patients, particularly on-site within the clinic setting; received administrative and other supports from primary health care staff; and adhered to the governance, cultural, and clinical protocols within ACCHSs as part of their shared vision.	Transferability will require and depend on fidelity to the integration model that was evaluated in the IPAC Trial.
Pharmacist registration	Integrated pharmacists fulfilled the following eligibility criteria: registration with the Australian Health Practitioners Regulation Agency (Ahpra); more than 2 years' post-registration experience; and post-graduate clinical qualifications or demonstrated clinical experience. Accreditation to conduct an HMR was preferred, however it was not mandatory for integrated pharmacists.	Transferability will require fidelity to the eligibility criteria for registered pharmacists as was evaluated in the IPAC Trial.
Pharmacists core roles	Integrated pharmacists functioned within existing and usual primary health care service delivery systems and focused on pre-determined core roles that included providing medication management reviews; assessing participant adherence and medication appropriateness; providing medicines information and education and training; collaborating with healthcare teams; delivering preventive care; liaising with stakeholders and developing stakeholder liaison plans; providing transitional care; and undertaking a drug utilisation review. Pharmacists' worked with ACCHSs to apply the roles to their individual setting to ensure the intervention was most impactful.	Transferability will require and depend on fidelity to the core pharmacist roles within the integration model that was evaluated in the IPAC Trial, with allowances for each health service to prioritise pharmacist activity to meet the individual needs of the proposed population.
Pharmacist training	Pharmacists were trained by the Pharmaceutical Society of Australia (PSA) to deliver core roles (all within their existing scope of practice). Pharmacists were also	Transferability of the intervention to broader ACCHSs will require additional resource commitments, such as the development of

Factor	Translation issues	Implications for translation
	provided with ongoing support through regular online communications and mentoring support.	training materials and resources, to train registered pharmacists prior to commencing integrated pharmacist roles within ACCHSs. The PSA and PGA are well placed to provide a program of training and ongoing support for pharmacists.
	Patient follow-up to medication management reviews as undertaken by integrated pharmacists, was substantial. There were 1,548 follow-up assessments of patients who had a review (mean time for follow-up was 30 mins), over a mean period of 284 days of participant involvement in the study. Patient follow-up is complicated as the target population is burdened by many chronic diseases and healthcare providers face many important demands. Clinical algorithms to streamline patient referral systems so that integrated pharmacists within the ACCHS model of care can follow-up patients will be valuable (Appendix 14, and Appendix 16).	Opportunistic pharmacists' assessments of the target patient population are particularly important in enhancing patient access to medication-related services. NACCHO, the Affiliates and PSA are well placed to develop generic clinical algorithms and resources to support ACCHSs to implement processes for opportunistic and patient follow-up regarding medication management.
Cultural protocols	Pharmacists integrated within ACCHSs were required to adhere to cultural and team-based principles relevant to ACCHS settings, so that study participants could benefit from the community trust this supported. Only ACCHSs were involved in the IPAC study (n=18).	Translation of the impact of the intervention is relevant only to primary healthcare settings within the ACCHS sector.
ACCHSs being service-ready	All ACCHSs received support and a site visit to be involved in the IPAC Trial. Some services were well prepared for the pharmacist and understood the value of the role. Staff in other services needed time to fully understand the role and learn how to utilise the pharmacists' expertise. Support from GPs and Aboriginal Health Workers and Practitioners (AHW/P) were enablers to the integration of the integrated pharmacist within the ACCHS. In particular, AHW/Ps played a vital role in assisting with patient follow-up. (Appendix 14)	Support will need to be provided to clinic staff and managers (for flow-on effect to healthcare staff) to ensure ACCHSs are ready for the integrated pharmacist role. The adaption and development of policies and procedures to guide ACCHS medicine-related activity with an integrated pharmacist will be valuable. NACCHO and the Affiliates are well placed to develop these policies, support staff, and procedures, in partnership with the PSA, to support ACCHSs.

Factor	Translation issues	Implications for translation
Integrated pharmacist recruitment	Integrated pharmacists were selected for the IPAC Trial with skills aligned to the expected scope of practice and core roles. Placements within ACCHS were influenced by the needs, capacity, and preparedness of ACCHSs that was assessed by NACCHO. Local community pharmacies were approached first to see if they are able to provide a pharmacist to work within the ACCHS according to service requirements of the ACCHS. If community pharmacies were unable to nominate a pharmacist, or if this nomination was not accepted by the ACCHS in line with principles of self-determination, the integrated pharmacist was employed directly by the PSA for the purposes of the Trial. Analysis was not undertaken to compare outcomes arising from differential models of integrated pharmacist employment.	Pharmacist recruitment to integrated non-dispensing roles within ACCHSs will be influenced by the financing models for broader program roll-out. Respecting the principles of self-determination means that ACCHSs have control of pharmacist recruitment to ensure their 'fitness for the service' with respect to suitable skills and cultural safety. The employment of pharmacists by the PSA (which was the dominant model used in the IPAC trial) will not be applicable for broader program roll-out. Ensuring similar selection criteria and community pharmacy involvement will help with recruitment of suitable similar candidates.
Community pharmacy	Many ACCHSs already had strong existing relationships with their local community pharmacies. Integrated pharmacists worked together with community pharmacists to problem solve, access discharge summaries, confirm the patient's medication history, undertake medication reconciliation by correcting errors and medication lists, and facilitate dose administration aids for patients. Community pharmacists reported that the integrated pharmacist role was very helpful and useful to them and it facilitated communication between the community pharmacy and GPs. Community pharmacists also perceived that patient knowledge of their medicines and adherence to medicines had improved since the integrated pharmacists had commenced in the ACCHSs. (Appendix 14). Integrated pharmacists completed 49 stakeholder liaison plans (median time taken for each plan was up to 5 hours) and 82% were completed with community pharmacies. Integrated pharmacists recorded 3,233 contacts with community pharmacy with nearly 70% being initiated by the integrated pharmacist [Appendix 16]	Pharmacists integrated within ACCHSs had substantial engagement with community pharmacy and pharmacists. Although engagement with community pharmacy is core to model of care for integrated pharmacist activity, resources to facilitate this stakeholder liaison will further encourage this activity. The PSA and the PGA are well placed to develop these resources or other supports.

Factor	Translation issues	Implications for translation
Transferability of all IPAC outcomes	The trial was a pragmatic, non-randomized, prospective, pre and post quasi-experimental study that was community-based and participatory. Generalisability was explored in all evaluation reports for primary and secondary outcomes (Appendices 9-13).	Improvements to clinical endpoints, prescribing quality improvements, improvements in access to medication management reviews, and improvements to adherence and self-assessed health status are generalisable to the proposed population (Appendices 9-13).
Business rules for HMRs	Pharmacists within ACCHSs operated within existing and usual business rules for Home Medicines Review MBS item 900 rebate claim and pharmacist fee for HMR under the 6CPA.	Existing business rules for medication management reviews can be utilised by integrated pharmacists within ACCHSs.

ACCHS= Aboriginal community-controlled health service
GP= general practitioner
HCH= Health Care Homes
HMR= Home Medicines Review
IPAC= Integrated pharmacists within ACCHSs to improve chronic disease management Project
NACCHO= National Aboriginal community-controlled health organisation
PGA= Pharmacy Guild of Australia
PSA= Pharmaceutical Society of Australia
QUMAX= Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander People
RAICCHO= Regional Aboriginal and Islander community-controlled health organisations

ECONOMIC EVALUATION

A trial-based economic evaluation was undertaken (interventional pre-post quasi experimental study conducted within ACCHSs as presented in **Section B**). Three types of economic analysis were conducted:

(i) a cost-consequence analysis that included all participants with changes in biomedical indices for whom pre- and post-measures of outcomes were recorded;

(ii) a cost-effectiveness analysis for two sub-groups of participants: those with T2DM with pre- and post-measures of HbA1c and those selected for MAI assessments at baseline and at the end of the study, with potential prescribing omissions (PPOs) used as the relevant outcome measure; and

(iii) for participants with a clinical diagnosis of T2DM, a cost-utility analysis that derived lifetime quality of life changes from the decreases in HbA1c observed during the trial period based on T2DM simulation models.

A summary of the economic evaluation that was undertaken is included in Table 7.

Table 7 Summary of the economic evaluation

Perspective	Health system (excludes private)
Comparator	Usual care pre-intervention
Type of economic evaluation	Cost-effectiveness analysis (CEA) and cost-consequence analysis (CCA)
Sources of evidence	Clinical trial
Time horizon	284 days
Outcomes	Biomedical indices, HbA1c, number of potential prescribing omissions
Methods used to generate results	Trial-based
Discount rate	Not necessary due to time horizon
Software packages used	SPSS and MSExcel

1. A cost-utility analysis was included by deriving lifetime quality of life changes from a systematic review of published studies that modelled the relationship between decreases in HbA1c and lifetime gain in QALYs.

This economic evaluation compared the costs and outcomes of the IPAC intervention versus usual care prior to the addition of an integrated non-dispensing pharmacist within ACCHSs to promote the quality use of medicines. The perspective adopted was the publicly funded health system. Discounting was not applied as the mean participant enrolment period was less than one year.

The cost of implementing the IPAC intervention was $1,946,876 (Table 8). As a result of the intervention, the net cost of health services (HMRs) increased by $132,899 ($179,012-$46,113) and the net cost of PBS medicines (i.e. medicines started less medicines stopped) increased by $553,849 ($132,899+$418,049). Participants for whom information on medicine use was not collected, were allocated the average cost of PBS medicines per participant, as calculated for participants with a medicine cost. Cost offsets from time saved by GPs and integrated pharmacists conducting HMRs (within trial hours) and non-HMRs during the trial period amounted to $459,643.

The net total cost of implementing the IPAC trial was $2,173,981 (calculated as [$1,946,876+($132,899+$553,849)-$459,643]). **On a per participant basis, this cost was equivalent to $1,493 per person.**

The results of the economic analysis are outlined in Section D.

Table 8 Resource use, costs and cost offsets in delivering the IPAC intervention (n=1,456)

Item	Resource use (units)	Costs ($)	
		During-trial period	Pre-trial period ("comparator")
Integrated pharmacist salary	27,478 hours	$1,621,079	
Integrated pharmacist allowances	-	$136,658	
Pharmacist out-of-pocket payment	-	$9,741	
Integrated pharmacist training	-	$64,820	
ACCHS contribution[1]	-	$52,158	
General Practitioner time spent	719 hours	$62,420	
Total: Intervention costs	**-**	**$1,946,876**	
Home Medicines Review based on item 900 claims (HMR)	149 pre-intervention; 471 during intervention[2]	$179,012 [2]	$46,113[3]
Net cost of PBS medicines (participants for whom medicines was measured)		$135,800[4]	
- (PBS medicines started)	-	($514,467)[4]	
- (PBS medicines stopped)	-	($378,667)[4]	
Net cost of medicines (participants for whom medicines were not directly measured)	-	$418,049[5]	-
Cost of utilisation health services		**$732,861**	**$46,113[3]**
Time saved by General Practitioners	1366 hours	$118,528	
Cost offsets HMRs	-	$53,402[6]	
Non-HMRs	757	$287,713	
Cost offsets		**$459,643**	
Net total costs		**$2,220,094**	**$46,113[4]**

HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
PBS= Pharmaceutical Benefit Scheme.
[1]Excludes overheads and infrastructure costs (e.g. office space, computers, etc)
[2]Data from HMR report (Appendix 12).[71] A cost offset of $380.07 per HMR was applied.
[3]A cost offset of $380.07 per HMR was applied but was adjusted for each participant to reflect equivalent number of days in pre-trial period as during trial period.
[4]Derived from: *Couzos S, Drovandi A, Smith D, Hendrie D, Biros E. Net cost to the PBS of medication changes arising from the IPAC intervention: Method used to assess health system costs for economic analysis. Supplement to the Economic Evaluation for the IPAC Project. Report to the PSA, December 2019.* The costs differ slightly from this report as the costs here also include the cost of medicines for four participants who were not in the AoU group, totalling $2593.69 ($135,800 - $133,206). This cost relates to the subset of participants who had an AoU conducted.
[5]Participants for whom information on medicine use was not collected were allocated the average cost of PBS medicines per participant as calculated for participants with a medicine cost.
[6]Derived from 471 HMRs X $113.39. The majority (96.4%) of HMRs conducted during the trial period were completed by the integrated pharmacists, with approximately half (52.8%) conducted within IPAC hours and for which no 6CPA claim was submitted. Given the fee of $222.77 per HMR, this amounts to a cost offset to the system of $113.39 per HMR (0.964 x 0.528 x $222.77).

[71] Couzos S, Smith D, Buttner P, Biros E. Assessment of Home Medicines Review (HMR) and non-HMR in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal community - controlled health services (IPAC Project). Final Report to the PSA, Feb 2020.

ESTIMATED EXTENT OF USE AND FINANCIAL IMPLICATIONS

Section E outlines the financial implications of the broader roll-out of the proposed service to Aboriginal and Torres Strait Islander patients with chronic disease (irrespective of age) attending ACCHSs.

The financial implications have been determined based on the integrated model of care for pharmacists investigated in the IPAC Trial. **Section B and Appendices** outline the methods, main results, findings, limitations and generalisability of the findings. **Section C** outlines translation issues.

The approach used to estimate the financial implications of the introduction of an integrated pharmacist within ACCHSs has been based on costings for recruitment, employment, training, taking into account the proposed settings and the proposed population and extrapolated to the proposed ACCHS services. Information is also drawn from the economic evaluation presented in Section D.

Financial implications include the cost of (i) delivering the proposed service and (ii) additional utilisation of health services resulting from integrated pharmacists being part of the primary health care team. Costs presented are a maximum figure that assumes all ACCHSs across Australia will participate in the extended IPAC program and be able to access suitable pharmacists.

Cost offsets from implementing the IPAC model of care will be generated as the integrated pharmacists assume tasks previously undertaken by GPs, thus freeing up time for GPs. Additionally, improvement in biomedical indices for clients is likely to lead to a reduction in the need for acute health care services over time.

Over the projected 5-year period, total costs of implementing the extended IPAC intervention average $13.2 million per annum (Table 9).

Table 9 Financial implications of extending the IPAC intervention to all ACCHSs

Item	Year 1 ($)	Year 2 ($)	Year 3 ($)	Year 4 ($)	Year 5 ($)
Pharmacists salary	11,735,262	11,735,262	11,735,262	11,735,262	**11,735,262**
Training and support for pharmacists	1,151,000	621,000	621,000	488,750	488,750
Program support for ACCHSs	647,500	622,500	490,000	357,500	332,500
Program monitoring and evaluation	312,380	294,780	294,780	294,780	294,780
TOTAL COSTS	13,846,142	13,273,542	13,141,042	12,876,292	12,851,292

The corresponding annual increase in utilisation of medications and primary health care services associated with better medication management support and for more equitable use of health systems by the Aboriginal and Torres Strait Islander population was $5.1 million. However, cost savings were also likely to be achieved from the improvement in health outcomes, for example, from a reduction

in the utilisation and corresponding costs of emergency department presentations and hospital admissions. Under different scenarios, these cost savings were assessed as falling between $0.6 and $1.9 million per annum, varying according to the expected decrease in utilisation achieved (see **Section E**).

CONSUMER IMPACT SUMMARY

The impact of the intervention on consumers is detailed in a qualitative analysis that was undertaken to investigate participant, health service staff, pharmacist and general practitioner perspectives of the intervention (see Appendix 14). Twenty-four (24) integrated pharmacists representing all 20 health services involved in the project provided feedback on their experiences in the role and how well the project was able to be implemented within their ACCHS. Thirteen general practitioners, 12 managers and 10 community pharmacists responded to an online survey. Three ACCHSs were visited for an in-depth assessment of implementation.

The majority of patients, managers, GPs, other health services staff, and integrated pharmacists overwhelmingly supported the integration of pharmacists within ACCHSs.

Patients and health services staff benefited from having a pharmacist delivering services within the ACCHS. The majority of patients reported that the integrated pharmacist had been able to look at their medications and suggest alternative or different combinations of medications, or regimes that resulted in them 'feeling better'. Patients felt empowered to better manage their health conditions through better understanding why they needed to take their medications and how they worked. Many patients indicated they were more adherent to their medications. In addition to feeling better, patients reported other benefits as a result of medication changes such as losing weight, being motivated to do more exercise and engaging with other support groups in the community. The integrated pharmacist and other health services staff concurred that patients' management of the health conditions (such as adherence) had improved, as had their biomedical test results, particularly their HbA1c levels for patients with diabetes.

The main benefit for health services staff was having access to an 'in-house medicines expert'. The integrated pharmacists provided support and advice to health services staff informally such as through 'corridor conversations' as well as formally through medication reviews. Integrated pharmacists and GPs reported that recommendations were commonly made by the integrated pharmacists following medication reviews. Recommendations were perceived to be of high quality and prescriber up-take of the recommendations was said to be high. Education sessions delivered for health services staff, including GPs, nurses and Aboriginal Health Workers were perceived as valuable. Health services staff

also benefited from the pharmacists having input into their clinical team meetings and case conferences. The pharmacists contributed to medicines safety and quality assurance activities by conducting drug utilisation reviews and assisting in reviewing ACCHS medication-related policies.

Many ACCHSs had strong existing relationships with their local community pharmacies, particularly through supports for the Section 100 Remote Area Aboriginal Health Services program, and the Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander People (QUMAX) program arrangements. Integrated pharmacists worked together with community pharmacists to problem solve, access discharge summaries, confirm the patient's medication history, undertake medication reconciliation by correcting errors and medication lists, and facilitate access to dose administration aids (DAAs) for health service patients. Community pharmacists reported that the integrated pharmacist role was very helpful and useful to them and it facilitated communication between themselves and general practitioners. Relationships between ACCHSs and community pharmacies were further strengthened as a result of significant contact through the project. Participating community pharmacists believed there was a role for an IPAC-type (non-dispensing) pharmacists within ACCHSs

OTHER RELEVANT CONSIDERATIONS- ACCESS AND EQUITY, AND WORKFORCE TRAINING

The integrated pharmacist intervention is likely to result in additional costs to the Australian Government through increased PBS medications, access to HMRs and health service utilisation. However, this is consistent with achieving equity for Aboriginal and Torres Strait Islander peoples who currently receive much less of these services. The integrated pharmacist intervention enhances access for Aboriginal and Torres Strait Islander peoples to these services.

Please see transferability issues in **Section C** and detailed considerations in **Section F**. For the intervention to be delivered to ACCHSs, issues needing further consideration include the additional resource commitments necessary to prepare and support pharmacists, such as through the PSA, and other ACCHS supports to deliver the integrated model of care effectively. The qualitative analysis of the IPAC trial (Appendix 14) outlines some challenges that warrant consideration in the planning and support of program expansion.

Readiness for the pharmacist services delivered through the project was a challenge for some ACCHSs. All ACCHSs received support and a site visit as part of the recruitment process, and some services were well prepared for the pharmacist and understood the scope and roles in which integrated pharmacists can work. However, staff in other services needed time to further understand the role and learn how to best utilise the pharmacists' expertise. Addressing this issue if there is a broader roll-out of this program will require support to be provided to clinical staff and managers to ensure they are prepared for the integrated pharmacist role. A lead-in period enabling the pharmacist and services to familiarise themselves with the proposed model and role would be beneficial prior to requiring any outcome data related to program deliverables. Supporting ACCHSs to develop policies and procedures to guide

medicine-related activity will be valuable and could assist pharmacists to establish their role within the service. Making sure that ACCHS have the physical space to support clinical consultations between the patient and pharmacist and have a GP prescriber employed within the service are essential.

Support for ACCHSs in a broader roll-out of this program should be based on the six ACCHS support strategies provided throughout the IPAC trial (Appendix 22). This involved support from NACCHO and its Affiliates with some collaboration and technical and pharmacy-related involvement from PSA. Affiliates of NACCHO can leverage from their public health and clinical expertise and local knowledge based on their proximity and involvement in daily ACCHS activity to ensure local needs are optimally met and include pharmacist induction into the service, as well as health care staff induction to the role of the integrated pharmacist. For example, most pharmacists had project 'go to' people or 'champions' who assisted with their integration in services. Support from GPs and AHW/Ps were enablers to the integration of the integrated pharmacist and patient referral process. This was particularly the case with AHW/Ps who played a vital role in assisting with patient follow-up. Clinical algorithms to support patient referral to the pharmacists within the ACCHS model of care may also be valuable. Coordinating referral processes is complicated as the target population is burdened by many chronic diseases and other important health care provider demands. This means opportunistic assessments are particularly important to close the gap in access to medication-related services. NACCHO is well placed to lead the development of generic clinical algorithms and referral resources in collaboration with Affiliates and the PSA, if there is a broader roll-out of the integrated pharmacist model of care within ACCHSs.

Pharmacist recruitment to integrated non-dispensing roles within ACCHSs will be influenced by the financing models for broader program roll-out. The selection criteria and processes undertaken throughout the IPAC trial can inform future models of recruitment (Appendix 19). Pharmacists would not need to be employed by the PSA. Principles to be considered are:

- Respecting the principles of self-determination, ACCHSs have a role in pharmacist recruitment to ensure their 'fitness for the service' with respect to suitable skills and cultural safety.
- Pharmacists are selected with skills aligned to the expected scope of practice and core roles;
- Placements within ACCHSs will be influenced by the ACCHSs' needs, capacity, and preparedness;
- Community pharmacies who have well developed and respectful relationships with ACCHSs are well placed to provide or identify pharmacists to perform integrated roles to build on and enhance existing connections.

Induction to the integrated pharmacist role and ongoing support was provided throughout the trial by the PSA project coordinators. Pharmacists providing an integrated service within ACCHSs would

benefit from a coordinated induction to the role and ongoing support to enable them to work effectively within their respective health services.

SECTION A. CONTEXT

This submission-based assessment of the *Integrating Pharmacists within Aboriginal Community Controlled Health Services* (ACCHSs) *to improve Chronic Disease Management* (IPAC) Trial for the integration of non-dispensing pharmacists within Aboriginal Community-Controlled Health Services (ACCHSs) is intended for the Medical Services Advisory Committee (MSAC). MSAC evaluates new and existing health technologies and procedures for which funding is sought under the Medicare Benefits Schedule (MBS) in terms of their safety, effectiveness and cost-effectiveness, while taking into account other issues such as access and equity. MSAC adopts an evidence-based approach to its assessments, based on reviews of the scientific literature and other information sources, including clinical expertise.

James Cook University, has provided systematic and umbrella review evidence and the results of the IPAC Trial including economic evaluation on behalf of the broader IPAC program team, in order to inform MSAC's decision-making regarding whether the proposed medical service should be publicly funded.

The Pharmaceutical Society of Australia (PSA) was commissioned by the Australian Government Department of Health to conduct the IPAC Trial and economic evaluation of the IPAC Trial which was then undertaken in partnership with James Cook University and the National Aboriginal Community Controlled Health Organisation (NACCHO).

Appendix 23 provides a list of the people involved in the development of this assessment report.

A1 ITEMS IN THE AGREED PICO CONFIRMATION

This submission-based assessment of the integration of pharmacists within ACCHSs addresses all of the PICO elements that were pre-specified. The reference standard was the test as set out in the approved Trial Protocol and the case for the economic evaluation is based on a trial-based evaluation.

The summary PICO for the IPAC trial was as follows:

> P: Aboriginal and/or Torres Strait Islander patients (adults ≥18 years of age and considered 'regular' clients) with chronic disease in receipt of care from eligible ACCHSs.

I: The addition of an integrated pharmacist as part of the primary health care team of ACCHSs providing evidence-based core support services and responsive needs-based services.

C: Usual care prior to the addition of an integrated non-dispensing pharmacist.

O: To improve quality of care outcomes (primary biomedical outcome measures, secondary outcome measures, and economic cost-effectiveness analysis).

A minor change from the original PICO proposed at the time of the PTP Trial funding application was accepted by the Department of Health and incorporated in the funding contract and project protocol. The change altered the target population from patients 'of any age' to adults ≥ 18 years. This change was made prior to PTP Trial funding and was agreed at the time contracts were finalised. Primary and secondary outcome measures were also refined to reflect improvements to the research methodology, and this was done and accepted prior to contracts being finalised. Iterations to the Project Protocol were made over time to refine the research methods, so that the current version 1.6, 18 November 2019 (Appendix 2) reflects the final version of the protocol that was ratified by the Steering Committee and the Department of Health.

A2 PROPOSED MEDICAL SERVICE

The proposed service is the addition of an integrated non-dispensing pharmacist as part of the primary health care team of ACCHSs to provide care to Aboriginal and/or Torres Strait Islander patients (considered 'regular' clients) with chronic disease. The services to be delivered by the integrated pharmacist include both patient-related and practice-related activities through the following core roles: providing medication management reviews, assessing and supporting medication adherence, providing medicines information and education and training, collaborating with healthcare teams, delivering preventive care, liaising with stakeholders such as community pharmacy, providing transitional care, and undertaking quality improvement activity such as a drug utilisation review.

The integration of a non-dispensing pharmacist within ACCHSs means the following (based on the key features of pharmacists working to deliver IPAC services):

- Pharmacists supported as team members within ACCHSs with identified positions;
- with shared access to clinical information systems;
- providing rational and continuous clinical care to patients;
- receiving administrative and other supports from primary health care staff within ACCHSs, and
- adhering to governance, cultural, and clinical protocols within ACCHSs as part of their shared vision.

These roles are consistent with the dimensions of 'integration' reported by other studies investigating the integration of pharmacists within primary health care (PHC) settings,[72] and the Integrating Models of Pharmacists across Care Teams (IMPACT) Framework that identified six domains to guide PHC services in readiness for the integration of pharmacists.[73]

Analysis of participant data and integrated pharmacist activities collected through the IPAC Trial has demonstrated that integrated pharmacists significantly improved a range of intermediate clinical outcomes for adult Aboriginal and Torres Strait Islander participants with chronic disease attending ACCHSs. Participants had significantly improved control of CVD risk factors, glycaemic control in participants with T2DM, and reduced absolute CVD risk. A nearly four-fold increase in HMRs indicates that pharmacists integrated within ACCHSs are well placed to deliver medication management reviews to participants who experience substantial barriers in accessing HMRs under current program rules, especially for participants who would otherwise forgo a medication review. Prescribing quality improved significantly for participants following assessments of medication appropriateness and underutilisation. Medication adherence and self-assessed health status improved significantly indicating that integrated pharmacists can help to overcome the many difficulties this population faces with taking medications.

A3 PROPOSAL FOR PUBLIC FUNDING

This proposal is for baseline plus pro-rata public funding (depending on the health service client load and episodes of care) of a non-dispensing pharmacist within ACCHSs to provide the services outlined in this proposal within an integrated model of care.

While a mixed model encompassing baseline funding plus a fee-for-service (FFS) methodology may be considered for future program rollout, block funding is likely to be more appropriate to enable integrated pharmacists to most effectively meet the unique needs of Aboriginal and Torres Strait Islander peoples. A block funding approach aligns with other Commonwealth funding approaches for ACCHSs (such as Indigenous Australians' Health Programme); accommodates patient non-attendance at scheduled clinic appointments that occurred in some ACCHSs during the IPAC trial; and allows for the significant variation in preference for pharmacist services (including clinical governance, education and training, and patient-directed care) observed across ACCHSs in the IPAC trial. On this basis an MBS item descriptor is not being proposed as it would encourage a FFS funding arrangement for pharmacists' services which is inconsistent with the integration model being proposed. An MBS item

[72] Hazen ACM, de Bont AA, Boelman L, et al. The degree of integration of non-dispensing pharmacists in primary care practice and the impact on health outcomes: A systematic review. Res Social Adm Pharm. 2018; 14(3):228-240. doi: 10.1016/j.sapharm.2017.04.014. Epub 2017 Apr 22.

[73] Northern Territory PHN and Northern Territory Government Top End Health Service. *IMPACT Framework - A Framework to Guide the Integration of Pharmacists into Primary Health Care Teams*. 2018 18 Dec 2018 25 February 2020]; Available from: https://www.ntphn.org.au/web_images/IMPACT%20Framework.pdf.

descriptor may not deliver the necessary integration of pharmacists required for them to provide services consistent with the proposed core roles within ACCHSs.

Pharmacists are not currently supported through existing Australian Government of State and territory programs to deliver integrated and non-dispensing services within these primary health care service settings, except nominally through the Workforce Incentive Program (WIP). The WIP is intended for rural and remote Australia and provides financial incentives to support general practices to engage the services of nurses and other allied health staff. Many ACCHSs are currently accessing the WIP to employ practice nurses and/or Aboriginal health practitioners/workers. This means there are no remaining WIP program funds to support the proposed medical service. The quantum of funding from the WIP is insufficient to support both the integration of a non-dispensing pharmacist as well as the existing uses of the WIP funding within ACCHSs. Furthermore, non-dispensing pharmacists remain unable to claim MBS item fees for chronic disease management (CDM) services provided in a primary care setting, and therefore cannot supplement the maximum incentive payment available under the WIP.

A4 PROPOSED POPULATION AND PROPOSED SETTING

The population targeted by this proposed service are Aboriginal peoples and Torres Strait Islanders with chronic disease who are known as 'active' or 'regular' patients receiving services within ACCHSs (at least three times in the past two years). Patients to be targeted are those with a diagnosis of:

- Cardiovascular (CV) disease (coronary heart disease, stroke, hypertension, dyslipidaemia and any other CV disease),
- Type 2 diabetes mellitus,
- Chronic kidney disease, or
- Other chronic conditions and at high risk of developing medication-related problems (e.g. polypharmacy).

These conditions represent the participant inclusion criteria for the IPAC Trial.

The proposed settings are comprehensive primary health care services that are Aboriginal Community-Controlled Health Services (ACCHSs), as indicated by the service inclusion criteria for the IPAC Trial **(Appendix 1 and 2**). As this submission aims to extend the service (integrated pharmacists) beyond the IPAC Trial to ACCHSs broadly, the proposed setting has been amended to reflect program translation beyond the research trial (Table 10)

Table 10 Proposed Health Service criteria for participation in the proposed service (integrated pharmacist)

To receive the proposed service, the health service must:
• be an *Aboriginal Community Controlled Health Service* and funded by the Department of Health for the provision of primary health care services to Aboriginal and Torres Strait Islander peoples. • be a member of NACCHO, and the relevant NACCHO State/Territory Affiliate. • employ at least one full-time- equivalent general practitioner per clinic who is able to prescribe medicines to patients of that organisation. • use an electronic clinical information system. • participate in continuing quality improvement and reporting on the national Key Performance Indicators through the use of electronic data extraction tools. • adhere to program business rules and guidelines, data provision requirements, and patient/service consent requirements for the program. • provide the integrated pharmacist access to a private consulting room on the clinic premises that has access to the clinical information system. • be an accredited practice in accordance with the *Royal Australian College of General Practitioners* Practice Standards. • be participating or eligible to participate in the Pharmaceutical Benefits Scheme co-payment measure (practice incentive program), if in a non-remote location. • be eligible to participate in the section 100 arrangements for the supply of pharmaceutical benefits, if in a remote location.

Aboriginal peoples and Strait Islander people are known to experience a significantly higher burden of chronic disease than non-Indigenous Australians.[74] Despite the high burden of chronic disease, under-use of medications amongst Aboriginal and Torres Strait Islander people persists.[75] The rate of potentially avoidable hospitalisations for Aboriginal and Torres Strait Islander people is almost 5 times the rate for other Australians with over half of these relate to chronic conditions.[76] Aboriginal and Torres Strait Islander people's access to primary health services remains disproportionately low

[74] Bainbridge R, McCalman J, Clifford A, Tsey K, : Cultural competency in the delivery of health services for Indigenous people. Issues paper no. 13. Produced for the Closing the Gap Clearinghouse. In. Edited by Welfare AIoHa, vol. 13. Canberra: Australian 2015.
[75] Pharmaceutical Society of Australia. *Guide to providing pharmacy services to Aboriginal and Torres Strait Islander people.* Jul 2014. http://www.psa.org.au/download/guidelines/Guide-to-providing-pharmacy-services-to-Aboriginal-and-Torres-Strait-Islander-people.pdf
[76] Australian Institute of Health and Welfare 2011. Access to health services for Aboriginal and Torres Strait Islander people. Cat. No. IHW 46. Canberra: AIHW http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=10737418951

particularly when considering their higher burden of chronic disease[77] and PBS medicines continue to be underutilised compared with non-Indigenous Australians.[78] Quality Use of Medicines services are accessed at lower rates and this problem is often compounded by more complex medicine regimens and more co-morbidities seen in Aboriginal and Torres Strait Islander patients.[79]

Chronic diseases are the leading cause of illness, disability and death in Australia and comorbidities are associated with poorer health outcomes, more frequent use of health services and higher healthcare costs. Aboriginal and Torres Strait Islander people have two-to-three times higher levels of illness than non-Indigenous Australians. [80] Together with changes to lifestyle factors, long term treatment with medications is usually needed to prevent or reduce disease progression and thereby mitigate outcomes of ill health. Yet, registered pharmacists currently provide only limited clinical pharmacy services to Indigenous Australians due to several barriers including in remote areas, the limited funding available through the Section 100 Support Allowance.[81] [82] [83] [84] These barriers also include prohibitive HMR business rules and processes that are not always possible or culturally acceptable.[85] [86] Many Aboriginal health services provide few HMR referrals due to issues with the cultural responsiveness of pharmacists, and lack of relationships pharmacists have with these services.[87] [88] Yet, when medication reviews are delivered in culturally appropriate settings (such as in Aboriginal

[77] Australian Institute of Health and Welfare: Australia's health 2014. Australia's health series no.14. In., vol. Cat.no.AUS178. Canberra: AIHW; 2014.
[78] Australian Health Ministers' Advisory Council. Aboriginal and Torres Strait Islander Health Performance Framework 2017 Report. AHMAC, Canberra, 2017.
[79] Swain L: Guide to providing pharmacy services to Aboriginal and Torres Strait Islander people. In. Canberra, ACT, Australia: Pharmaceutical Society of Australia, 2014
[80] Australian Institute of Health and Welfare. *Expenditure on health for Aboriginal and Torres Strait Islander people, 2010–11. An analysis by remoteness and disease*. Accessed 25 August 2014. Available at: http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129544363
[81] Swain L. Are rural and remote HMRs viable? Australian Pharmacist. 2012; 31(3):184.
[82] Campbell Research and Consulting. Home Medicines Review Program. Qualitative Research Project. Final Report. Department of Health and Ageing, Australian Government, Canberra, 2008.
[83] NOVA Public Policy Pty Ltd. Evaluation of Indigenous Pharmacy Programs Final Report 28 June 2010. Available from: https://www1.health.gov.au/internet/main/publishing.nsf/Content/F520A0D5EDEA0172CA257BF0001D7B4D/$File/Indigenous%20Programs%20Report.pdf
[84] Australian Government. Australian Government response to the Senate Community Affairs References Committee Report: Inquiry into the Effectiveness of Special Arrangements for the Supply of Pharmaceutical Benefits Scheme (PBS) Medicines to Remote Area Aboriginal Health Services. March 2018. Available from: https://www1.health.gov.au/internet/main/publishing.nsf/content/AC97597F257E6ABBCA257BF0001FE872/$File/government-response-to-senate-enquiry-into-raahs-march-2018.pdf
[85] Swain L, Barclay L. Medication reviews are useful, but the model needs to be changed: Perspectives of Aboriginal Health Service health professionals on Home Medicines Reviews. BMC Health Serv Res. 2015;15:366-.
[86] Swain L, Griffiths C, Pont L, Barclay L. Attitudes of pharmacists to provision of Home Medicines Review for Indigenous Australians. Int J Clin Pharm. 2014; 1;36(6):1260-7.
[87] Swain L, Barclay L. Medication reviews are useful, but the model needs to be changed: Perspectives of Aboriginal Health Service health professionals on Home Medicines Reviews. BMC Health Serv Res. 2015;15:366-.
[88] Swain L, Griffiths C, Pont L, Barclay L. Attitudes of pharmacists to provision of Home Medicines Review for Indigenous Australians. Int J Clin Pharm. 2014; 1;36(6):1260-7.

health services) there is great potential to increase patients' medication knowledge, medication adherence and to improve chronic disease management.[89]

Social determinants of health, and population-based disparities also impact on adherence to prescribed medications and are factors associated with adverse health outcomes in all population groups.[90] Social circumstances, and deficiencies in health services and systems mean Aboriginal people often suffer even greater challenges in medication management than non-Indigenous Australians. Social and emotional wellbeing issues may deeply pervade the lives of many Aboriginal people and may diminish the value that individuals place upon medications and the potential for these to improve their quality of life.[91] It has been said that "Australia's mainstream medical model focuses on compliance with medical advice and often ignores the complex historical and sociocultural influences that shape patients' responses to their health and health care."[92]

A5 COMPARATOR DETAILS

The proposed medical service supplements the usual care provided to Aboriginal and Torres Strait Islander patients with chronic disease attending existing ACCHSs. The comparator used for the evaluation of the IPAC trial was the 'usual care' provided to the enrolled participants within participating ACCHSs in the 12 months preceding their enrolment into the study. Usual care was defined as usual primary healthcare service provision to Aboriginal and Torres Strait Islander patients without the presence of an integrated pharmacist within the health service. Health service activity that was conducted prior to pharmacist integration and patient enrolment was defined as baseline activity. Baseline (usual care) comprised a period of 12 months prior to participant enrolment into the study, or the first assessment that was conducted after patient enrolment and within the first 90 days, depending on the outcome measure being evaluated.

Usual care varies across ACCHS contexts. In the absence of integrated pharmacists' services, usual care provides limited medication adherence support to Aboriginal and Torres Strait Islander patients of ACCHSs. Access is ad hoc and if it is sourced by the target population, it is usually accessed via community pharmacy. Medication management reviews (if sourced) are accessed via community pharmacies or directly from independent accredited pharmacists with delivery and content strictly

[89] Swain L, Barclay L. Medication reviews are useful, but the model needs to be changed: Perspectives of Aboriginal Health Service health professionals on Home Medicines Reviews. BMC Health Serv Res. 2015;15:366-.
[90] World Health Organisation. Adherence to long term therapies; evidence for action. WHO, Switzerland, 2003. http://www.who.int/chp/knowledge/publications/adherence_full_report.pdf?ua=1 {accessed 8 October 2018].
[91] Emden C, Kowanko I, De Crespigny C, et al. *Better medication management for Indigenous Australian: findings from the field*. Aust J Prim Health 2005;11:80–90.
[92] Pharmaceutical Society of Australia. *Guide to providing pharmacy services to Aboriginal and Torres Strait Islander people.* Jul 2014. http://www.psa.org.au/download/guidelines/Guide-to-providing-pharmacy-services-to-Aboriginal-and-Torres-Strait-Islander-people.pdf

guided by Program Rules.[93] Education and training is currently provided to ACCHS staff (and some patients in the target population) according to the program rules for the S100 Support Allowance, and some arrangements contracted with community pharmacy through the QUMAX Program. The following services have not been generally and routinely available as part of usual care to healthcare providers and the target population within ACCHSs:

- Opportunistic patient follow up;
- Team-based collaboration activity;
- Preventive health care delivery specifically targeting the Aboriginal and Torres Strait Islander population;
- Medicines information service on-site, including opportunistic advice;
- Stakeholder liaison services;
- Transitional care support;
- Quality improvement activity (such as a drug utilisation review).

A6 CLINICAL MANAGEMENT ALGORITHM(S)

The theory of change model for the IPAC Trial outlines that if pharmacists are integrated within ACCHSs providing primary health care to Aboriginal peoples and Torres Strait Islanders, they can facilitate increased access to medication-related expertise and assessments for prescribers and other members of the primary healthcare team, compared with usual care. When that access is coupled with increased engagement with patients, as well as other stakeholders such as community pharmacy and hospitals, this will result in improved patient access to services, improved quality use of medicines such that suboptimal prescribing is reduced, increased medicines utilisation, and improvements in chronic disease outcomes for the target population. This model was tested in the IPAC Trial and the evidence now confirms these associations and outcomes as being achieved. The theory of change for the intervention is summarised as Appendix 3.

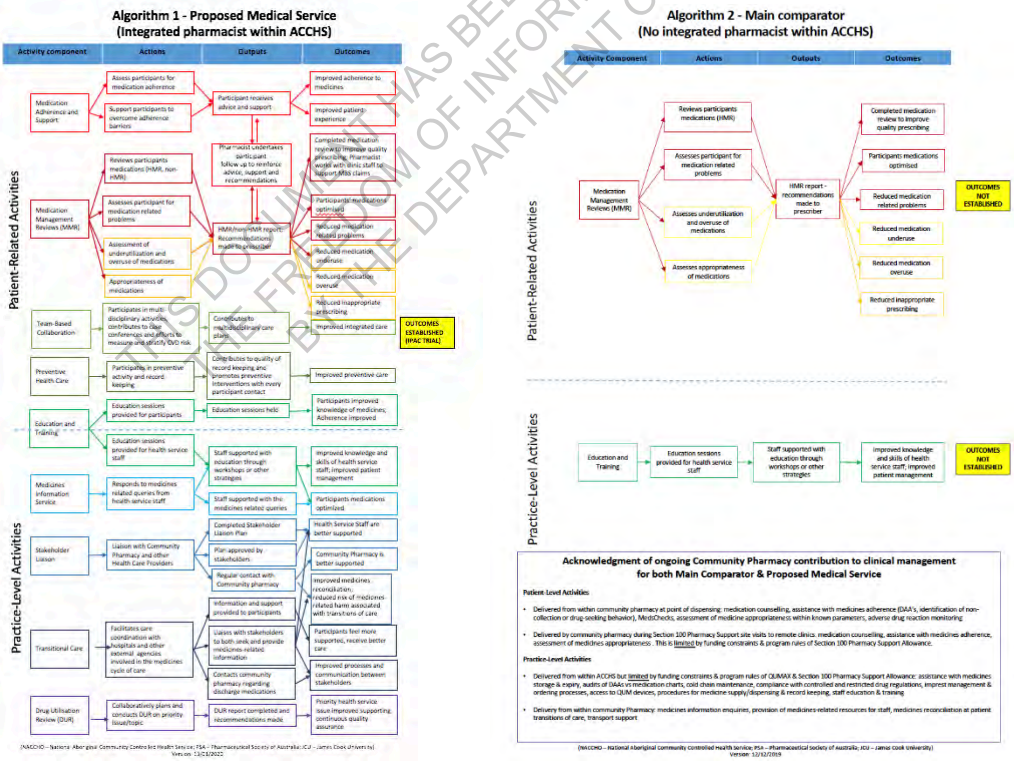
This model outlines factors influencing the impact of an integrated pharmacist and the underpinning assumptions, such as conditions outside the control of individual healthcare professionals, and also to some extent outside the control of healthcare services. These assumptions include: that prescribers are supportive and receptive to pharmacists recommendations; that many barriers to optimal medication use are socially determined and outside the control of the patient and healthcare team; and that community pharmacy is sufficiently engaged and has the capacity to support change.

[93] Pharmacy Programs Administrator. Program Rules. Home Medicines Review. Australian Government, Department of Health, Canberra, July 2019.

A logic model developed for evaluation of the IPAC Trial is in effect, a clinical management algorithm. It depicts the context of the proposed service where a non-dispensing pharmacist integrated within the health service functions to deliver clinical care to individual Aboriginal and Torres Strait Islander patients, and to improve the overall integration of care for the patient. Pharmacists integrated within the ACCHS can themselves facilitate a 'joined-up' and more coordinated journey for the patient. This is achieved through medicines reconciliation when patients are hospitalised or discharged supporting their transition in care; through liaison with community pharmacy to support the patient and general practitioner; through consultations at time and place that suit the patient; and through improved record-keeping and team-based care. Integrated pharmacists can enhance health systems by supporting quality prescribing and quality improvement within the ACCHS context. The logic model is summarised as Appendix 4.

The proposed clinical management algorithm that depicts the context of the intended use of the proposed medical service following public funding for the service is shown as Appendix 5. It is formatted to be comparable to the usual care algorithm (without an integrated pharmacist within ACCHSs) as Appendix 6. The algorithms are placed side by side to highlight differences.

Figure 1 Clinical management algorithm/s for the proposed new service relative to current clinical practice (usual care)



A7 KEY DIFFERENCES IN THE PROPOSED MEDICAL SERVICE AND THE MAIN COMPARATOR

The differences between the proposed medical service and the main comparator have been explained in the following Table 11. The main differences pertain to a more integrated, coordinated, collaborative, and expansive set of medication- related services being introduced than is able to be provided through current and usual care within Aboriginal primary health care settings. This means that Aboriginal and Torres Strait Islander patients with chronic disease (who are particularly vulnerable to disjointed care), have a 'joined-up' experience of care with regard to medication management, within the ACCHS setting. For example, based on findings from the IPAC Trial, patients with chronic disease and substantial comorbidity, were at risk of forgoing a medication management review under usual care arrangements. Significantly more patients with chronic disease received Home Medicines Reviews and other medication management reviews than from usual care.[94] These patients were able to be treated to optimise health outcomes, who would not otherwise have accessed this benefit through usual care mechanisms.

Table 11 Key differences in the delivery of the proposed medical service and the main comparator

Activity Component	Proposed medical service (Integrated pharmacist within ACCHS) Algorithm 1	Main comparator (No integrated pharmacist within ACCHS) Algorithm 2	Description of Difference
Medication Adherence and Support	Readily available. At each patient encounter, the pharmacist tailor's adherence assessment and support to known barriers relevant to the patient and ACCHS context.	Not readily available	Proposed medical services enable increased assessment and support for medicines adherence to help overcome related barriers to optimal medicines use and improves patient experience (Appendix 13).
Medication Management Reviews	Readily available. Option of opportunistic delivery at each patient contact. Location of service flexible to meet patient needs and preference. Unlimited follow up enables reinforcement of recommendations made and advice provided at initial medication review, and also assesses need for additional pharmacist services.	Limited availability. Restricted by CPA Medication Management Review program rules which determine frequency and location of service delivery. Follow up not readily available.	Proposed medical service offers increased uptake of Medication Management Reviews (MMR). Proposed medical service increases identification and prioritisation of patients for review, and enables flexibility with time and location as preferred by patients. This helps to overcome these known barriers to provision of the MMR service (Appendix 12).

[94] Couzos S, Smith D, Buttner P, Biros E. Assessment of Home Medicines Review (HMR) and non-HMR in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal community - controlled health services (IPAC Project). Final report to the Pharmaceutical Society of Australia for the IPAC Project, February 2020.

Medication Appropriateness	Readily available. Pharmacist assesses medication appropriateness at each patient encounter.	Limited availability. Provided within Medication Management Reviews (see above).	Proposed medical service increases opportunities to assess prescribing appropriateness, overprescribing & medicines underutilization, with resultant improvements in prescribing quality (Appendices 10 and 11).
Team-Based Collaboration	Readily available. Pharmacist as integrated team member undertakes both opportunistic and scheduled collaboration with other clinicians.	Not readily available	Proposed medical service enables increased pharmacist participation in Multidisciplinary Case Conferences, & contribution to TCA/GPMPs (Appendix 16).
Preventive health Care	Readily available. Pharmacist participates in health promotion activities & contributes to the recording of parameters needed to estimate CVD risk.	Not readily available	Proposed medical service increases preventive health care in relation to chronic disease management ((*Appendix 16*).
Education and Training	Readily available. Pharmacist provides education and training sessions tailored to the needs and preferences of the ACCHS, including topics, frequency, duration & intended audience. Sessions may be conducted for patient groups as well as staff.	Limited availability. Restricted by Section 100 Support Allowance and QUMAX program rules and funding.	Proposed medical service increases opportunities to improve the health literacy of patients and staff and contributes to the up skilling of health service clinicians to ultimately improve patient care (Appendices 14 and 16).
Medicines Information Service	Readily available. Pharmacist responds to medicines-related queries in a timely manner.	Not readily available	Proposed medical service improves prescribing quality (Appendices 10, 14 and 16).
Stakeholder Liaison	Readily available. Pharmacist shares relevant information with Community Pharmacy via mutually agreed methods of communication.	Not readily available	Proposed medical service increases communication between ACCHS and Community Pharmacy to optimise patient care (Appendices 14 and 16).
Transitional Care	Readily available. Pharmacist facilitates care coordination between ACCHS and other external agencies involved in the medicines cycle of care such as hospitals and renal dialysis units via mutually agreed methods of communication.	Not readily available	Proposed medical service increases communication between ACCHS and external agencies, with improvement in medicines reconciliation and reduction of risk of medicines-related harm associated with transitions of care (Appendices 14 and 16).
Drug Utilisation Review (DUR)	Readily available. Pharmacist collaborates with ACCHS staff to identify and address priority drug-related issues/topics.	Not readily available	Proposed medical service improves priority health service issues related to drug use and supports continuous quality improvement (Appendices 14 and 16).

Note: Core roles are color coded to match the logic model for the IPAC Project (Appendix 4).

The contribution of community pharmacy to usual care (algorithm 2- main comparator to the proposed service) is acknowledged as being provided within ACCHSs.

A8 CLINICAL CLAIM

Aboriginal and/or Torres Strait Islander adult patients with chronic disease receiving pharmacist services that are integrated within ACCHSs, will experience superior quality of care outcomes compared to usual care.

Services provided by pharmacists within ACCHSs is likely to lead to superior health care service utilization (towards equity) by patients with chronic disease compared to usual care.

A9 SUMMARY OF THE PICO

The summary PICO for the IPAC trial was as shown in Table 12.

Table 12 PICO criteria from the IPAC trial in Aboriginal and Torres Strait Islander adult patients with chronic disease attending Aboriginal community-controlled health services

Criteria	Description
Population	Aboriginal and/or Torres Strait Islander patients (adults ≥18 years of age and considered 'regular' clients) with chronic disease in receipt of care from eligible ACCHSs. Inclusion criteria: • Cardiovascular (CV) disease (coronary heart disease, stroke, hypertension, dyslipidaemia and any other CV disease), • Type 2 diabetes mellitus, • Chronic kidney disease, or • Other chronic conditions and at high risk of developing medication-related problems (e.g. polypharmacy).
Intervention	The addition of an integrated pharmacist as part of the primary health care team of ACCHSs providing evidence-based core support services and responsive needs-based services.
Comparator/s	Usual care prior to the addition of an integrated non-dispensing pharmacist.
Outcomes	To improve quality of care outcomes (primary biomedical outcome measures, secondary outcome measures, and economic cost-effectiveness analysis). Primary expected outcome was an improvement in quality of care indicators (including systolic and diastolic blood pressure, glycated haemoglobin (HbA1c), lipids, estimated absolute cardiovascular disease (CVD) risk, and albumin-creatinine ratio (ACR) in patients with chronic disease. Expected secondary outcomes included improvements in: • estimated glomerular filtration rate (eGFR); • prescribing indices (medication appropriateness, overuse, underuse, and medication-related problems); • patient use of medicines (medication adherence, self-assessed health status, and patient experience); • health service utilization indices (Medicare Benefits Schedule claims for: home medicines reviews, care plans, case conferences, team care arrangements and other items), and out-of-home medication management reviews (non-HMRs); and • stakeholder perceptions (ACCHSs staff; community pharmacies; pharmacists). An economic evaluation of the IPAC trial ascertained the incremental cost-effectiveness ratio of the pharmacy intervention in relation to usual practice (at baseline) to assess whether the IPAC trial represents value for money from a health system perspective.

	Critical for decision making: some primary outcomes and secondary outcomes pertaining to prescribing quality, health service utilisation indices such as MBS claims for Home Medicines Reviews; and stakeholder perceptions. These outcomes have been sourced from good quality data. *Important, but not critical for decision making*: other health service utilisation indices. *Low importance for decision making*: change in medication adherence, eGFR, CVD risk, ACR, self-assessed health status. These outcomes are subject to limitations in the quality of the data sourced from ACCHSs.
Primary research question	*Does the addition of an integrated pharmacist as part of the primary health care team of ACCHSs providing care to Aboriginal and/or Torres Strait Islander patients (≥18 years and considered 'regular' clients) with chronic disease, improve quality of care, and therefore health outcomes, compared with prior usual care?*

A10 CONSUMER IMPACT STATEMENT

The consumer impact is detailed in a qualitative analysis that was undertaken to investigate participant, health service staff, pharmacist and general practitioner perspectives of the intervention (see Appendix 14). Twenty-four (24) integrated pharmacists from all ACCHSs recruited in the project (n=20) [95] provided feedback on their experiences in the role and how well the project was able to be implemented within their service. Thirteen general practitioners, 12 managers and 10 community pharmacists responded to an online survey. Three ACCHSs were visited for an in-depth assessment of implementation.

The majority of participants, managers, GPs, other health services staff, and integrated pharmacists overwhelmingly supported the integration of pharmacists within ACCHSs.

Participants and health services staff benefited from having a pharmacist delivering services within the ACCHS. The majority of participants reported that the integrated pharmacist had been able to look at their medications and suggest alternative or different combinations of medications, or regimes that resulted in them 'feeling better'. Participants felt empowered to better manage their health conditions through better understanding why they needed to take their medications and how they worked and many indicated they were more adherent to their medications. In addition to feeling better, patients reported other benefits as a result of medication changes such as losing weight, being motivated to do more exercise and engaging with other support groups in the community. The integrated pharmacist and other health services staff concurred that participants' management of the

[95] IPAC Project quantitative reports are based on patient data from 18 ACCHSs due to the discontinuation of two services in the implementation phase of the project.

health conditions (such as adherence) had improved, as had their biomedical test results, particularly their HbA1c levels for patients with diabetes.

The main benefit for health services staff was having access to an 'in-house medicines expert'. The integrated pharmacists were provided support and advice to health services staff informally such as through 'corridor conversations' as well as formally through medication reviews. Integrated pharmacists and GPs reported that recommendations were commonly made by the integrated pharmacists following medication reviews that were perceived to be of high quality and with reportedly high prescriber up-take of the recommendations. Education sessions delivered for health services staff, including GPs, nurses and AHW/Ps) were perceived as valuable, as was pharmacists input into their clinical team meetings and case conferences.

Many ACCHSs had strong existing relationships with their local community pharmacies, particularly through the Section 100 Remote Area Aboriginal Health Services program, and the Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander People (QUMAX) program arrangements. Relationships between ACCHSs and community pharmacies were further strengthened as a result of the IPAC trial. The qualitative evaluation found that the integrated pharmacists worked together with community pharmacists to problem solve, access discharge summaries, confirm the patient's medication history, undertake medication reconciliation by correcting errors and medication lists, and facilitate provision of dose administration aids for health service patients.

Activities recorded in the pharmacist logbook indicated integrated pharmacists interacted with community pharmacists on a daily basis with more occasions logged for such interactions than any other IPAC activity. The most common agency engaged by integrated pharmacists for supporting the transitional care of patients was also community pharmacy for the purpose of reconciling medication lists (Appendix 16).

Community pharmacists reported that the integrated pharmacist role was very helpful and useful to them and it facilitated communication between the community pharmacy and general practitioners. Community pharmacists also perceived that patient knowledge of their medicines and adherence to medicines had improved since the integrated pharmacists had commenced in the ACCHSs. Participating community pharmacists believed that there was a role for an IPAC-type (non-dispensing and integrated) pharmacists within ACCHSs.

SECTION B. CLINICAL EVALUATION

The clinical effectiveness of integrated pharmacists within ACCHSs is based on direct primary research evidence through the conduct of the PTP Trial known as the Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) to improve Chronic Disease Management (IPAC) Trial. The IPAC trial was funded by the Australian Government Department of Health, under the Pharmacy Trials Program (Tranche 2) funding as part of the Sixth Community Pharmacy Agreement (6CPA) that sought to improve clinical outcomes for patients utilizing the full scope of pharmacist's role in delivering primary health care services.

The IPAC Trial investigated the effectiveness of non-dispensing pharmacists integrated within ACCHSs during 2018-2019. The trial was a pragmatic, non-randomized, prospective, pre and post quasi-experimental study that was community-based and participatory (*Trial Registration Number and Register: ACTRN12618002002268*). The intervention was the integration of a registered pharmacist within the ACCHS primary healthcare team for up to a 15-month period. There were 22 ACCHS sites (18 ACCHSs) that participated in the project until the end, across three jurisdictions: Victoria, Queensland and the Northern Territory to ensure a sampling frame that best informed external validity of the outcomes across varied services and patient populations. Pharmacist positions were aggregated to represent a total of approximately 12.3 full time equivalents (FTE). All eligible ACCHS sites that participated received the intervention.

Two systematic reviews were sourced:

1) A systematic review of published literature was undertaken as part of the IPAC trial to explore cost-effectiveness analyses of integrated models of care involving pharmacists (Appendix 7) in the absence of existing reviews (see Section D);

2) A recently completed umbrella review of systematic reviews was sourced and included in this report, with permission granted from the authors[96] (Copyright James Cook University, in-confidence**, Appendix 8).** This umbrella review synthesised several systematic reviews that have been published exploring patient-related outcomes from integrated pharmacist interventions within primary health care settings. **Please note that permission to release this report in the public domain has not been granted.**

[96] Shaw C, Couzos S. Integration of non-dispensing pharmacists into primary healthcare services: an umbrella review and narrative synthesis of the effect on patient outcomes. James Cook University, January 2020.

B1 DIRECT EVIDENCE

B1.1 LITERATURE SOURCES AND SEARCH STRATEGIES

For the literature review on the 'cost-effectiveness of non-dispensing pharmacist services integrated within primary health care'[97] (Appendix 7), see Section D.

B1.2 LITERATURE SOURCES AND SEARCH STRATEGIES

This section refers to the umbrella review of systematic reviews on the 'cost-effectiveness of non-dispensing pharmacist services integrated within primary health care'[98] (Appendix 8).

This review aimed to determine the effectiveness of the integration of non-dispensing pharmacists into primary health care settings on patient outcomes such as intermediate clinical endpoints, prescribing quality, and patient-reported outcomes. Integration was defined broadly as any intervention that involved co-location of pharmacists within PHC settings, and/or pharmacists who worked as part of multidisciplinary healthcare teams using a range of integrative processes.

The umbrella review of systematic reviews did not reveal any systematic reviews nor any primary research studies that have investigated quantitative outcomes from pharmacist integration within Aboriginal health settings. The review revealed five systematic reviews- one of which was conducted in Australia exploring pharmacist integration within general practice.[99] None of the included studies identified if participants were from marginalised groups such as Indigenous peoples or peoples residing in remote geographical locations.

The medical literature was searched between August and December 2019 using Medline, PubMed, CINAHL, the Cochrane Database of Systematic Reviews, and the JBI Database of Systematic Reviews to identify all relevant systematic reviews and meta-analyses regarding the integration of non-dispensing pharmacists in primary health care. A set date range of 1990-current was used. Searches were conducted of the databases and sources described in Appendix 8. Search terms are described in Table 13.

[97] Johnstone K, Smith D, Couzos S. Literature review on the cost-effectiveness of non-dispensing pharmacist services integrated within primary health care. James Cook University, February 2020.
[98] Shaw C, Couzos S. Integration of non-dispensing pharmacists into primary healthcare services: an umbrella review and narrative synthesis of the effect on patient outcomes. James Cook University, January 2020.
[99] Tan ECK, Stewart K, Elliot RA, George J. Pharmacist services provided in general practice clinics: a systematic review and meta-analysis. *Res Social Adm Pharm*. 2014;10: 608-622.

Table 13 Search terms used (literature search platform) for the review on the integration of non-dispensing pharmacists into primary healthcare services: an umbrella review and narrative synthesis of the effect on patient outcomes.

Element of clinical question	Search terms
Population	AND (primary health care OR general practice OR family practice OR patient care team OR community health service OR community health centre OR primary care OR outpatient care OR family medicine OR multidisciplinary health care team OR team-based care)
Intervention	pharmacists OR pharmaceutical services OR non-dispensing pharmacist OR clinical pharmacist OR pharmaceutical care
Outcomes	AND (systematic review OR review).
Exclusions	Financial outcomes; analysis of interprofessional relationships; pharmacist based in community pharmacy or inpatient setting; concerned with health professionals other than pharmacists; unpublished studies or not clearly a systemic review or a meta-analysis; articles not in English.

B1.3 RESULTS OF LITERATURE SEARCH

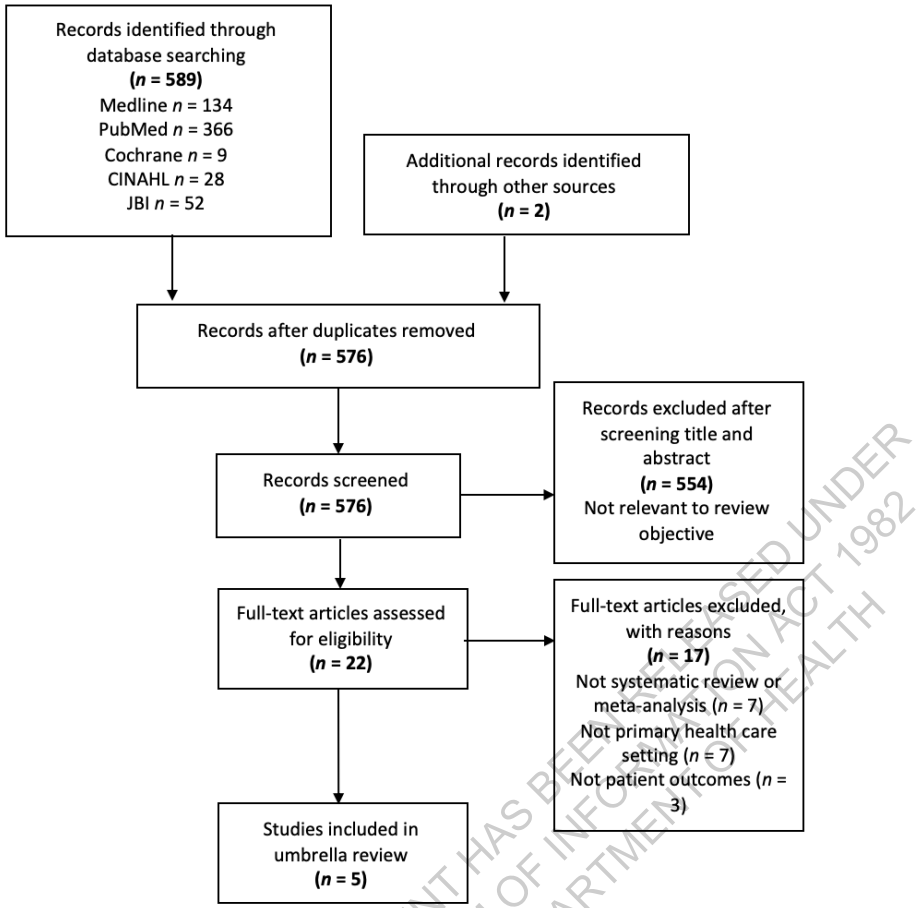
A PRISMA flowchart (Figure 2) provides a graphic depiction of the results of the literature search and the application of the study selection criteria.

Two independent reviewers screened the titles and abstracts of all publications for eligibility (based on inclusion criteria; Table 14) and examined the full text of those considered eligible. Pre-specified criteria for excluding studies are included in Table 13. All studies that met the inclusion criteria are listed in Appendix 8.

Table 14 Population, intervention, comparison, outcome (PICO) scheme of inclusion criteria for Umbrella review.

Parameter	Description
Population	adults (over 18 years), chronic disease, any sex, any country, any ethnicity
Intervention	pharmacist integrated or co-located in PHC setting, provision of direct patient services or participation in the PHC team
Comparison	Usual care, lack of intervention
Outcome	Patient outcomes (biomedical measures, prescribing quality or appropriateness, medication adherence)

Figure 2 Summary of the process used to identify and select studies for the Umbrella review on the Integration of non-dispensing pharmacists into primary healthcare services.



A profile of each included study is given in Table 15 and in Appendix 8.

This study profile describes the authors, study ID, publication year, study design, study location, setting, study population characteristics, assessment methods, description of the comparator (and associated intervention), and the relevant outcomes assessed.

Table 15 Characteristics of included studies – Umbrella Review of integration of non-dispensing pharmacists into primary health care services (copyright: James Cook University, 2020) [100]

Author, year, journal	Objectives	Outcomes	Type of review	Participants	Patient characteristics	Setting	No. of data-bases searched	Date range of database searching	Publication date range	No. and types of studies, country of origin	Conclusions
Fish et al. 2002 **The International Journal of Pharmacy Practice**	Effect and cost of practice-based pharmaceutical services	Changes in prescribing practices Prescribing quality Cholesterol BP Medication compliance QoL	Systematic review	Physicians/GPs Pharmacists/ Pharmaceutical prescribing advisors	Adults with chronic disease (hypercholesterolaemia, hypertension, polypharmacy, COPD) Patients at risk of medication-related errors	GP practice Community health centre	5	Jan 1980-March 2001	1983-2000	16 studies RCTs UK Australia Sweden Canada US	Educational outreach visits, medication reviews and patient specific prescribing advice were effective in achieving desired outcomes There is insufficient evidence to generalise about cost-effectiveness of the interventions
Tan et al. 2014 **Research in Social and Administrative Pharmacy**	Effectiveness of clinical pharmacist services delivered in primary care general practice clinics	HbA1c BP Cholesterol Framingham risk score	Systematic review and meta-analysis	GPs Pharmacists	Adults with chronic disease (CVD, diabetes, depression, metabolic syndrome, pain, COPD, menopause) or polypharmacy Patients at risk of medication-related errors	GP practice	4	1966-2013	1996-2013	38 studies RCTs US UK Canada Brazil Chile Japan Thailand Jordan	Pharmacist co-location in GP clinics delivered a range of interventions with favourable results in chronic disease management and quality use of medications

[100] Shaw C, Couzos S. Integration of non-dispensing pharmacists into primary healthcare services: an umbrella review and narrative synthesis of the effect on patient outcomes. James Cook University, January 2020.

					Patients at risk of adverse health problem						
Riordan et al. 2016 **SAGE Open Medicine**	Effect of pharmacist-led interventions in optimising prescribing	Change in prescribing appropriateness: Beers criteria STOPP/START MAI Clinical or patient-reported outcomes eg QoL or patient satisfaction	Systematic review	Pharmacists Physicians Nurses	Community-dwelling older adults (>65 years) with polypharmacy, drug-related problems	GP practice Family medicine clinic Veterans Affairs medical centre	11	Inception-Dec 2015	1996-2010	5 studies RCTs Quasi-RCTs Controlled before and after studies Interrupted time series US UK New Zealand	Pharmacist-led interventions involving access to medical notes and medication reviews conducted in physician practices with feedback to physicians may improve prescribing appropriateness
Fazel et al. 2017 **Annals of Pharmacotherapy**	Impact of pharmacist interventions as part of the health care team on diabetes therapeutic outcomes in ambulatory care settings	HbA1c Systolic BP LDL-C	Systematic review and meta-analysis	Pharmacists	Adults with Type 1 or Type 2 diabetes mellitus	Hospital-based outpatient clinics Community pharmacies Primary care physician offices Community clinics	9	1995-Feb 2017	1996-2016	42 studies (Systematic review = 42 studies Meta-analysis = 35 studies) RCTs Non-RCTs Pretest-posttest studies US Australia Iran Jordan Thailand	Pharmacists' interventions as part of the patient's health care team improved diabetic therapeutic outcomes by significantly reducing HbA1c, SBP, LDL-C
Hazen et al. 2018 **Research in Social and**	Impact of degree of integration of a non-dispensing	Real clinical health outcomes eg mortality	Systematic review	Pharmacists GPs	Adults with chronic disease (diabetes, hypertension, dyslipidaemia,	Primary care practice	2	1966-June 2016	1996-2015	60 studies RCTs	Full integration of a non-dispensing pharmacist into a primary health

Administrative Pharmacy	pharmacist on medication related health outcomes in primary care	Surrogate clinical health outcomes eg HbA1c, lipids, BP Patient reported outcomes eg QoL Proxies of health outcomes eg quality of care performance indicators	metabolic syndrome, heart failure, depression, cardiovascular disease, osteoporosis)	Two group cohort studies One group cohort study US UK Brazil Canada Hong Kong Jordan Australia Sweden	care setting adds value to patient-centred (heterogeneous patients such as those with multimorbidity and polypharmacy), but not disease-specific (patients with specific chronic conditions), clinical pharmacy services

BP = blood pressure, SBP = systolic blood pressure, LDL-C = low-density lipoprotein C, HbA1c = haemoglobin A1c, CVD = cardiovascular disease, COPD = chronic obstructive pulmonary disease, QoL = quality of life, GPs= general practitioners, RCT = randomised controlled trial, STOPP/START = Screening Tool for Older Persons Prescriptions/Screening Tool to Alert doctors to Right Treatment, MAI = Medication Appropriateness Index

B1.4 Risk of Bias Assessment

Eligible publications were assessed for methodological quality using the critical appraisal tool for systematic reviews and research syntheses developed by The Joanna Briggs Institute[101], presented in Table 16. Each element of the checklist was designated as being 'met', 'not met', 'unclear', or 'not applicable'. This tool allows for an assessment of the quality of the included publications and was not used as part of the inclusion criteria.

Table 16 Risk of bias assessment for the review on the Integration of non-dispensing pharmacists into primary healthcare services- based on Joanna Briggs Institute critical appraisal checklist for systematic reviews and research syntheses[102]

Checklist	Fish et al. 2002	Tan et al. 2014	Riordan et al. 2016	Fazel et al. 2017	Hazen et al. 2018
Review question clearly and explicitly stated	Met	Met	Met	Met	Met
Inclusion criteria appropriate for the review question	Met	Met	Met	Met	Met
Appropriate search strategy	Met	Met	Met	Met	Met
Adequate sources and resources used to search for studies	Met	Met	Met	Met	Met
Critical appraisal conducted by two or more reviewers independently	Met	Met	Met	Met	Met
Appropriate methods used to combine studies	Not applicable	Met	Not applicable	Met	Met
Likelihood of publication bias assessed	Unmet	Met	Met	Met	Unclear
Recommendations for policy and/or practice supported by reported data	Unclear	Met	Met	Met	Met
Appropriate specific directives for new research	Met	Met	Met	Unmet	Unclear

B1.5 Characteristics of the Evidence Base

See Appendix 8 for details on the individual studies included in the evidence base.

A summary of literature review evidence is provided in Table 15.

B1.6 Outcome Measures and Analysis

See Appendix 8 and Table 13 for details on the outcomes measured in the included studies, along with the statistical methods used to analyse the results.

[101] Aromataris E, Fernandez R, Godfrey C et al. Summarizing systematic reviews: methodological development, conduct and reporting of an umbrella review approach. Int J Evid Based Healthc. 2015;(13)3:132-140.
[102] Aromataris E, Fernandez R, Godfrey C et al. Summarizing systematic reviews: methodological development, conduct and reporting of an umbrella review approach. Int J Evid Based Healthc. 2015;(13)3:132-140.

B1.7 RESULTS OF THE LITERATURE REVIEW (UMBRELLA REVIEW OF SYSTEMATIC REVIEWS)

A narrative synthesis of the findings of this Umbrella Review is presented in Appendix 8. Eligible publications were assessed for methodological quality using the critical appraisal tool for systematic reviews and research syntheses developed by The Joanna Briggs Institute.[103] A total of 161 studies were assessed across the five reviews, and included randomised controlled trials (RCTs), non-randomised controlled trials (non-RCTs), quasi RCTs, cohort studies, controlled before and after studies and pretest-posttest studies. Approximately 60% (97 of 161) of the studies were conducted in the US. The studies were heterogenous in regard to 'integration' of NDPs into primary health care teams. All studies primarily examined interprofessional collaboration between pharmacists and GPs. Across the included studies patients were either categorised according to a particular chronic disease; or were considered more broadly as patients prescribed multiple medications, those at risk of an adverse health issue or those at risk of a medication-related adverse event. All reviews except one stipulated that the comparison group was usual care or no intervention. Outcomes examined across the included studies were also heterogenous. Because of this significant heterogenicity and small number of included publications, a narrative synthesis of the evidence was completed.

Outcomes assessed in reviews were classified broadly as changes in biomedical markers (blood pressure, HbA1c, cholesterol, lipids, Framingham risk score), changes in prescribing practices or appropriateness (prescribing quality, reduction of inappropriate prescribing), and patient-reported outcomes (quality of life, patient satisfaction).

In summary, the aggregated results from the included reviews suggest that the integration of a non-dispensing pharmacist in PHC settings can improve patient outcomes and quality of care. Biomedical markers, such as HbA1c, blood pressure and cholesterol improved with pharmacist intervention across a number of trials. Pharmacist intervention also improved quality use of medications and reduced inappropriate prescribing. There was no effect on the quality of life.

On the basis of the benefits reported in the evidence-base summarised above, it is suggested that relative to usual care, the integration of pharmacists within primary health care settings has superior effectiveness with regard to biomedical and prescribing quality outcomes that benefit patients with chronic disease or who are at risk of a medication-related adverse effect. However, there are no

[103] Aromataris E, Fernandez R, Godfrey C et al. Summarizing systematic reviews: methodological development, conduct and reporting of an umbrella review approach. Int J Evid Based Healthc. 2015;(13)3:132-140.

published studies to date that inform on the impact to the Aboriginal and Torres Strait Islander population with chronic disease, of interventions provided by pharmacists when they are integrated within ACCHS or other relevant primary healthcare settings.

B2 IPAC TRIAL (PROJECT)

This section of this submission summarises the conduct and outcomes of the IPAC Trial (Project).

The IPAC Trial was the first interventional study to investigate integrating a non-dispensing pharmacist within Aboriginal community-controlled health services (ACCHSs). All primary and secondary outcomes from the trial are summarised in Table 17 and Table 18.

The following Appendices include the reports that describe the conduct, methods, results, discussion and conclusions regarding primary and secondary outcomes from the IPAC Trial. The economic evaluation is described in Sections D and E.

Appendix 1: Published protocol for the IPAC Trial. (*Integrating pharmacists into Aboriginal Community Controlled Health Services (IPAC project): Protocol for an interventional, non-randomised study to improve chronic disease outcomes*)[104]

Appendix 2: Full Protocol for the IPAC Trial. V1.6 (18 November 2019)

Appendix 9: Integrated pharmacists in ACCHSs- Analysis of the assessment of clinical endpoints in Aboriginal and Torres Strait Islander patients with chronic disease (IPAC study), May 2020.

Appendix 10: Assessment of medication appropriateness using the Medication Appropriate Index (MAI) in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC project), February 2020.

[104] Couzos, S, Smith D, Stephens M, Preston R, Hendrie D, Loller H, Tremlett M, Nugent A, Vaughan F, Crowther S, Boyle D, Buttner P, Biros E. Integrating pharmacists into Aboriginal community controlled health services (IPAC Project): Protocol for an interventional, non-randomised study to improve chronic disease outcomes. [published online ahead of print, 2019 Dec 26]. Res Social Adm Pharm. 2019;S1551-7411(19)30791-0. doi:10.1016/j.sapharm.2019.12.022

Appendix 11: Assessment of medicines underutilisation in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC project), February 2020.

Appendix 12: Assessment of Home Medicines Review (HMR) and non-HMR in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC Project), February 2020.

Appendix 13: Assessment of change in medication adherence and self-assessed health status in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC project), May 2020.

Appendix 14: IPAC Project: Qualitative Evaluation Report, February 2020.

Table 17 Summary of the IPAC Trial findings- primary and secondary outcomes

Population	Outcome measure	Number of participants (n)	Median length of stay in the study (days)	Baseline (usual care)	End of study (follow-up)	Difference	p-value ^
Clinical endpoints (Appendix 9), (SD, 95% CI)							
Participants with a clinical diagnosis of T2DM	HbA1c*, mmol/mol [%units]	539	284	66.8 (37.2) *[8.3% (5.5%)]*	64.0 (39.5) *[8.0% (5.8%)]*	-2.8 (19.5, -4.5 to -1.0) *[-0.3% (3.9%, - 0.4% to - 0.1%]*	0.001
All participants	SBP, mmHg	1103	266	132.7 (33.2)	132.0 (29.9)	-0.7 (16.6, -1.7 to 0.4)	0.16
	DBP, mmHg	1045	268	80.0 (35.6)	79.2 (29.1)	-0.8 (9.4, -1.4 to -0.2)	**0.008**
	TC, mmol/L	660	314	4.51 (1.80)	4.35 (2.06)	-0.15 (0.77, -0.22 to -0.09)	**<0.001**
	LDL-C, mmol/L	575	295	2.35 (1.20)	2.27 (1.20)	-0.08 (0.48, -0.13 to -0.03)	**0.001**
	HDL-C, mmol/L	622	294	1.05 (0.5)	1.06 (0.5)	0.01 (0.25, -0.02 to 0.03)	0.32
	TG, mmol/L	730	296	2.39 (2.43)	2.29 (2.21)	-0.11 (1.08, -0.20 to -0.01)	**0.006**
	ACR, mg/mmol*	475	301	57.9 (183.1)	61.7 (224.5)	3.8 (102.4, -6.32 to 13.83)	0.42
	CVD 5-year risk, %units	38	255	11.9 (7.2)	10.9 (5.4)	-1.0 (2.6, -1.8 to -0.12)	**0.027**
	eGFR* (no minimum follow-up time), ml/min/1.73m^2	895	296	49.1 (159.2)	48.4 (160.4)	1.9 (25.7, 0.1 to 3.7)**	**<0.001**
	eGFR* (6-month minimum follow-up time), ml/min/1.73m^2	720	317	49.6 (140.6)	48.1 (145.4)	-0.2 (36.0, -2.99 to 2.7)**	**0.034**
Prescribing quality according to the Medication Appropriateness Index (MAI, Appendix 10)- appropriateness of medications							
MAI subset of participants	Mean MAI score per participant	357	329	6.02 (SD 23.6)	3.20 (SD 11.7)	↓46.8%	**0.003**
	Mean MAI score per medication	357	329	0.76 (SD 8.5)	0.39 (SD 4.4)	↓48.7%	**0.004**
	Number of medications with ≥1 inappropriateness rating (n, %)	357	329	647/2804 (23.1%)	357/2963 (12.1%)	-11.0%	**0.008**
	Mean number of medications per participant with ≥1 inappropriateness rating (n, %)	357	329	1.8 (SD 5.3)	1.0 (SD3.6)	↓44.4%	**0.001**
	Number of participants with at least one inappropriate medication rating (n, %)	357	329	242 (67.8%)	159 (44.5%)	-23.3%	**<0.001**
Prescribing quality according to the Medication Appropriateness Index (MAI, Appendix 10)- overuse of medications (n,%)							
MAI subset of participants	Number of participants with any medications that met ≥1 overuse criterion	357	329	132 (37.0%)	87/377 (24.4%)	-12.6%	**<0.001**

Population	Outcome measure	Number of participants (n)	Median length of stay in the study (days)	Baseline (usual care)	End of study (follow-up)	Difference	p-value ^
	Number of medications that met ≥1 overuse criterion	357	329	249/2804 (8.9%)	147/2963 (5.0%)	-3.9%	**0.017**
Prescribing quality according to the Medication Appropriateness Index (MAI, Appendix 10)- medications meeting MAI risk criteria (n,%)							
MAI subset of participants	Drug not indicated	357	329	156/2804 (5.6%)	97/2963 (3.3%)	-2.29%	**0.033**
	Medication is ineffective for the condition	357	329	103/2804 (3.7%)	51/2963 (1.7%)	-1.95%	**0.010**
	Dosage incorrect	357	329	194/2804 (7.0%)	92/2963 (3.1%)	-3.81%	**<0.001**
	Directions incorrect	357	329	88/2804 (3.1%)	65/2963 (2.2%)	-0.94%	0.107
	Directions Impractical	357	329	89/2804 (3.2%)	16/2963 (0.5%)	-2.63%	**0.001**
	Significant drug-drug interactions	357	329	144/2804 (5.1%)	58/2963 (2.0%)	-3.18%	0.059
	Significant drug-disease interactions	357	329	72/2804 (2.6%)	38/2963 (1.3%)	-1.29%	**0.008**
	Unnecessary duplication of drugs	357	329	83/2804 (3.0%)	46/2963 (1.6%)	-1.41%	0.066
	Unacceptable therapy duration	357	329	164/2804 (5.9%)	98/2963 (3.3%)	-2.54%	**0.029**
	Most expensive drug	357	329	41/2804 (1.5%)	33/2963 (1.1%)	-0.35%	0.447
Prescribing quality according to the Medication Appropriateness Index (MAI, Appendix 10)- medications with an inappropriateness rating by medication type (n,%)							
MAI subset of participants	Cardiovascular medications [a]	357	329	164/1014 (16.2%)	77/1056 (7.3%)	-8.9%	**0.013**
	Endocrine medications [b]	357	329	136/593 (22.9%)	64/615 (10.4%)	-12.5%	**0.002**
Prescribing quality according to the Medication Appropriateness Index (MAI, Appendix 10)- participants with medications with an inappropriateness rating by medication type (n,%)							
MAI subset of participants	Cardiovascular medications [a]	357	329	117/357 (32.8%)	46/357 (12.9%)	-19.9%	**<0.001**
	Endocrine medications [b]	357	329	91/357 (25.5%)	51/357 (14.3%)	-11.2%	**<0.001**
Prescribing quality according to the Medication Appropriateness Index (MAI, Appendix 11)- underuse of medications							
AoU subset of participants	Number of participants assessed with AoU, who had at least one potential prescribing omission (PPO) (n,%)	353	330	181/353 (51.3%)	76/353 (21.5%)	-29.7%	**<0.001**
	Number of PPOs/participant	353	330	0.73 (SD 1.3)	0.29 (SD 0.9)	↓60.3%	**<0.001**
Home Medicines Reviews by MBS item 900 (Appendix 12) (n/100 person years, 95%CI)							
All participants	Number of participants with ≥1 Home Medicines Reviews (HMR) based on MBS item 900 claims	1456	285	10.0 (5.2-18.0)	38.7 (29.6-49.3)	↑3.9 times (rate ratio)	**<0.001**
	Number of MBS item 900 rebate claims	1456	285	10.2 (5.5-18.0)]	41.6 (32.2-52.3)	↑4.1 times (rate ratio)	**<0.001**
Medication management reviews (Appendix 12) (n,%)							

Population	Outcome measure	Number of participants (n)	Median length of stay in the study (days)	Baseline (usual care)	End of study (follow-up)	Difference	p-value ^
All participants	Number of participants with HMR (from the logbook)	1456	285	na	609/1456 (41.8%)	↑639 reviews	na
	Number of participants with ≥1 'medication related problems' that were identified following a HMR	1456	285	na	535/609 (87.9%)	na	na
	Number of participants with a non-HMR[c]	1456	269	na	719/1456 (49.4%)	↑757 reviews	na
	Number of participants with ≥1 'medication related problems' that were identified following a non-HMR	1456	269	na	503/719 (70.0%)	na	na
	Number of assessments that were a follow-up to a HMR or non-HMR[d]	1456	285/269	na	na	↑1,548 reviews	na
Medication adherence and self-assessed health status (Appendix 13) (n,%)							
All participants	Number of participants adherent to medications (NMARS)	1103	294	808/1103 (73.3%)	950/1103 (86.1%)	12.8%	**<0.001**
	Number of participants adherent to medications (SIQ)	1103	294	781/1103 (70.8%)	895/1103 (81.1%)	10.3%	**<0.001**
	Number of participants with 'very good to excellent' self-assessed health status	975	281	175/975 (18.0%)	303/975 (31.1%)	23.9%	**<0.001**
Qualitative analysis -the patient experience and stakeholder perceptions (See **Appendix 14**							

Bold p-values imply statistically significant change at the 0.05 level. SD = cluster-adjusted standard deviation (ACCHS cluster). 'na' refers to 'not applicable'.
^p-values are cluster adjusted (ACCHS), however the adjustment may have also been conducted at the patient level – see analyses described in each individual report for the method used for each outcome measure.
↑Refers to a relative increase in the outcome measure (baseline compared with end of study).
↓Refers to a relative reduction in the outcome measure (baseline compared with end of study).
*Refers to last observation pre-enrolment and at follow-up. Unit conversion from IFCC (International Federation of Clinical Chemistry, mmol/mol) to DCCT (Diabetes Control and Complications Trial, %) units using the https://www.diabetes.co.uk/hba1c-units-converter.html units converter. eGFR reference range: Normal or Stage 1: CKD >89, Stage 2: 60-89 Stage 3A: 45-59, Stage 3B: 30-44, Stage 4: 15-29, Stage 5:<15. (Units in ml/min/1.73m^2), sourced from the National Guide (3rd Edn).[105] Albumin:creatinine ratio normal reference range: >2.5 mg/mmol for males and >3.5mg/mmol for females. Macroalbuminuria is defined as >25mg/mmol in males and >35 mg/mmol in females. Absolute CVD 5-year risk sourced from the National Guide (3rd Edn).[106]

[105] NACCHO and RACGP. National Guide to a preventive health assessment for Aboriginal and Torres Strait Islander people. 3rd Edn. RACGP, Melbourne, 2018
[106] NACCHO and RACGP. Op. Cit.

**Mean annualised difference. P-value (paired data) were derived from the cluster-adjusted (ACCHS cluster) comparison of annualised differences against -3, as this is equivalent to a paired t-test. The value of -3 is the expected mean annual eGFR (ml/min/1.73m2) linear decline in Aboriginal and Torres Strait Islander adults (*see Appendix 9*).

[a] Medications for: heart failure, angina, hypertension, arrhythmia, dyslipidaemia, pulmonary hypertension, other.

[b] Medications for: adrenal insufficiency, bone, diabetes, thyroid disorders, other.

[c] Based on logbook entries. A non-HMR was defined as a comprehensive medication management review comprising some or all the elements of a HMR, but not fulfilling all relevant MBS HMR criteria. The most common reason given by pharmacists for a non-HMR was to opportunistically provide a medication management review because the patient was at risk of forgoing a HMR. The other most common reasons for a non-HMR were because of limited patient access to an accredited pharmacist, and patient preference.

[d] A follow-up to a HMR or non-HMR was defined as a participant follow-up 3-6 months after the completion of an HMR or a non-HMR. Each activity involved reminder about the HMR and non-HMR advice and recommendations provided by the pharmacist (and the GP, if appropriate), assessment of the impact of any actions recommended from the HMR or non-HMR, and if another HMR or non-HMR or education session or preventive intervention was needed.

ACR= albumin-creatine ratio
AoU= Assessment of underutilisation
BP= blood pressure;
CVD= cardiovascular disease.
DBP= diastolic blood pressure
eGFR= estimated glomerular filtration rate
HbA1C= glycated haemoglobin
HDL-C= high density lipoprotein cholesterol
HMR= Home Medicines Review
LDL-C= low density lipoprotein cholesterol
MAI= Medication Appropriateness Index. The MAI score increases with increasing medication inappropriateness.
MBS = Medicare Benefits Schedule
NMARS = NACCHO medication adherence response scale for the reasons for non-adherence
PPO= potential prescribing omission
SBP= systolic blood pressure
SIQ = Single-item question for the extent of medication adherence
TC= total cholesterol
TG= triglycerides
T2DM= type 2 diabetes mellitus

Table 18 Summary of the IPAC Trial findings- economic analysis

Economic Analysis (Section D)							
Type of economic evaluation	**Population**	**Outcome measure**	**Number of participants (n)**	**Mean length of stay in the study (days)**	**Incremental cost**	**Incremental outcomes**	**ICER**
Cost-consequence analysis	All participants	Various biomedical indices	1,456	284	$2,173,981	Various[1]	$1,493 per participant to achieve improvements in multiple biomedical indices[1]
Cost-effectiveness analysis	Participants with a clinical diagnosis ofT2DM	Number of participants with a clinically meaningful reduction in HbA1c	539	287	**$753,774**	**200**	$3,769 per participant with a clinically meaningful reduction in HbA1c of at least 0.5%
Cost-effectiveness analysis	Participants assessed for the underutilisation of medications	Number of potentially preventable omissions (PPO)	353	326	$714,959	105	$6,809 per reduction in the number of participants with a PPO
Cost-utility analysis	Participants with a clinical diagnosis of T2DM	QALYs	539	287	$753,774	101	$7,463 per QALY

[1] Statistically significant improvements in the following biomedical indices for participants with pre and post-intervention measures: glycated haemoglobin (HbA1c) (for participants with a clinical diagnosis of T2DM), diastolic blood pressure (DBP), total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), triglycerides (TG), cardiovascular risk 5-year risk (CVD 5-year risk) and estimated glomerular filtration rate (eGFR).

Economic Analysis (Section E)						
Cost item	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Total – 5 years**
Total intervention costs to extend IPAC model to all ACCHSs	$13,846,142	$13,273,542	$13,141,042	12,876,292	$12,851,292	$66.0 million
Total costs of additional health services from extending IPAC model to achieve more equitable use of PBS medicines and HMRs	5,139,777	5,139,777	5,139,777	5,139,777	5,139,777	$26.0 million
Potential reduction in costs from fewer ED presentations and hospital admissions[1]	$633,532-$1,900,597	$633,532-$1,900,597	$633,532-$1,900,597	$633,532-$1,900,597	$633,532-$1,900,597	$3.17 million – $9.5 million

[1] Range based on assumption as to potential reduction in ED presentations and hospital admissions.

The observed net improvements in biomedical outcomes are clinically meaningful at a population level. Even a modest HbA1c drop may translate to a reduction in micro and macrovascular complications in people with T2DM if sustained population wide. According to the UK Prospective Diabetes Study (UKPDS) *any improvement* in HbA1c in those with T2DM reduced the risk of diabetes complications, with little evidence of a threshold of effect.[107] Moreover, the observed net improvement in glycaemic control of participants with T2DM from baseline values was consistent with the -0.18% to -2.1% HbA1c decrease (difference between intervention and control groups) observed over a mean of 9.4 months in 24 of 26 other studies that investigated pharmacist interventions in patients with T2DM.[108]

The small but significant average DBP and SBP reductions shown for IPAC participants may also attenuate the incidence of CVD events for Aboriginal and Torres Strait islander peoples if such reductions were population-wide, particularly for those with chronic disease. The net BP reduction was observed for the IPAC cohort as a whole, irrespective of whether participants had a clinical diagnosis of hypertension. Population-wide BP reduction strategies are recommended for the primary prevention of CVD events because the benefits that accrue from BP reduction are not just limited to those with hypertension.[109] A population-wide reduction in DBP of a mere 2mmHg has been estimated to reduce the prevalence of hypertension and CHD risk by 17% and 6% respectively, and combined with BP reductions in those needing medical treatment, could double or triple the impact of medical treatment alone.[110] A mere 1 mmHg reduction in SBP may substantially reduce heart failure (with 20 fewer cases for every 100,000 African-Americans per year), as well as CHD, and stroke incidence.[111]

Any population-wide reduction in LDL-C, even if small in magnitude such as demonstrated in the IPAC study, may also have broader benefits in reducing major CVD events for Aboriginal and Torres Strait Islander peoples. For example, for those already on statins, reducing LDL-C levels by a further 0.51 mmol/l from the LDL-C at baseline over a year, can significantly reduce the residual risk for major CVD events by an additional 15% (on top of the existing 20% relative risk reduction per 1 mmol/L LDL-C reduction from statin therapy).[112] [113]

[107] Stratton IM, Adler AI, Neil HAW, Matthews DR, Manley SE, Cull CA, Hadden D, Turner RC, Holman RR. Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): Prospective observational study. BMJ 2000; 321:7258: 405-412.
[108] Pousinho S, Morgado M, Falcão A, Alves G. Pharmacist Interventions in the Management of Type 2 Diabetes Mellitus: A Systematic Review of Randomized Controlled Trials. J Manag Care Spec Pharm. 2016 22:5: 493-515
[109] Hardy ST, Loehr LR, Butler KR, et al. Reducing the Blood Pressure-Related Burden of Cardiovascular Disease: Impact of Achievable Improvements in Blood Pressure Prevention and Control. *J Am Heart Assoc*. 2015;4(10):e002276. Published 2015 Oct 27. doi:10.1161/JAHA.115.002276
[110] Cook NR, Cohen J, Hebert PR, Taylor JO, Hennekens CH. Implications of small reductions in diastolic blood pressure for primary prevention. Arch Intern Med. 1995;155:701–709.
[111] Hardy ST, Loehr LR, Butler KR, et al. Op. Cit.
[112] Cholesterol Treatment Trialists' (CTT) Collaboration. Efficacy and safety of more intensive lowering of LDL cholesterol: a meta-analysis of data from 170 000 participants in 26 randomised trials. Lancet 2010; 376: 1670–81.
[113] Collins R, Reith C, Emberson J, et al. Interpretation of the evidence for the efficacy and safety of statin therapy. Lancet 2016; 388: 2532–2561.

The progression of kidney disease significantly slowed as a result of the intervention for IPAC participants and this slowing may have delayed the onset of end-stage kidney disease (ESKD) and CVD events if the impact of the intervention was sustained. Moreover, without intervention, IPAC participants were at risk of a much higher rate of eGFR decline per year than the selected expected rate because their characteristics more closely matched those in the eGFR Follow-Up study who had an annual eGFR decline of -5 ml/min/1.73m^2. In an analysis from the USA involving participants from mixed ethnic groups, a decline in eGFR of 5ml/min/1.73m^2 over 2 years predicted a 1.5 and 1.2 times higher risk of ESKD and CVD events respectively.[114] The eGFR Follow-Up study involving Aboriginal Australians showed that those with a slower rate of kidney disease progression (a 5 ml/min/1.73m^2 higher eGFR) had an 18% risk reduction (hazard ratio 95% confidence interval 0.75-0.91) in combined renal endpoints over a median of 3 years (adjusted for aged, sex, and ACR) that included death from renal causes, and initiation of renal replacement therapy.[115]

The net biomedical improvements observed in the IPAC study most likely emanated from the observed targeted improvements to prescribing quality, participant medication adherence, and team-based care. Prescribing quality significantly improved following the IPAC intervention with reductions in inappropriate prescribing for BP lowering and diabetes medications,[116] a significant reduction in underprescribing of BP-lowering medications for those with T2DM and albuminuria,[117] and significant improvements in patient self-reported medication adherence.[118] Integrated pharmacists also delivered team-based care to optimise chronic disease management (such as case conferences) and attended patient group meetings to deliver preventive health messages such as advice on dietary and lifestyle improvements (Appendix 16).

The net absolute reduction in 5-year CVD risk of 1% for participants without pre-existing CVD indicates the clinically significant potential for primary CVD prevention arising from the IPAC intervention.

In conclusion:

On the basis of the benefits reported in the evidence base (summarised in Table 17 and 18), **relative to usual care, integrating a non-dispensing pharmacist within ACCHSs led to superior effectiveness and clinically relevant improvements in a range of primary and secondary quality of care outcomes for Aboriginal and Torres Strait Islander peoples with chronic disease attending Aboriginal community-controlled health services. Integrated pharmacists embedded into usual care in a range**

[114] Ku E, Xie D, Shlipak M, et al. Change in Measured GFR Versus eGFR and CKD Outcomes. J Am Soc Nephrol. 2016;27(7):2196–2204. doi:10.1681/ASN.2015040341
[115] Maple-Brown LJ, Hughes JT, Ritte R, Barzi F, et al. Op. cit.
[116] Couzos S, Smith D, Buttner P, Biros E. Assessment of medicines underutilisation in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC project). Op. Cit.
[117] Couzos S, Smith D, Buttner P, Biros E. Assessment of medicines underutilisation in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC project). Op. Cit.
[118] Couzos S, Smith D, Buttner P, Biros E. Assessment of change in medication adherence and self-assessed health status in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal community -controlled health services (IPAC Project): Report to the Pharmaceutical Society of Australia. Draft Report, May 2020.

of geographical settings, can significantly improve the control of CVD risk factors, glycaemic control in patients with T2DM, and reduce absolute CVD risk in Aboriginal and Torres Strait islander adults with chronic disease. The intervention significantly improved glycaemic control in participants with T2DM and also brought about improvements in diastolic BP, total cholesterol, LDL-C, triglycerides, mean annual eGFR, and mean calculated absolute 5-year CVD risk in all study participants. Systolic BP significantly improved in those younger than 57 years of age. These improvements were clinically meaningful and evident in a population with a substantial chronic disease burden that occurred at a relatively younger age than other Australians.

Improvements were evident for prescribing quality indicators reflective of significant reductions in suboptimal prescribing, reductions in the use of medications that were unnecessary, and reductions in underprescribing of high-value pharmacotherapies. There were significant and substantial increases in participant access to Home Medicines Reviews (based on item 900 MBS claims), and other medication management reviews. Services provided by pharmacists within ACCHSs relative to usual care, led to superior health care service utilization (towards equity) by Aboriginal and Torres Strait Islander participants with chronic disease compared to usual care. There were significant improvements in adherence to medications for participants who enrolled to receive pharmacist services, as well as significant improvements in their self-assessed health status. Qualitative evaluation indicated that patients, integrated pharmacists, community pharmacists, and ACCHS staff reported that the intervention had improved quality of care outcomes.

Economic analysis reported relatively low costs to be associated with increases in the utilisation of medications and primary health care services, the latter having the potential to contribute to more equitable, needs-based health care expenditure for the Aboriginal and Torres Strait Islander population. Additionally, the modelled cost-utility analysis conducted for patients with T2DM found that, based on commonly used reference ICERs for the Australian health system, the ICER of $7,463 represented good value for money.

SECTION C. TRANSLATION ISSUES

C.1. OVERVIEW

The IPAC trial investigated the integration of a non-dispensing pharmacist within ACCHS settings delivering services expected within their current scope of practice. The pragmatic study design enabled the evaluation of real-world outcomes expected in this setting for Aboriginal and Torres Strait Islander adults with chronic disease to enhance the external validity of the quality improvements expected from the intervention.[119] The study involved a large sampling frame of 18 services of varying sizes and geographic locations (across 22 sites in Queensland, Victoria, and the Northern Territory).

The IPAC trial is possibly the largest prospective and interventional study to investigate the impact of integrated pharmacists using intermediate clinical endpoints in primary health care settings, and analysed data from 1,456 enrolled Aboriginal and/or Torres Strait Islander participants. The study is also the first work globally to investigate the impact of integrated pharmacist interventions with regard to Indigenous peoples. The intervention comprised non-dispensing medicines-related services, collaborative and coordinated care, including the provision of medication management reviews by pharmacists integrated within Aboriginal community-controlled health services.

The outcomes from the intervention are generalisable to the broader Aboriginal and Torres Strait Islander patient population who are at risk of developing medication related problems and attending ACCHSs in urban, rural and remote geographical locations. The evidence for generalisability has been demonstrated for every outcome measure investigated in the project (see Appendices 9-16). The IPAC participants were representative of the proposed population, and were usual patients accessing ACCHSs, and the intervention was tested within usual clinical settings involving the ACCHS sector.

For clinical endpoint analysis, a non-probabilistic sampling method was adopted to reflect the pragmatic study design where all patients who had relevant chronic disease conditions were invited to participate without setting criteria for study compliance or other study restrictions.[120] Patients were consented into the study by pharmacists or other health service staff according to the cultural and usual protocols of the ACCHS, after which pharmacists provided supportive clinical care as part of the

[119] Øvretveit J, Leviton L, Parry G. Increasing the generalisability of improvement research with an improvement replication programme *BMJ Quality & Safety* 2011;20:i87-i91

[120] Thorpe KE, Zwarenstein M, Oxman AD, et al. A pragmatic–explanatory continuum indicator summary (PRECIS): a tool to help trial designers. J Clin Epidemiol 2009; 62: 464-475

primary healthcare team to meet the individual needs of the participant. This pragmatic recruitment and other pragmatic features of the IPAC study meant that the findings have external validity.[121] Pragmatic trials differ from trials conducted under ideal conditions, in that similar participant recruitment methods are used to those that would be used under usual conditions within the proposed health services.[122] The delivery of the intervention was also flexible, and follow-up reflected the usual mechanisms in healthcare settings which are other hallmarks of pragmatic study design. Pragmatic trials frequently include complex interventions, including an interdependence between a range of healthcare staff to deliver the intervention,[123] as was the case with the IPAC trial. It is unique for a clinical interventional study to consent and enrol this many adult Aboriginal and Torres Strait Islander participants with chronic disease, which suggests that the community-based participatory research and pragmatic study design were success factors. This suggests that the trial enrolled and evaluated the impact of the intervention using a sample large enough to adequately represent the population for whom the broader roll-out of the intervention is proposed.

For the analysis of prescribing quality, a subset of all IPAC participants (24% of the cohort) was selected by pharmacists using methods consistent with usual care. Pharmacists selected a sample of enrolled participants according to their clinical need for a medication review to assess the appropriateness of their medications, as is undertaken with usual care. The Medication Appropriateness Index (MAI) tool was used to undertake a comprehensive prescribing quality review of participants' medications assessing for medication appropriateness. The clinical need for such a review was reflective of usual care and based on criteria such as for Home Medicines Review where the patient must have 'a chronic medical condition or a complex medication regimen, and not [have] their therapeutic goals met'.[124] The study did not formally randomize the selection of participants for MAI audit in order to reflect usual care clinical processes and services consistent with a pragmatic trial.[125] Pharmacists used the MAI assessment findings to inform medication management plans and recommendations for prescribers, as needed and as part of usual care.

Due to the length of time usually required for pharmacists to undertake the MAI assessment and the large number of participants expected to be enrolled into the study, pharmacists were advised to only undertake MAI assessments on 30 participants per FTE pharmacist and to complete these within the

[121] Thorpe KE, Zwarenstein M, Oxman AD, et al. Op. Cit.
[122] Ford I, Norrie J. Pragmatic Trials. N Engl J Med 2016; 375:454-463.
[123] Ford I, Norrie J. Pragmatic Trials. N Engl J Med 2016; 375:454-463.
[124] Australian Government Department of Health. Medicare Benefits Schedule – Item 900. MBS Online, Commonwealth of Australia. [Accessed February 2020]. http://www9.health.gov.au/mbs/fullDisplay.cfm?type=item&q=900&qt=ItemID
[125] Thorpe KE, Zwarenstein M, Oxman AD, et al. Op. Cit.

first three months after participant recruitment into the study. The analysis subsequently showed that the characteristics of this subset (n=357) was similar to the remaining broader IPAC cohort that did not have MAI assessments (n=1099, Appendix 10). Similarities were observed in age, sex, Aboriginality, geographical location, pensioner status, number of medications, CTG script eligibility, Health Care Homes enrolment, prior HMR, self-assessed health status, clinical diagnoses, type of chronic disease, degree of comorbidity or multimorbidity, obesity, glycaemic control, or prevalence of eGFR levels. The proportion of participants who self-reported as adherent to medications was also similar between cohorts (**Appendix 13).** For this reason, it is clear that prescribing quality outcomes of the magnitude described, would be generalisable to the proposed population - patients who have a clinical need for a medication review, within a broader ACCHS context.

C.2. APPLICABILITY TRANSLATION ISSUES

Table 19 summarises translation issues related to the IPAC trial and implications of the intervention if it is rolled out to the proposed population. The proposed population for integrated pharmacist services delivered within ACCHSs are Aboriginal and Torres Strait Islander patients (irrespective of age) who have a clinical need for pharmacist support because of chronic disease and/or being at high risk of developing medication related problems.

Aboriginal and Torres Strait Islander patients who are <18 years of age who are at high risk of developing medication related problems (irrespective of chronic disease) are also recommended to be eligible for support from integrated pharmacists.

The evaluation of pharmacist services as part of the IPAC trial was restricted to adults over 18 years, mainly because of the ethics requirements for research associated with children providing informed consent. In view of the pragmatic trial design and the principles of Aboriginal self-determination, ACCHSs may have also permitted children to receive the services of integrated pharmacists. All integrated pharmacists were required to have 'working with children checks' (or state based equivalent) and were cleared to provide services to children if needed. Chronic disease emerges at younger ages in the Aboriginal and Torres Strait Islander population, such as with T2DM, than the general Australian population. This means that arbitrary age-based criteria (set for evaluation purposes) cannot logistically be applied in real-world settings for those who need medication support. There is a clear clinical need for services to support medication use in children, which is within the scope of practice of pharmacists to provide.

Moreover, all patients who are using medications could benefit from integrated pharmacist support, not just those with chronic disease. Other schemes such as the PBS Closing the Gap co-payment measure recognise this need and have expanded criteria for accessing the initiative to all patients with chronic disease or at risk of chronic disease. Poorly treated acute conditions can lead to chronic problems. Patients requiring medication for the first time still need education. In remote areas where ACCHSs use the Section 100 scheme for remote-area Aboriginal Health Services, patients do not have the opportunity to speak to a pharmacist when being provided medications for acute conditions. Integrated pharmacists have an opportunity to improve all medication use from within ACCHS including treatment for acute conditions, Antibiotic Microbial Stewardship support and pain management services. The latter were the focus of Drug Utilisation Reviews preformed as part of the IPAC trial and activity reports from integrated pharmacists in the IPAC trial indicated that support for a range of services for non-acute disease conditions were also provided (Appendix 16).

Table 19 Summary of factors relevant to the translation of the IPAC intervention to Aboriginal community-controlled health services more broadly

Factor	Translation issues	Implications for translation
General (implementation)	The IPAC trial used data from 1,456 participants making it one of the largest interventional studies involving individually consented Aboriginal and Torres Strait Islander adults with chronic disease ever conducted in Australia. The trial was a pragmatic, non-randomized, prospective, pre and post quasi-experimental study that was community-based and participatory.	The large sample size, the broad geographical distribution of involved ACCHSs, and the study design supports the transferability of the study findings to other ACCHS settings and the proposed population. The IPAC study evaluated real-life outcomes within ACCHS settings arising from the intervention (integrated pharmacists within ACCHSs).
Proposed population	IPAC participant criteria were: adult (18 years and over) patients with chronic disease who had visited a participating ACCHS site at least three times in the past two years relative to the recruitment date into the study (known as 'active' or 'regular' patients). Patients had a diagnosis of: • Cardiovascular (CV) disease (coronary heart disease, stroke, hypertension, dyslipidaemia and any other CV disease), • Type 2 diabetes mellitus, • Chronic kidney disease, or	The proposed patient population for the broader translation of the integrated pharmacist intervention includes all adult Aboriginal and Torres Strait Islander patients who have a clinical need for pharmacist support because of chronic disease and/or being at high risk of developing medication related problems. The economic evaluation has been outlined the financial implications for this roll-out (Section D and E).

Factor	Translation issues	Implications for translation
	• Other chronic conditions and at high risk of developing medication-related problems (e.g. polypharmacy).	The intervention is likely to benefit a broader ACCHS population including children (who would only make up a very small portion of pharmacist patients). Broader roll-out of the intervention needs to meet the needs of all ACCHS patients using medication, and this more flexible approach aligns with the principle of ACCHS self-determination.
Consumer impact	Qualitative evaluation involved twenty-four (24) integrated pharmacists who provided feedback on their experiences in the role and how well the project was able to be implemented within their ACCHS. Thirteen general practitioners, 12 managers and 10 community pharmacists responded to an online survey. Three ACCHSs were visited for an in-depth assessment of implementation.	Consumer impact reports from the qualitative evaluation (Appendix 14) support transferability of the intervention to the broader ACCHS sector.
Participant satisfaction	Several focus groups with participants revealed the benefits and challenges of the intervention and were overwhelmingly positive. There was increased knowledge and engagement of participants in their own health care through increased engagement with the health service. (Appendix 14).	Qualitative evaluation (Appendix 14) support transferability of the intervention to the broader ACCHS sector.
ACCHS inclusion criteria	Each ACCHS underwent a health systems assessment (HSA) to explore service characteristics and identify any systems change over the trial intervention period. There was little change in health systems assessment within participating sites from baseline to the end of the study that might otherwise explain prescribing improvements (such as from non-IPAC related service activity). ACCHSs were also required to meet site inclusion criteria for the project and are reported in the published protocol (Appendix 1). For example, making sure that ACCHS have the physical space to support clinical consultations between the patient and pharmacist, to have a GP prescriber employed within the service, and pharmacist access to patient medical records (clinical information systems) and team-based care, are essential. (Appendix 14)	The intervention (integrated pharmacist) is transferable to ACCHSs that meet site inclusion criteria consistent with the core success factors of the IPAC trial. The proposed health service criteria that have been modified for transferability are shown in Table 20.

Factor	Translation issues	Implications for translation
	ACCHSs involved in the IPAC trial were representative of other ACCHSs within their jurisdiction (reported by *NACCHO Affiliates*).	The intervention (integrated pharmacist) is transferable to ACCHSs that meet site inclusion criteria shown in Table 10.
Integration model within ACCHSs	Pharmacists were integrated within ACCHSs with: identified positions and core roles; had shared access to clinical information systems; provided continuous clinical care to patients, particularly on-site within the clinic setting; received administrative and other supports from primary health care staff; and adhered to the governance, cultural, and clinical protocols within ACCHSs as part of their shared vision.	Transferability will require and depend on fidelity to the integration model that was evaluated in the IPAC trial.
Pharmacist registration	Integrated pharmacists fulfilled the following eligibility criteria: registration with the Australian Health Practitioners Regulation Agency (Ahpra); more than 2 years' post-registration experience; and post-graduate clinical qualifications or demonstrated clinical experience. Accreditation to conduct an HMR was preferred, however it was not mandatory for integrated pharmacists.	Transferability will require fidelity to the eligibility criteria for registered pharmacists as was evaluated in the IPAC trial.
Pharmacists core roles	Integrated pharmacists functioned within existing and usual primary health care service delivery systems and focused on pre-determined core roles that included providing medication management reviews; assessing participant adherence and medication appropriateness; providing medicines information and education and training; collaborating with healthcare teams; delivering preventive care; liaising with stakeholders and developing stakeholder liaison plans; providing transitional care; and undertaking a drug utilisation review. Pharmacists' worked with ACCHSs to apply the roles to their individual setting to ensure the intervention was most impactful.	Transferability will require and depend on fidelity to the core pharmacist roles within the integration model that was evaluated in the IPAC trial, with allowances for each health service to prioritise pharmacist activity to meet the individual needs of the proposed population.
Pharmacist training	Pharmacists were trained by the Pharmaceutical Society of Australia (PSA) to deliver core roles (all within their existing scope of practice). Pharmacists were also provided with ongoing support through regular online communications and mentoring support.	Transferability of the intervention to broader ACCHSs will require additional resource commitments, such as the development of training materials and resources, to train registered pharmacists prior to commencing integrated pharmacist roles within ACCHSs. The PSA and PGA are well placed to provide a program of training and ongoing support for pharmacists.

Factor	Translation issues	Implications for translation
	Patient follow-up to medication management reviews as undertaken by integrated pharmacists, was substantial. There were 1,548 follow-up assessments of patients who had a review (mean time for follow-up was 30 mins), over a mean period of 284 days of participant involvement in the study. Patient follow-up is complicated as the target population is burdened by many chronic diseases and healthcare providers face many important demands. Clinical algorithms to streamline patient referral systems so that integrated pharmacists within the ACCHS model of care can follow-up patients will be valuable (Appendix 12, and Appendix 16).	Opportunistic pharmacists' assessments of the target patient population are particularly important in enhancing patient access to medication-related services. NACCHO, the Affiliates and PSA are well placed to develop generic clinical algorithms and resources to support ACCHSs to implement processes for opportunistic and patient follow-up regarding medication management.
Cultural protocols	Pharmacists integrated within ACCHSs were required to adhere to cultural and team-based principles relevant to ACCHS settings, so that study participants could benefit from the community trust this supported. Only ACCHSs were involved in the IPAC study (n=18).	Translation of the impact of the intervention is relevant only to primary healthcare settings within the ACCHS sector.
ACCHSs being service-ready	All ACCHSs received support and a site visit to be involved in the IPAC trial. Some services were well prepared for the pharmacist and understood the value of the role. Staff in other services needed time to fully understand the role and learn how to utilise the pharmacists' expertise. Support from GPs and AHW/Ps were enablers to the integration of the integrated pharmacist within the ACCHS. In particular, AHW/Ps played a vital role in assisting with patient follow-up (Appendix 14).	Support will need to be provided to clinic staff and managers (for flow-on effect to healthcare staff) to ensure ACCHSs are ready for the integrated pharmacist role. The adaption and development of policies and procedures to guide ACCHS medicine-related activity with an integrated pharmacist will be valuable. NACCHO and the Affiliates are well placed to develop these policies, support staff, and procedures, in partnership with the PSA, to support ACCHSs.
Integrated pharmacist recruitment	Integrated pharmacists were selected for the IPAC trial with skills aligned to the expected scope of practice and core roles. Placements within ACCHS were influenced by the needs, capacity, and preparedness of ACCHSs that was assessed by NACCHO. Local community pharmacies were approached first to see if they are able to provide a pharmacist to work within the ACCHS according to service requirements of the ACCHS. If community pharmacies were unable to nominate a pharmacist, or if this nomination was not accepted by the ACCHS in line with principles of self-determination, the integrated pharmacist was employed directly by the PSA for the	Pharmacist recruitment to integrated non-dispensing roles within ACCHSs will be influenced by the financing models for broader program roll-out. Respecting the principles of self-determination means that ACCHSs have control of pharmacist recruitment to ensure their 'fitness for the service' with respect to suitable skills and cultural safety.

Factor	Translation issues	Implications for translation
	purposes of the Trial. Analysis was not undertaken to compare outcomes arising from differential models of integrated pharmacist employment.	The employment of pharmacists by the PSA (which was the dominant model used in the IPAC trial) will not be applicable for broader program roll-out. Ensuring similar selection criteria and community pharmacy involvement will help with recruitment of suitable similar candidates.
Community pharmacy	Many ACCHSs already had strong existing relationships with their local community pharmacies. Integrated pharmacists worked together with community pharmacists to problem solve, access discharge summaries, confirm the patient's medication history, undertake medication reconciliation by correcting errors and medication lists, and facilitate dose administration aids for patients. Community pharmacists reported that the integrated pharmacist role was very helpful and useful to them and it facilitated communication between the community pharmacy and GPs. Community pharmacists also perceived that patient knowledge of their medicines and adherence to medicines had improved since the integrated pharmacists had commenced in the ACCHSs. (Appendix 14). Integrated pharmacists completed 49 stakeholder liaison plans (median time taken for each plan was up to 5 hours) and 82% were completed with community pharmacies. Integrated pharmacists recorded 3,233 contacts with community pharmacy with nearly 70% being initiated by the integrated pharmacist (Appendix 16).	Pharmacists integrated within ACCHSs had substantial engagement with community pharmacy and pharmacists. Although engagement with community pharmacy is core to model of care for integrated pharmacist activity, resources to facilitate this stakeholder liaison will further encourage this activity. The PSA and the PGA are well placed to develop these resources or other supports.
Transferability of all IPAC outcomes	The trial was a pragmatic, non-randomized, prospective, pre and post quasi-experimental study that was community-based and participatory. Generalisability was explored in all evaluation reports for primary and secondary outcomes (Appendices 9-16).	Improvements to clinical endpoints, prescribing quality improvements, improvements in access to medication management reviews, and improvements to adherence and self-assessed health status are generalisable to the proposed population (Appendices 9-16).
Business rules for HMRs	Pharmacists within ACCHSs operated within existing and usual business rules for Home Medicines Review MBS item 900 rebate claim and pharmacist fee for HMR under the 6CPA.	Existing business rules for medication management reviews can be utilised by integrated pharmacists within ACCHSs.

ACCHS= Aboriginal community-controlled health service
GP= general practitioner
HCH= Health Care Homes
HMR= Home Medicines Review
IPAC= Integrated pharmacists within ACCHSs to improve chronic disease management Project
NACCHO= National Aboriginal community-controlled health organisation
PGA= Pharmacy Guild of Australia
PSA= Pharmaceutical Society of Australia
QUMAX= Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander People
RAICCHO= Regional Aboriginal and Islander community-controlled health organisations

C.3. EXTRAPOLATION TRANSLATION ISSUES

See Section C.2. This section describes that the outcomes from the IPAC Trial can be extrapolated to the Aboriginal and Torres Strait Islander population attending the ACCHS more broadly. Table 19 also outlines the broader translation issues by category, so that translation can be understood according to the logistics of broader roll-out. **Section D and E** describes the transformation of trial outcomes for economic analysis, using an intermediate clinical endpoint and transforming it to a QALY equivalent.

C.4. TRANSFORMATION ISSUES

See Section C.2 and Table 19.

C.5 ANY OTHER TRANSLATION ISSUES

See Section C.2 and Table 19.

C.6 RELATIONSHIP OF EACH PRE-MODELLING STUDY TO THE ECONOMIC EVALUATION

The economic evaluation (Section D) was undertaken based on the IPAC Trial evaluation.

SECTION D. ECONOMIC EVALUATION

D.1. OVERVIEW

The economic analyses literature review (Appendix 7)[126] did not reveal studies for which cost-effectiveness was analysed for interventions involving a pharmacist integrated within primary health care services such as ACCHSs in Australia. Furthermore, there were no cost-effectiveness studies from any other country reporting interventions involving clinical pharmacist services to Indigenous peoples through Indigenous health services or any other type of primary health care service.

The review did not identify cost-effectiveness evaluations of pharmacist's interventions that were directly relevant to the integration of registered pharmacists within ACCHSs (IPAC trial). This highlights the importance of this IPAC trial to inform on the cost-effectiveness of pharmacist interventions relevant to the health of Indigenous Australians.

Of cost-effectiveness studies set in countries other than Australia involving collaborative care between a pharmacist and a general practitioner (GP), most authors concluded that the pharmacist intervention was cost-effective. However, these studies involved different health systems and therefore different ways of managing health problems within the primary health care setting than in Australia. A comparative assessment of the effectiveness and safety of integrated pharmacists based on the literature review findings was not possible due to the absence of relevant studies.

Advocating for inclusion of a pharmacist as part of the primary health care team within ACCHSs requires that such an initiative is economically feasible in addition to meeting its objective of improving quality of care outcomes. In order to address this question, an economic evaluation was conducted as part of the IPAC trial to establish its relative costs and impacts, and with the underlying objective of assessing the extent to which it represents value for money.

Consequently, a trial-based economic evaluation was undertaken (interventional pre-post quasi experimental study conducted within ACCHSs as presented in **Section B**). Three types of economic analysis were conducted:

[126] **Johnstone K, Smith D, Couzos S. Literature review on the cost-effectiveness of non-dispensing pharmacist services integrated within primary health care. James Cook University, February 2020.**

(iv) a cost-consequence analysis that included all participants with changes in biomedical indices for whom pre- and post-measures of outcomes were recorded;

(v) a cost-effectiveness analysis for two sub-groups of participants: those with T2DM with pre- and post-measures of HbA1c and those selected for MAI assessments at baseline and at the end of the study, with potential prescribing omissions (PPOs) used as the relevant outcome measure; and

(vi) for participants with a clinical diagnosis of T2DM, a cost-utility analysis that derived lifetime quality of life changes from the decreases in HbA1c observed during the trial period based on T2DM simulation models.

The economic evaluation compared the costs and outcomes of the IPAC intervention versus usual care prior to the addition of an integrated non-dispensing pharmacist within ACCHSs (comparator) to promote the quality use of medicines. The perspective adopted was the publicly funded health system. Discounting was not applied as the mean participant enrolment period was less than one year.

The trial used a pragmatic study design to evaluate quality of care outcome measures consistent with measures usually explored for quality improvement within clinical practice, with the comparator being 'usual care'. For these reasons, quality of life measures for cost utility analysis were not collected from trial participants to reduce the burden on participants and on clinical staff. Furthermore, (i) changes in quality of life would be unlikely to have been achieved over the relatively short time frame of the IPAC Trial and (ii) problems have been demonstrated in the use of existing instruments to measure the quality of life in Aboriginal populations, especially in populations experiencing more chronic conditions.[127] For a subset of participants with a clinical diagnosis of HbA1c, the cost-utility analysis derived lifetime quality of life changes from the decreases in HbA1c observed during the trial period. The relationship between decreases in HbA1c and lifetime quality-adjusted life years (QALYs) was mapped from the results of a systematic review.[128]

Cost-consequence analysis was undertaken as this is recommended for complex interventions with multiple effects and public health interventions which have a range of health and non-health benefits that are difficult to measure in a common unit.[129] [130] Cost-consequence analysis differs from cost-

[127] Banham D, Karnon J, Lynch J. Health related quality of life (HRQoL) among Aboriginal South Australians: a perspective using survey-based health utility estimates. Health and Quality of Life Outcomes, 2018;17(1); 39.
[128] Hua X, Lung TW, Palmer A, Si L, Herman WH, Clarke P. How consistent is the relationship between improved glucose control and modelled health outcomes for people with type 2 diabetes mellitus? a systematic review. Pharmacoeconomics. 2017; 35(3):319-329.
[129] Drummond M, Sculpher M, Torrance G, O'Brien B, Stoddart G. Methods for the economic evaluation of health care programmes. Oxford University Press;2005.
[130] National Institute for Health and Care Excellence. Medical technologies evaluation programme methods guide: process and methods [PMG33]. https://www.nice.org.uk/process/pmg33/resources/medical-technologies-evaluation-programme-methods-guide-pdf-72286774205893

effectiveness analysis in not reporting a single summary measure such as the incremental cost per incremental change in outcome. Rather, costs are presented alongside a range of outcomes to demonstrate the full impact of the intervention and allow policy makers to interpret the findings as appropriate to their decision-making context. Given the study had multiple biomedical endpoints, a cost-consequence analysis (CCA) was conducted, with costs presented alongside a range of relevant outcomes.

The IPAC trial economic evaluation found that the IPAC intervention generated relatively low costs associated with increases in the utilisation of medications and primary health care services, the latter having the potential to contribute to more equitable, needs-based health care expenditure for the Aboriginal and Torres Strait Islander population.

D.2. POPULATIONS AND SETTINGS

The economic evaluation included the following target groups:

(i) All participants enrolled in the IPAC Trial

(ii) All participants enrolled in the IPAC Trial with T2DM with pre-post measures of HbA1c.

(iii) A subset of participants enrolled in the IPAC Trial who were selected for Medication Appropriateness Index (MAI) assessments at baseline and at the end of the study.

Given the nature of the intervention, which was to include a non-dispensing pharmacist as part of the primary health care team to facilitate increased access to medication-related expertise and assessments, the medical services provided during the IPAC trial were available to all participants who were enrolled in the IPAC study. Similarly, the comparator, which was existing health services in the period prior to the IPAC intervention being implemented, was available to all enrolled participants. The economic evaluation compared costs and outcomes in the pre- and post-intervention periods when the proposed medical service and main comparator were and were not available respectively to enrolled participants.

The population targeted by this proposed service have been described in **Section C.**

The proposed settings are comprehensive primary health care services that are Aboriginal Community-Controlled Health Services (ACCHSs), as indicated by the service inclusion criteria for the IPAC Trial (Appendix 1). As this submission aims to extend the service (integrated pharmacists) beyond the IPAC Trial to ACCHSs broadly, the proposed setting has been slightly amended to reflect program translation beyond the research setting (Table 20)

The economic analysis evidence presented is applicable and generalisable to the proposed population and the proposed health service setting, as summarised in the study outcome reports included in **Section B, and Section C** for broader translation.

Table 20 Proposed Health Service criteria for participation in the proposed service (integrated pharmacist).

To receive the proposed service, the health service must:
• be an *Aboriginal Community Controlled Health Service* and funded by the Department of Health for the provision of primary health care services to Aboriginal and Torres Strait Islander peoples. • be a member of NACCHO, and the relevant NACCHO State/Territory Affiliate. • employ at least one full-time- equivalent general practitioner per clinic who is able to prescribe medicines to patients of that organisation. • use an electronic clinical information system. • participate in continuing quality improvement and reporting on the national Key Performance Indicators through the use of electronic data extraction tools. • adhere to program business rules and guidelines, data provision requirements, and patient/service consent requirements for the program. • provide the integrated pharmacist access to a private consulting room on the clinic premises that has access to the clinical information system. • be an accredited practice in accordance with the *Royal Australian College of General Practitioners* Practice Standards. • be participating or eligible to participate in the Pharmaceutical Benefits Scheme co-payment measure (practice incentive program), if in a non-remote location. • be eligible to participate in the section 100 arrangements for the supply of pharmaceutical benefits, if in a remote location.

D.3. STRUCTURE AND RATIONALE OF THE ECONOMIC EVALUATION

A summary of the key characteristics of the economic evaluation is presented in Table 21. The perspective adopted was the publicly funded health system (i.e. the cost of pharmaceuticals not on the PBS was excluded). The comparator was usual care prior to the addition of an integrated non-dispensing pharmacist. Data relating to resource use in implementing the IPAC intervention and changes in resource use were obtained directly from the trial, with unit costs also available from the trial with the exception of GP earnings (the latter obtained from official ABS data).

Outcome measures included biomedical indices and, for the subset of participants for whom an assessment of underutilisation (known as an AoU) of medications, were conducted, the number of potential prescribing omissions (Appendices 9 and 11).

Table 21 Summary of the economic evaluation

Perspective	Health system (excludes private)
Comparator	Usual care pre-intervention
Type of economic evaluation[1]	Cost-effectiveness analysis (CEA) and cost-consequence analysis (CCA)
Sources of evidence	Clinical trial
Time horizon	284 days
Outcomes	Biomedical indices, HbA1c, number of potential prescribing omissions
Methods used to generate results	Trial-based
Discount rate	Not necessary due to time horizon
Software packages used	SPSS and MSExcel

1. A cost-utility analysis was included by deriving lifetime quality of life changes from a systematic review of published studies that modelled the relationship between decreases in HbA1c and lifetime gain in QALYs.

LITERATURE REVIEW

Summarised here is the literature review on the 'cost-effectiveness of non-dispensing pharmacist services integrated within primary health care'[131] (Appendix 7).

The medical literature was searched on 5th April 2019 to identify relevant randomised controlled trials published and accessible from Medline, CINAHL and Emcare databases. Searches were conducted of the databases and sources described in Appendix 7. A search of the internet was also conducted to identify reports on cost-effectiveness analyses on relevant interventions that had not been published in the academic literature. Search terms are described in Table 22.

Table 22 Search terms used (literature search platform) for the review on the cost-effectiveness of non-dispensing pharmacist services integrated within primary health care

Element of clinical question	Search terms
Population	"primary health care" OR "indigenous health services"
Intervention	AND "pharmacist"
Outcomes	AND "cost-effectiveness"

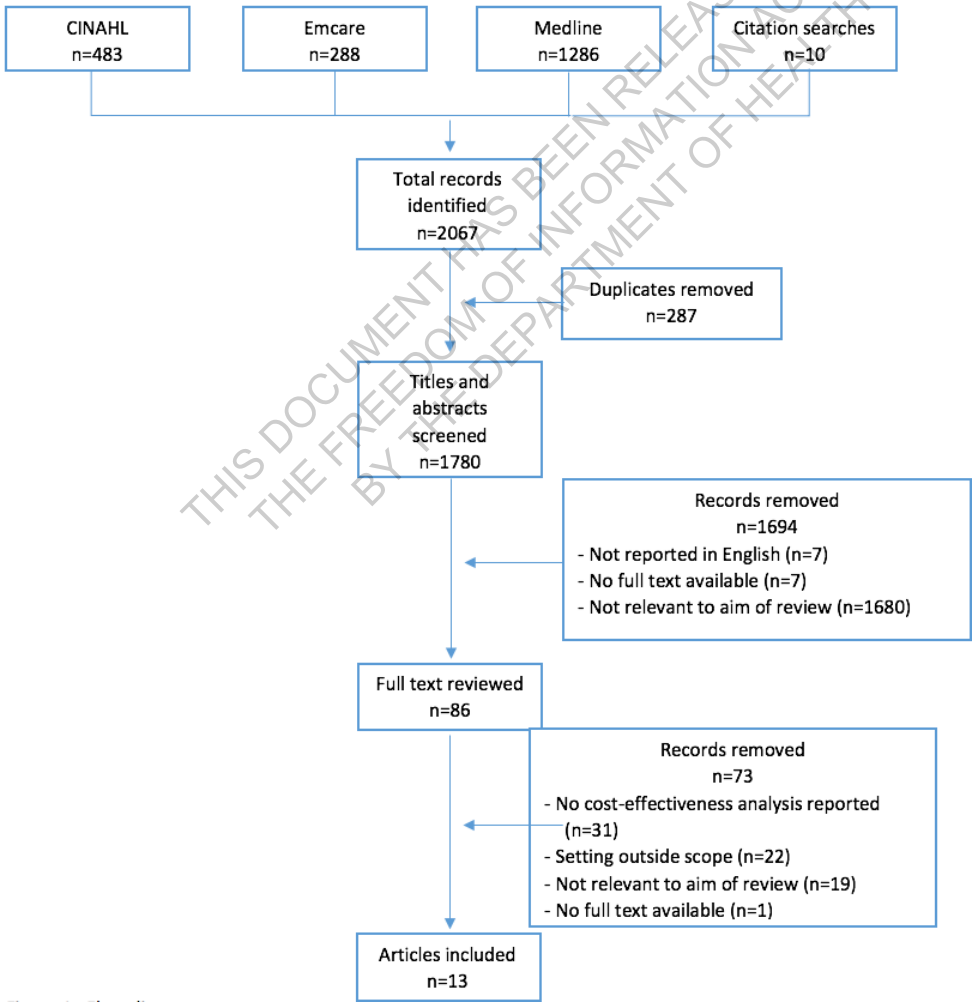
[131] **Johnstone K, Smith D, Couzos S. Literature review on the cost-effectiveness of non-dispensing pharmacist services integrated within primary health care. James Cook University, February 2020.**

Element of clinical question	Search terms
Exclusions	Article other than a journal article or report; study protocol; study intervention that was set within a hospital or involved specialist physicians; the intervention involved community pharmacists without specified collaboration with general practitioners (GPs); the intervention involved a team-based approach where pharmacist involvement was not explicit; the study did not include a cost-effectiveness analysis; or the full text was unavailable online or written in a language other than English.

A PRISMA flowchart (Figure 3) provides a graphic depiction of the results of the literature search and the application of the study selection criteria.

Studies were selected independently by a single reviewer. Pre-specified criteria for excluding studies are included in Table 22. All studies that met the inclusion criteria are listed in Appendix 7.

Figure 3 Summary of the process used to identify and select studies for the review on the cost-effectiveness of non-dispensing pharmacist services integrated within primary health care



A profile of each included study is given in Table 23 and in Appendix 7.

This study profile describes the authors, study ID, publication year, study design, study location, setting, length of follow-up of patients, study population characteristics, description of the interventions and assessment methods, description of the comparator (and associated intervention), and the relevant outcomes assessed.

See Appendix 7 for details on the individual studies included in the evidence base.

Table 23 Summary of systematic literature review findings of cost-effectiveness analyses from randomised controlled trials that explored pharmacist interventions within primary health care settings

Author, year, setting, study design	Participants	Pharmacist intervention	Follow-up duration	Control	Outcome measure	Cost-effectiveness outcome
Avery et al, 2012. UK, general practice, Pragmatic Cluster randomised trial	General practices	Simple computerised feedback plus pharmacist-led interventions with practice team	12 months	Simple computerised feedback	Patients identified with potential medication error. Cost per additional medication error avoided due to the intervention at 12 months.	95% probability is cost effective if the decision-maker's ceiling willingness to pay reached £85 per error avoided (at 12 months).
Bojke et al, 2010. UK General practice. Randomised multiple interrupted timeseries.	>=75 years with polypharmacy	Pharmacist moderated drug management in collaboration with doctor, patient and carer.	12 months	Usual care	Mean incremental cost per additional QALY	78%-81% probability that pharmaceutical care is cost-effective at a threshold between £20,000 and £30,000 per QALY.
Cowper et al, 1998. USA Randomised control trial	>=65 years (males) with polypharmacy	Pharmacist medication review for prescribing appropriateness (MAI)	12 months	Nurse review of prescriptions.	Cost per 1 unit change in MAI	Cost was $7.50 per 1-unit change in MAI. Excluding drug costs, the ratio was $30/1 unit change in MAI.
Elliott et al, 2014, UK. General Practice Pragmatic cluster randomised trial	General practices	Simple computerised feedback plus pharmacist-led interventions with practice team	12 months	Simple computerised feedback	Cost per additional QALY	59% probability of being cost-effective at a threshold ceiling willingness-to-pay for a QALY of £20,000.
Kulchaitanaroaj et al, 2012, and 2017, USA Community-based clinics. Combined data from two prospective cluster-randomised controlled clinical trials	>=21 years with hypertension	Pharmacists co-located with physicians. In-person recommendations to address suboptimal drug regimens and educate physicians as needed.	6 months	Physician management only.	Cost for one additional patient to achieve blood pressure control Cost per QALY gained	Cost for one additional patient to achieve blood pressure control was $1338.05. $36.25 per additional 1mmHg reduction in systolic blood pressure and $94.32 per additional 1mmHg reduction in diastolic blood pressure. $26,807.83 per QALY gained
Obreli-Neto et al, 2015. Brazil Primary health care unit. Randomised	>= 60 years, diagnosed with diabetes or hypertension	Pharmacist follow-up of patients every 6 months,	36 months	Usual care (3 monthly physician	Incremental cost-effectiveness ratio per QALY, based on patients reaching	Incremental cost-effectiveness ratio per QALY was estimated at $53.50.

Author, year, setting, study design	Participants	Pharmacist intervention	Follow-up duration	Control	Outcome measure	Cost-effectiveness outcome
controlled trial	receiving medications	compliance checks; patient and family education; and physician recommendations		visits without a pharmacist)	clinical outcome goals.	The intervention did not significantly increase health care cost and significantly improved health outcomes.
Polgreen et al, 2015. USA. Primary care Offices. Cluster randomised controlled trial	>= 18 years with uncontrolled hypertension defined as SBP>140mmHg or DBP >90 mmHg or SBP >130 mmHg and DBP >80 mmHg in diabetes and chronic kidney disease	Pharmacist collaboration with physicians with pharmacist care plans and regular patient visits.	9 months	Usual care – no pharmacist involvement	Cost to lower blood pressure by 1mmHg.	Cost to lower BP by 1mmHg was $33.27 for systolic and $69.98 for diastolic. Comparing rates in the intervention and control groups, the cost to increase BP control by 1 percentage point was $22.55.
Simpson et al, 2015. USA. Primary care clinic Randomised controlled trial	Patients with Type 2 diabetes	Pharmacist visits with patients with medication review and physical examination including blood pressure measurement; pharmacist recommendations to the physician; and patient follow-up by pharmacist.	12 months	Usual care – no pharmacist involvement	Cost to reduce annualised cardiovascular 10-year risk by 1%	95% probability that intervention is cost-effective at level of about $4,000 per 1% reduction in annualised cardiovascular risk.
Sorensen et al, 2004. Australia. General practice, Randomised controlled trial	Patients at risk of medication misadventure	GPs coordinated linking up of pharmacists. Patient home visit by the pharmacist for medication review, with prescriber recommendations	6 months	Usual care	Cost-saving per intervention patient	There was a net cost saving per intervention patient (marginal cost benefit) of AUS$54 per patient relative to controls. No significant difference was demonstrated in health-related quality of life, patient satisfaction, or clinical outcomes.

See Appendix 7 and Table 23 for details on the outcomes measured in the included studies, along with the statistical methods used to analyse the results.

The literature search (Appendix 7) did not reveal studies for interventions involving a pharmacist integrated within primary health care services such as ACCHSs in Australia for which cost-effectiveness was analysed. Furthermore, there were no cost-effectiveness studies from any other country reporting interventions involving clinical pharmacist services to Indigenous peoples through

Indigenous health services or any other type of primary health care service. Only one study, set in the United States, commented on the participation of minority populations.

Given the lack of cost-effectiveness studies that were directly relevant to the IPAC trial, cost-effectiveness studies included in this review were selected to have a broader focus in general practice or other primary health care settings and involving collaborative care between a pharmacist and a general practitioner (GP).

The literature review for studies assessing the cost-effectiveness of primary health care integrated pharmacist interventions, found only two studies that explicitly mentioned the co-location of the pharmacist within the primary health care facility. However, it was not clear if the pharmacists in these studies were co-located solely for the purposes of the intervention or if they were existing staff at the facility.[132] [133] The remaining studies involved community pharmacists, clinical pharmacists or research pharmacists and again it was unclear if they were co-located at the primary health care facility for the intervention period (Table 3).

In summary, this literature search did not identify any cost-effectiveness evaluations of pharmacist's interventions that were directly relevant to the IPAC trial. This highlights the importance of the IPAC trial to inform on the cost-effectiveness of pharmacist interventions relevant to the health of Indigenous Australians. The studies set in countries other than Australia have different health systems and therefore different ways of managing health problems within the primary health care setting. Studies also measured health gains in different ways. It is therefore difficult to report the cost-effectiveness of the interventions without considering and understanding the context of each setting. Most authors concluded that the pharmacist intervention was cost-effective.

STRUCTURE OF THE ECONOMIC EVALUATION

This economic evaluation compared the costs and outcomes of the IPAC intervention versus usual care prior to the addition of an integrated non-dispensing pharmacist within ACCHSs to promote the quality use of medicines. The perspective adopted was the publicly funded health system. Discounting was not applied as the trial duration was less than one year.

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[132] Kulchaitanaroaj, P., Brooks, J. M., Ardery, G., Newman, D. & Carter, B. L. (2012). Incremental costs associated with physician and pharmacist collaboration to improve blood pressure control. Pharmacotherapy, 32(8):772-780.
[133] Kulchaitanaroaj, P., Brooks, J. M., Chaiyakunapruk, N., Goedken, A. M., Chrischilles, E. A., & Carter, B. L. (2017). Cost-utility analysis of physician-pharmacist collaborative intervention for treating hypertension compared with usual care. Journal of Hypertension, 35(1), 178-187.

The analysis was trial-based, rather than model-based, with costs and outcomes compared in the post- and pre-intervention periods. As such, types of events and health states did not need to be defined. The trial used a pragmatic study design to evaluate quality of care outcome measures consistent with measures usually explored for quality improvement within clinical practice, with the comparator being 'usual care'. For these reasons, quality of life measures for cost utility analysis were not collected from trial participants to reduce the burden on participants and on clinical staff. Furthermore, (i) changes in quality of life would be unlikely to have been achieved over the relatively short time frame of the IPAC Trial and (ii) problems have been demonstrated in the use of existing instruments to measure the quality of life in Aboriginal populations, especially in populations experiencing more chronic conditions.[134] A single-item question for self-assessed health status of participants (SF1 of the SF-36 scale) was used in the IPAC evaluation but this was not suitable for use in the economic evaluation.

A cost-effectiveness analysis was undertaken for two sub-groups of participants: (i) those with T2DM with pre- and post-measures of HbA1c and (ii) those selected for MAI assessments at baseline and at the end of the study, with potential prescribing omissions (PPOs) used as the relevant outcome measure.

A cost-consequence analysis was undertaken for all participants, with changes in biomedical indices reported for participants with pre- and post-measures of each outcome. Cost-consequence analysis differs from cost-effectiveness analysis in not reporting a single summary measure such as the incremental cost per incremental change in outcome. Rather, costs are presented alongside a range of outcomes to demonstrate the full impact of the intervention and allow policy makers to interpret the findings as appropriate to their decision-making context. Cost-consequence analysis has been recommended for complex interventions with multiple effects and public health interventions which have a range of health and non-health benefits that are difficult to measure in a common unit.[135] [136]

For participants with a clinical diagnosis of T2DM, a cost-utility analysis was also conducted that derived lifetime quality of life changes from the decreases in HbA1c observed during the trial period. The economic evaluation was conducted using SPSS and MS Excel.

[134] Banham D, Karnon J, Lynch J. Health related quality of life (HRQoL) among Aboriginal South Australians: a perspective using survey-based health utility estimates. Health and Quality of Life Outcomes, 2018;17(1); 39.
[135] Drummond M, Sculpher M, Torrance G, O'Brien B, Stoddart G. Methods for the economic evaluation of health care programmes. Oxford University Press;2005.
[136] National Institute for Health and Care Excellence. Medical technologies evaluation programme methods guide: process and methods [PMG33]. https://www.nice.org.uk/process/pmg33/resources/medical-technologies-evaluation-programme-methods-guide-pdf-72286774205893

A description of the proposed population, disease states and settings and justification is described in Section A.4 and repeated in Section D.2. A description of the intervention is described in the section of this report that describes the clinical algorithm (Section A.6).

Assumptions

The *theory of change* for the integrated pharmacist's intervention demonstrates the relationships and interactions between the various events that can influence outcomes and the economic evaluation (Appendix 3). In short, the effect of integrated pharmacists is influenced by their training and the integration model within the ACCHS (fidelity to the conditions of the IPAC intervention), as well as assumptions that are outside the control of the ACCHS and integrated pharmacist. For example, patient adherence behaviour can be mediated by social and economic factors outside the control of the patient and the healthcare team, and the effect of integrated pharmacists may also be mediated by the capacity of community pharmacy to engage and support systems that enhance patient-centredness in the quality use of medicines.

The economic evaluation estimated the net cost of medication utilisation during the IPAC trial (as a health system cost). Certain assumptions made in developing these estimates have been reported in Appendix 15 (*Net cost to the PBS*).[137] The cost of medications that were actually dispensed during the study period could not be directly ascertained as dispensing data was not collected for this study.

Consequently, assumptions were applied when estimating the cost of changes to prescription medicines and a conservative approach was taken. It is likely that each of the following assumptions had the effect of overestimating the cost of medication changes during the study period. Costs were assigned to continuous-use medicines (at a standard dosage) for: a) the whole study period; b) assumed complete participant adherence over this time; and c) assumed that prescribing changes occurred immediately following the date of the baseline medication review.

Given that there are delays in patients filling prescriptions from community pharmacy, and a usual non-adherence rate of at least 30% for Aboriginal peoples and Torres Strait Islanders,[138] the actual cost of medications dispensed for the whole follow-up period would most likely have been less than what was assumed. The same assumptions were applied to ceased medications to offset the cost of

[137] Couzos S, Drovandi A, Smith D, Hendrie D, Biros E. Net cost to the PBS of medication changes arising from the IPAC intervention: Method used to assess health system costs for economic analysis. Supplement to the Economic Evaluation for the IPAC Project. Report to the PSA, December 2019.

[138] de Dassel JL, Ralph AP, Cass AA. systematic review of adherence in Indigenous Australians: an opportunity to improve chronic condition management. BMC Health Serv Res. 2017 Dec 27;17(1):845. doi: 10.1186/s12913-017-2794-y.

newly started medications. This may have overestimated the costs saved, as medications may not have been ceased immediately after the baseline MAI. The net effect of these competing assumptions would favour an overestimation of medication costs as it is easier to cease a medication than to take it.

The costs of single-expense medications may also have been overestimated by extending the cost period to 30 days for some items according to the defined standard dosages, but this applied to only a few medications. An assumption was made that these single-expense items were not prescribed at repeated intervals during the study and this may have also underestimated the costs of these type of medications. In this case, the net effect is a more balanced set of assumptions.

The PBS patient co-payment did not factor in any of the medication cost estimates as most participants were concessional and the co-payment for Aboriginal peoples and Torres Strait Islanders in this situation is waived under the Closing the Gap PBS Co-Payment Measure. In addition, some participants were from remote locations sourcing their medications through the ACCHS under the section 100 (of the National Health Act, 1953) scheme that also waives a co-payment. The few remaining participants not in either of these situations may have paid a reduced co-payment of $6.50 (2019 prices) per medication dispensed. If the patient contribution was able to be factored into these estimates, the direction of the net effect on patient 'out of pocket' expenses arising from the medication changes is unclear given that new medications were started as well as ceased.

These assumptions provide a conservative estimate of the costs of medication changes that may be attributed to the pharmacist intervention.

D.4. INPUTS TO THE ECONOMIC EVALUATION

Intervention costs

Resources used to deliver the intervention included the integrated pharmacists salary, training time, GP time spent with pharmacists in medicine information sessions and attending workshops conducted by integrated pharmacists, resources provided by the ACCHSs and miscellaneous items. Information on the amount of resource use was collected directly from record keeping systems implemented specifically for the IPAC trial. Unit costs were similarly obtained directly from the trial records or, in

the case of GP time, from an official source (i.e. ABS earnings data adjusted to 2019 base year based on the change in average weekly earnings).[139] [140]

The change in use of health care resources resulting from the intervention included: (i) the net change in number of MBS item number 900 consultations with GPs and corresponding Home Medicines Reviews (HMRs) in the pre- and post- periods and (ii) the net effect of new medicines started less medicines stopped (for the subset of participants who had an MAI).

Net costs do not include changes in health system resource utilisation such as hospitalisations. Hospitalisation rates were not investigated as a measure in the IPAC trial, as the trial was community-based and participatory, being restricted to data extracted from ACCHS clinical information systems in order to respect Aboriginal and Torres Strait Islander participants ownership of their own data.

Including an integrated pharmacist as part of the primary health care team also generated cost savings (i.e. cost offsets). The costs-savings related to the provision by integrated pharmacists of medication management reviews, either as a HMR (MBS item 900 rebate claim) or a comprehensive medication review that was conducted under circumstances that did not fulfil all criteria of the HMR program. Examples of such circumstances included reviews conducted outside the patient's home, or if the pharmacist conducting the review was not accredited to conduct a HMR. These comprehensive reviews were designated for the purposes of the trial as 'non-HMRs'.

In addition to (i) HMRs conducted by the integrated pharmacists for which no Sixth Community Pharmacy Agreement (6CPA) claim was made and (ii) non-HMRs conducted by integrated pharmacists that substituted for HMRs that may, in the absence of the non-HMRs, have resulted in MBS/6CPA claims, time savings for GPs due to health care activities undertaken by pharmacists, were also included as a cost offset on the basis that they relieved GPs of these duties.

Home Medicines Reviews

The number of MBS item 900 claims was obtained for each participant for the 12-month period prior to enrolment and was collected for the duration of the implementation phase of the trial. The fee for

[139] Australian Bureau of Statistics. Employee earnings and hours, Australia, May 2018. Published January 22 2019. https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6306.0May%202018?OpenDocument.
[140] Australian Bureau of Statistics. Average weekly earnings, Australia, May 2018. Published August 16 2019https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6302.0May%202019?OpenDocument

MBS item number 900 is $157.30[141] and under the 6CPA the pharmacist's fee for a HMR is $222.77 (the total of HMR fees being $380.07).[142] Given varying follow-up periods for participants, MBS item 900 claims in the 12-month period prior to enrolment were proportionately adjusted to correspond to the period for which the participant was enrolled (i.e. number of MBS item 900 claims in 12-month pre-period multiplied by days in trial divided by 365).

Net cost of change in medicines

A method was developed to derive an estimate of the cost of additional medicines started, with cost-offsets for the number of medicines stopped for the subset of participants who had an MAI assessment (Appendix 15). Comparisons were made per patient between medicines at baseline and end of study. Whilst the study records could inform on the number and type of 'new medicine started' or 'previous medicine stopped', neither the dose of medicine prescribed nor the date when the medicine change occurred was known. Consequently, a standard, maximum or minimum medication dose was assigned by an expert panel and the dispensed price per maximum quantity (DPMQ) listed by the PBS used to assign costs for a standard time period consistent with complete adherence. A maximum drug dose for 'new drugs started' overestimates the cost of new medicines, and a minimum drug dose for 'medicines stopped' underestimates cost savings. An assumption was made that the medication change occurred from the date of the baseline MAI and continued until the date of the repeat MAI. A summary of the analysis undertaken for this assessment is included in Appendix 15. Participants for whom information on medicine use was not collected were allocated the average cost of PBS medicines per participant as calculated for participants with a medicine cost.

HMRs and non-HMRs conducted by the integrated pharmacists

The number of HMRs and non-HMRs conducted during the IPAC Trial were ascertained from the integrated pharmacist logbook. The majority (96.4%) of HMRs conducted during the trial period were completed by the integrated pharmacists, with approximately half (52.8%) conducted within IPAC hours and for which no 6CPA claim was submitted. Given the fee of $222.77 per HMR, this amounts

[141] Australian Government Department of Health. (MBS Online: Medicare Benefits Schedule. http://www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/Downloads-201907.
[142] Australian Association of Consultant Pharmacy, The facts on remuneration for mediation reviews. Fact Sheet No. 2. https://aacp.com.au/app/uploads/No-2-Remuneration-for-MMRs-2019-2020.pdf

to a cost offset to the system of $113.39 per HMR (0.964 x 0.528 x $222.77). The non-HMRs were also a cost offset for which the equivalent cost of a HMR of $380.07 was assigned.[143] [144]

Omitted from the analysis was the cost of follow-ups to HMRs and non-HMRs. Approximately half of the HMRs and non-HMRs resulted in follow-up encounters within the implementation phase, which represent a cost offset. However, these follow-up encounters were excluded as a cost offset as they did not relate to an activity funded at the time of the intervention

Time saved for GPs

Inclusion of an integrated pharmacist as part of the primary health care team resulted in time saved by GPs. A survey of GPs for the qualitative evaluation of the IPAC trial suggested a wide variation in the amount of GP time saved from the support provided to them by integrated pharmacists. This time saving ranged from 3% to 41% (Appendix 14). In view of the variation, the evaluation team adopted a minimal and conservative time saving that amounted to approximately 5% of their time. As indicated earlier, the cost of GP time was assigned based on ABS earnings data.[145]

Allocating costs to participants

Intervention costs were divided into (i) variable costs that could be attributed directly to participants (e.g. HMRs, non-HMRs, medicines started/stopped) and (ii) fixed costs which included intervention costs plus cost offsets.

Variable costs were allocated directly to participants based on their unit costs. Fixed cost components were allocated to each ACCHS based on relative resource use. These fixed cost components were allocated to participants based on the number of months each participant was enrolled in the study as a proportion of the total number of months measured across all participants enrolled at that ACCHS. In the case of time saved by GPs, the cost was allocated to participants based on the number of months they were enrolled in the study as a proportion of the total number of months of enrolment measured across all participants. The rationale for this latter was to account for the varying number of participants at each site and thus to allocate these cost offsets in a way more likely to reflect time saved.

[143] Australian Government Department of Health. MBS Online: Medicare Benefits Schedule. http://www.mbsonline.gov.au/internet/m.bsonline/publishing.nsf/Content/Downloads-201907.

[144] Australian Association of Consultant Pharmacy, The facts on remuneration for mediation reviews. Fact Sheet No. 2. https://aacp.com.au/app/uploads/No-2-Remuneration-for-MMRs-2019-2020.pdf

[145] Australian Bureau of Statistics. Employee earnings and hours, Australia, May 2018. Published January 22 2019.https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/6306.0May%202018?OpenDocument.

Total costs for each participant was calculated as the sum of their variable costs plus share of fixed costs.

Table 24 presents data relating to how direct health care resources used in delivering the IPAC intervention were calculated including unit costs, the source of unit cost data, and relevant explanatory comments. Similarly, Table 25 shows these items in regard to the utilisation of direct health care resource items by trial participants. Table 26 lists the range of outcome measures used in the primary and secondary economic evaluations.

Table 24 Direct health care resource items associated with delivering the IPAC intervention

Item	Units	Unit cost	Source	Comment
Integrated pharmacist salary	Hours	$50 per hour*	Financial records	Casual hourly rate for a pharmacist at two sites was $68.44. Salary for two discontinued sites was reallocated across other sites based on proportion of total pharmacist hours.
Integrated pharmacist on-costs	% of salary	17% ($8.50 per hour)*	Financial records	Range of $4.81 - $9.86 depending on employment arrangements.
Integrated pharmacist allowances (including relocation costs where applicable)	$	-	Financial records	Total amount across all sites allocated to pharmacists at each site based on their proportion of total hours
Out-of-pocket pharmacists' payments	$	-	Self-report	As above
Integrated pharmacist training	$	-	Financial records	As above
ACCHS support of integrated pharmacists	$	-	ACCHS records	As above
General practitioner time spent in receiving a medicines information service	Hours	$86.80 per hour	Hours from pharmacist logbook; unit cost from ABS (2019a). Updated to 2019 using ABS (2019b)[146,147]	As above

*Cost estimates were provided by the Pharmaceutical Society of Australia. The pharmacist's salary was budgeted by the PSA for the integrated pharmacist role in the IPAC trial. For some pharmacists this rate was an increase on their salary rate prior to IPAC trial, whilst for others the rate was lower than their pay rate immediately prior to IPAC. Market rates vary depending on remoteness.

Table 25 Utilisation of direct health care resource items by trial participants

Item	Units	Unit cost	Source	Comment
Net Home Medicines Reviews (HMRs)	n	$380.07	MBS and 6CPA	Comprises $157.30 for MBS item 900 plus 6CPA fee for pharmacists of $222.77
Cost offset HMRs conducted within IPAC hours (no 6CPA claim).	n	$113.38	Financial records, MBS item 900 and 6CPA	Attributed as a cost saving

[146] Australian Bureau of Statistics. Employee earnings and hours, Australia, May 2018. Cat no 6306.0. Canberra:ABS; 2019.
[147] Australian Bureau of Statistics., Average weekly earnings, Australia, May 2019. Cat no 6302.0. Canberra:ABS; 2019.

Cost offset Non-HMRs	n	$380.07	MBS and 6CPA	As above
Time saved by GPs	% of time	$86.80 per hour	% of time from GP survey; earnings from ABS (2019a); ABS (2019b)	As above
Net cost of PBS medicines	n	Various based on DPMQ listed by the PBS	See 'Net cost of change in medicines' section above	-

6CPA= 6Th Community Pharmacy Agreement; ABS= Australian bureau of Statistics; MBS= Medicare Benefits Schedule

Table 26 Outcome measures used in the primary and secondary economic evaluations

Outcomes	Measures	Source
Primary outcome measures	Biomedical indices including changes in HbA1c for participants with T2DM, and changed in SDP, DBP, TC, LDL-C, HDL-C, TG, ACR and CVD 5-year risk	Trial data
Primary outcome measure – participants with T2DM	Clinically meaningful reduction in HbA1c	Trial data
Secondary outcome measure	Potential prescribing omission	Trial data

ACR= albumin-creatine ratio
BMI= body mass index;
BP= blood pressure;
CVD= cardiovascular disease.
DBP= diastolic blood pressure
eGFR= estimated glomerular filtration rate
HbA1C= glycated haemoglobin
HDL-C= high density lipoprotein cholesterol
LDL-C= low density lipoprotein cholesterol
SBP= systolic blood pressure
TC= total cholesterol
TG= triglycerides
T2DM= type 2 diabetes mellitus

The cost-consequence analysis was undertaken using biomedical indices listed above, while the cost-effectiveness analysis was undertaken with regard to the primary outcome of a clinically meaningful reduction in HbA1c for participants with T2DM[148] and potential prescribing omissions for participants selected for MAI assessments.[149] These intermediate health outcome measures reflect 'quality of care' measures, consistent with quality measures used by the Australian Government to monitor the provision of primary health care through arrangements with Primary Health Networks and the ACCHS sector nationally.[150]

[148] Couzos S, Smith D, Buttner P, Biros E. Integrated pharmacists in ACCHSs- Analysis of the assessment of clinical endpoints in Aboriginal and Torres Strait Islander patients with chronic disease (IPAC Project). Final Report to the PSA, May 2020.
[149] Couzos S, Smith D, Buttner P, Biros E. Assessment of medication appropriateness using the Medication Appropriate Index (MAI) in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal community -controlled health services (IPAC project). Final Report to the PSA, Feb 2020.
[150] Australian Institute of Health and Welfare 2018. National Key Performance Indicators for Aboriginal and Torres Strait Islander primary health care: results for 2017. National key performance indicators for Aboriginal and Torres Strait Islander primary health care series no. 5. Cat. no. IHW 200. Canberra: AIHW.

The cost of implementing the IPAC intervention was $1,946,876 (Table 27). As a result of the intervention, the net cost of health services (HMRs) increased by $132,899 ($179,012-$46,113) and the net cost of PBS medicines (i.e. medicines started less medicines stopped) increased by $553,849 ($135,800+$418,049). Cost offsets from time saved by GPs and integrated pharmacists conducting HMRs and non-HMRs during the trial period amounted to $459,643.

The net total cost of implementing the IPAC trial was $2,173,981 (calculated as [$1,946,876+($132,899+$553,849)-$459,643]). **On a per participant basis, this cost was equivalent to $1,493 per person.**

Table 27 Resource use, costs and cost offsets in delivering the IPAC intervention (n=1,456)

Item	Resource use (units)	Costs ($)	
		During-trial period	Pre-trial period ("comparator")
Integrated pharmacist salary	27,478 hours	$1,621,079	
Integrated pharmacist allowances	-	$136,658	
Pharmacist out-of-pocket payment	-	$9,741	
Integrated pharmacist training	-	$64,820	
ACCHS contribution[1]	-	$52,158	
General Practitioner time spent	719 hours	$62,420	
Total: Intervention costs	-	**$1,946,876**	
Home Medicines Review based on item 900 claims (HMR)	149 pre-intervention; 471 during intervention[2]	$179,012 [2]	$46,113[3]
Net cost of PBS medicines (participants for whom medicines was measured)		$135,800[4]	
- (PBS medicines started)	-	($514,467)[4]	
- (PBS medicines stopped)	-	($378,667)[4]	
Net cost of medicines (participants for whom medicines were not directly measured)	-	$418,049[5]	-
Cost of utilisation health services		**$732,861**	**$46,113[3]**
Time saved by General Practitioners	1366 hours	$118,528	
Cost offsets HMRs	-	$53,402[6]	
Non-HMRs	757	$287,713	
Cost offsets		**$459,643**	
Net total costs		**$ 2,220,094**	**$46,113[4]**

HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
PBS= Pharmaceutical Benefit Scheme.
[1] Excludes overheads and infrastructure costs (e.g. office space, computers, etc)

[2] Data from HMR report (Appendix 12).[151] A cost offset of $380.07 per HMR was applied.
[3] A cost offset of $380.07 per HMR was applied but was adjusted for each participant to reflect equivalent number of days in pre-trial period as during trial period.
[4] Derived from: *Couzos S, Drovandi A, Smith D, Hendrie D, Biros E. Net cost to the PBS of medication changes arising from the IPAC intervention: Method used to assess health system costs for economic analysis. Supplement to the Economic Evaluation for the IPAC Project. Report to the PSA, December 2019.* The costs differ slightly from this report as the costs here also include the cost of medicines for four participants who were not in the AoU group, totalling $2593.69 ($135,800 - $133,206). This cost relates to the subset of participants who had an AoU conducted.
[5]Participants for whom information on medicine use was not collected were allocated the average cost of PBS medicines per participant as calculated for participants with a medicine cost.
[6] Derived from 471 HMRs X $113.39. The majority (96.4%) of HMRs conducted during the trial period were completed by the integrated pharmacists, with approximately half (52.8%) conducted within IPAC hours and for which no 6CPA claim was submitted. Given the fee of $222.77 per HMR, this amounts to a cost offset to the system of $113.39 per HMR (0.964 x 0.528 x $222.77).

Table 28 presents costs for subgroups of participants. It was possible to report costs for subgroups as intervention costs (variable and fixed) and components of the net cost of direct health care resources were apportioned to individuals either directly or based on allocation factors. Identifying costs separately for subgroups enabled the appropriate costs to be compared with corresponding outcomes in the incremental cost-effectiveness ratios presented in the cost-effectiveness analysis. Calculating costs for subgroup of participants assumes that the costs of implementing the IPAC intervention are proportionately divisible.

Table 28 Resource use, costs and cost offsets in delivering the IPAC intervention for specific subgroups of participants.

Subgroup	No. of participants	Total intervention costs[1]	Net cost of utilisation of health services[2]	Cost offsets	Net total costs
Participants with T2DM and pre-post HbA1c measures[3]	539	$732,130	$ 198,822	$177,178	$ 753,774
Participants for whom AoU conducted[3]	353	$690,949	$161,115	$137,105	$714,959

AoU= Assessment of medication underutilisation
HbA1C= glycated haemoglobin
T2DM= type 2 diabetes mellitus
[1] Includes sum of variable and fixed costs of the IPAC intervention for participants in each subgroup.
[2] Includes net cost of utilisation of health services for participants in each subgroup.
[3] Participants with T2DM and in the AoU groups had a mean length of participation in the IPAC trial of 287 and 326 days respectively. Additionally, more participants in the AoU group were associated with ACCHSs with higher mean costs per participant.

D.5. RESULTS OF THE ECONOMIC EVALUATION

Cost-consequence analysis

[151] Couzos S, Smith D, Buttner P, Biros E. Assessment of Home Medicines Review (HMR) and non-HMR in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal community - controlled health services (IPAC Project). Final Report to the PSA, Feb 2020.

The results of the cost-consequence analysis, comparing the cost of the IPAC intervention with changes in biomedical indices for which statistically significant differences were observed, are presented below (Table 29). Changes in biomedical indices were calculated using paired pre and post-intervention measures, adjusted for health service cluster and the length of follow-up time (Table 29 above).

The total cost of implementing the IPAC intervention was $1,493 per participant. This cost was associated with statistically significant improvements in the following biomedical indices for participants with pre and post-intervention measures: glycated haemoglobin (HbA1c) (for participants with a clinical diagnosis of T2DM, diastolic blood pressure (DBP), total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), triglycerides (TG), cardiovascular risk 5-year risk (CVD 5-year risk) and estimated glomerular filtration rate (eGFR) (Table 29).

Table 29 Cost-consequence analysis comparing mean incremental cost with mean differences in biomedical indices[1]

Variable	Mean incremental cost	Mean difference in biomedical indices mean (SD, 95% CI)	p-value[1]
Net total cost (including cost offsets)	$ 1,493[2]		
HbA1c mmol/mol *[% units]* (n=539 in T2DM)		-2.8 (19.5, -4.5 to -1.0) *[-0.3% (3.9%, -0.4% to -0.1%)]*	0.001
DBP, mmHg (n=1045)		-0.8 (9.4, -1.4 to -0.2)	0.008
TC, mmol/L (n=660)		-0.15 (0.77, -0.22 to -0.09)	<0.001
LDL-C mmol/L (n=575)		-0.08 (0.48, -0.13 to -0.03)	0.001
TG mmol/L (n=730)		-0.11 (1.08, -0.20 to -0.01)	0.006
CVD 5-year risk % units (n=38)		-1.0 (2.6, -1.8 to -0.12)	0.027
eGFR (no minimum follow-up time) ml/min/1.73m^2 (n=895)		1.9 (25.7, 0.1 to 3.7)	<0.001
eGFR (6-month follow-up time) ml/min/1.73m^2 (n=895)		-0.2 (36.0, -2.99 to 2.7)	0.034

1. Data pertains to biomedical indices with mean difference that was statistically significant at the 0.05 level, as sourced from clinical endpoint analysis report (Appendix **9**).
BP= blood pressure;
CVD= cardiovascular disease.
DBP= diastolic blood pressure
eGFR= estimated glomerular filtration rate
HbA1C= glycated haemoglobin
LDL-C= low density lipoprotein cholesterol
TC= total cholesterol
TG= triglycerides
T2DM= type 2 diabetes mellitus
[2]The estimate of $1,493 per participant, which includes the net costs of utilisation of health services and PBS medicines, is believed to be an overestimate. The net cost of medicine was estimated for a subset of participants based on assumptions that maximised the cost of new medicines started and minimised the cost of medicines that were stopped (see Appendix 15).

Cost-effectiveness analysis

The cost-effectiveness analysis was undertaken for: (i) participants with a clinical diagnosis of T2DM with pre- and post-measures of HbA1c and (ii) participants selected for MAI assessments at baseline

and at the end of the study, with potential prescribing omissions used as the relevant outcome measure.[152]

For participants with a clinical diagnosis of T2DM, and with pre and post-measures of HbA1c, costs and outcomes for the IPAC intervention compared with no IPAC intervention (the comparator) are shown in Table 30. The ICER of the IPAC intervention versus no IPAC intervention was $3,769 ($753,774/200) per participant with a clinically meaningful reduction in HbA1c of at least 0.5%.[153]

Adopting the statistically significant but still clinically meaningful reduction in HbA1c of 0.3% as the benchmark (rather than the benchmark reduction of 0.5%), the ICER reduces to $3,235 ($753,774/233) per participant.

Table 30 Incremental cost effectiveness ratio for reduction in HbA1c in participants with Type 2 diabetes mellitus

		A		B	A/B
	Cost	**Incremental cost**	**Effectiveness: Mean HbA1c (SD) mmol/mol [% units]**	**No. of participants with a clinically meaningful reduction in HbA1c[2]**	**ICER[1]**
Intervention	$ 772,098	$ 753,774	64.0 (22.3) [8.0% (2.0%)]	200	$ 3,769
Comparator	$ 18,324[3]		66.8 (23.8) [8.3% (2.2%)]		

[1] ICER = Incremental Cost Effectiveness Ratio (defined as incremental cost divided by number of participants with a clinically meaningful reduction in HbA1c).
[2] Number with clinically meaningful reduction (mean difference) in HbA1c of at least 0.5% at the participant level, from baseline compared with end of study (n=539).[154] HbA1c conversions used the formula: %HbA1c (units)= [IFCC HbA1c (mmol/mol)* 0.0915] +2.15. See Appendix 9. Note that a clinically meaningful reduction refers to whether the difference is likely to impact current medical practice based on change at the individual rather than population level. It differs from statistical significance, which quantifies the probability of a study's results being due to chance.[155] This analysis therefore adopted a conservative approach to estimate the ICER, as even small reductions in HbA1c can be clinically meaningful at both individual and population levels.[156]
[3] Cost reflects health system costs in the pre-intervention period; HMRs were the only cost item included.

For the sample of participants assessed for an AoU, the overall costs and outcomes, and incremental costs and outcomes, for the IPAC intervention compared with no IPAC intervention are shown below (Table 31). For this subset of participants, the ICER of the IPAC intervention versus no IPAC

[152] Couzos S, Smith D, Buttner P, Biros E. Assessment of medication appropriateness using the Medication Appropriate Index (MAI) in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal community -controlled health services (IPAC project). Final report to the Pharmaceutical Society of Australis for the IPAC Project, February 2020.
[153] Little RR, Rohlfing C. The long and winding road to optimal HbA1c measurement. Clinica Chimica Acta. 2013;418(xx):63-71.
[154] Little RR, Rohlfing C. The long and winding road to optimal HbA1c measurement. Clinica Chimica Acta. 2013;418(xx):63-71.
[155] Ranganathan P, Pramesh CS, Buyse M. Common pitfalls in statistical analysis: clinical versus statistical significance. Perspectives in Clinical Research. 2015;6(3):169-170.
[156] Stratton IM, Adler AI, Neil HAW, Matthews DR, Manley SE, Cull CA, Hadden D, Turner RC, Holman RR. Association of glycaemia with macrovascular and microvascular complications of type 2 diabetes (UKPDS 35): Prospective observational study. BMJ 2000; 321:7258: 405-412.

intervention was $6,809 per reduction in the number of participants with a potential prescribing omission.

Table 31 Incremental cost effectiveness ratio for reduction in potential prescribing omissions in participants assessed for the underutilisation of medications (AoU)

	Cost	Incremental cost	Effectiveness PPOs (n)	Incremental effectiveness[1]	ICER
Intervention	$729,237	$714,959	181	105	$6,809
Comparator	$14,278[2]		76		

AoU = Assessment of Underutilisation
ICER = Incremental Cost Effectiveness Ratio
PPO = Potential Prescribing Omission
[1] Reduction in the number of participants with a potential prescribing omission.
[2.] Cost reflects health system costs in the pre-intervention period; HMRs were the only cost item included.

Cost-utility analysis

For participants with a clinical diagnosis of T2DM, and with pre and post-measures of HbA1c, changes in HbA1c during the trial period were mapped to lifetime quality of life changes based on the findings of a systematic review.[157] This review included 76 studies using T2DM simulation models to evaluate the relationship between improvements in HbA1c and modelled health outcomes in terms of quality-adjusted life years (QALYs) or life expectancy. Of the 76 studies, 57 were based on the CORE Diabetes Model.[158]

Findings of the systematic review based on multivariable regression indicated a linear relationship of every 1% decrease in HbA1c resulting in a 0.371 (95% CI 0.286-0.456) increase in lifetime QALYs. However, studies did not appear to include a decrease in HbA1c exceeding 3%. Participants in the IPAC trial that were recorded to have HbA1c reductions of greater than 3% were assumed to have QALY gains corresponding to a 3% decrease. Percentage reductions in HbA1c refer to the change in measured HbA1c. For example, a change from 9% to 8% reflects a decrease of 1%.

The increase in lifetime QALYs for participants with T2DM were calculated based on the following assumptions:

1) Participants with a decrease in HbA1c of less than 1% were assigned no lifetime QALYs.

[157] Hua X, Lung TW, Palmer A Si L, Herman, WH, Clarke, P. How consistent is the relationship between improved glucose control and modelled health outcomes for people with Type 2 Diabetes Mellitus? a systematic review. Pharmacoeconomics. 2017; 35(3):319-329
[158] The IMS Core Diabetes Model. https://www.core-diabetes.com/Index.aspx?Page=About

2) Participants with a decrease in HbA1c of between 1% and 3% were assigned lifetime QALY gains calculated as 0.371 multiplied by the corresponding decrease.
3) Participants with a decrease in HbA1c of more than 3% were assigned lifetime QALY gains calculated as 0.371 multiplied by 3.

Mapping changes in HbA1c over the trial period to a gain in lifetime QALYs resulted in a projected increase of 101 QALYs (CI 78-125) (Table 31a).

Table 31a Distribution of lifetime QALY gains by changes in HbA1c for participants with T2DM

Change in HbA1c (%)	No. of participants	Lifetime QALY gains
<1%	401	0
1% to 3%	111	71.27
>3%	27	30.05
Total	**539**	**101.32**

Based on an incremental cost of the IPAC intervention of $753,774 for participants with a clinical diagnosis of T2DM, and with pre and post-measures of HbA1c, this suggested an ICER of $7,463 (95% CI $6,030 –$9,664) per QALY, assuming no lifetime costs additional to usual care are required to maintain the reduction in HbA1c.

Only one study identified in the literature review of the cost-effectiveness of non-dispensing pharmacist services integrated within primary health care presented an ICER based on lifetime cost/QALY, but its target group were patients with hypertension.[159]

While the concept of having a cost-effectiveness threshold as a guide for selecting health care interventions for inclusion in a national health insurance scheme has proved controversial,[160] these thresholds provide guidance as to which interventions provide relative value for money.[161] In Australia, analysis of public summary documents have shown that medical services with ICERs over $40,000 per QALY have been recommended for funding, whilst summary documents from the

[159] Kulchaitanaroaj P, Brooks JM, Chaiyakunapruk N, Goedken AM, Chrischilles EA, Carter BL (2017). Cost-utility analysis of physician-pharmacist collaborative intervention for treating hypertension compared with usual care. Journal of Hypertension. 2017; 35(1):178-187.
[160] Culyer A. Cost-effectiveness thresholds in healthcare: a bookshelf guide to their meaning and use. Health Economics, Policy and Law. 2016;11(4): 415-432.
[161] Brouwer W, van Baal P, van Exel, Versteegh M. When is it too expensive? Cost-effectiveness thresholds and health care decision-making. The European Journal of Health Economics. 2019; 20(2):175-180.

Pharmaceutical Benefits Advisory Committee have indicated an ICER threshold of between $45,000 and $75,000.[162,163] A recent study that estimated a reference ICER for the Australian health system showed a lower figure of $28,033 per QALY gained.[164] This latter threshold was based on adopting a supply-side rather than demand-side approach, which has been argued to be preferred in decisions about adding or subtracting interventions to a publicly funded health system.[165]

Based on these ICER thresholds for Australia of assessing the value of new interventions, the modelled ICER for the IPAC intervention for participants with T2DM of $7,463 (95% CI $6,030 - $9,664) per QALY indicates good value for money.

D.6. SENSITIVITY ANALYSES

The sensitivity analysis tested for uncertainty in two parameters: variability in the number of HMR claims (MBS item 900) during the trial period, which accounted for 57% of the cost of utilisation of health services; and an increase in time saved for GPs, which accounted for 29% of cost offsets. While varying the number of HMR claims adds direct health care costs, cost offsets are also generated as the majority of HMRs conducted during the trial period were conducted by integrated pharmacists with no 6CPA claims payments made. Salary and related costs of including integrated pharmacists within the ACCHS setting are the key driver of the cost of the IPAC intervention but unlikely to be subjected to variability.

Variability in HMR claims may occur if, in the future roll-out of the IPAC intervention, there are more integrated pharmacists who are accredited to complete HMRs. In the IPAC study, about 75% of integrated pharmacists were accredited. If this number increases to 100%, then even more HMRs are likely to be completed (and claimed). While this will increase health system costs, it increases patient access to the HMRs (which is a health system goal). Also, the variability in HMRs (costs to the health system) may also occur if community pharmacy (external pharmacists) complete more HMRs because the integrated pharmacist refers the patient to them, which occurred during the IPAC intervention. The sensitivity analysis increased the number of HMRs during the trial period to 1.33 of the number

[162] Edney L, Afzali HHA, Cheng TC, Karnon J. Estimating the reference incremental cost-effectiveness ratio for the Australian health system. PharmacoEconomics. 2018;36(2):239-252.
[163] George B, Harris AH, Mitchell AS. Cost effectiveness analysis and the consistency of decisions making: evidence from pharmaceutical reimbursement in Australia. Pharmacoeconomics. 2001;19(1), 1–8.
[164] Edney L, Afzali HHA, Cheng TC, Karnon J. Estimating the reference incremental cost-effectiveness ratio for the Australian health system. PharmacoEconomics. 2018;36(2):239-252.
[165] Culyer A. Cost-effectiveness thresholds in healthcare: a bookshelf guide to their meaning and use. Health Economics, Policy and Law. 2016;11(4): 415-432.

conducted during the intervention period (n=626 rather than n=471). The number of HMRs is dependent on program rules; future changes to these rules will impact on the frequency of HMRs conducted.

Time saved for GPs may increase as the integrated pharmacists become more embedded in the practice and assume more roles related to their expertise in medication use and safety.[166] The survey of GPs for the qualitative evaluation of the IPAC trial suggested a variation in the amount of GP time saved from the support provided to them by integrated pharmacists of between 3% and 41%. In the sensitivity analysis this percentage was assumed to be 10%, an increase from 5% in the base case analysis.

Increasing the number of HMRs by one third during the trial period increased net total costs of the IPAC Trial by $76,492, while the increase in time saved for GPs by having integrated pharmacists embedded in the ACCHSs decreased costs by $118,528. The impact of varying both parameters was low (Table 32).

Table 32 Key drivers of the economic evaluation

Description	Method/Value	Impact
Increase in number of HMRs	1.33 of number completed by integrated pharmacists during trial period	Low, favours comparator
Increase in time savings for GPs	10% (instead of 5%)	Low; favours intervention

[166] Deeks, L.S., Naunton, M., Tay, G.H., Peterson, G.M., Kyle, G., Davey, R., Dawda, P., Goss, J., Cooper, G.M., Porritt, J. & Kosari, S. What can pharmacists do in general practice? A pilot study. Australian Journal of General Practice; 47(6): 545-549.

SECTION E. FINANCIAL IMPLICATIONS

E.1. JUSTIFICATION OF THE SELECTION OF SOURCES OF DATA

The financial implications have been determined based on the integrated model of care for pharmacists investigated in the IPAC Trial. Section B and Appendices outline the methods, main results, findings, limitations and generalisability of the findings. Section C outlines translation issues.

Financial implications are presented for the broader roll-out of the proposed service to Aboriginal and Torres Strait Islander patients with chronic disease (irrespective of age) attending ACCHSs .

The approach used to estimate the financial implications of the introduction of an integrated pharmacist within ACCHSs has been based on costings for recruitment, employment, training, the proposed settings and the proposed population, extrapolated to the proposed ACCHS services. Information is also drawn from the economic evaluation presented in Section D.

Financial implications include the cost of (i) delivering the proposed service and (ii) additional utilisation of health services resulting from integrated pharmacists being part of the primary health care team. Costs presented are a maximum figure that assumes all ACCHSs across Australia will participate in the extended IPAC program and be able to access suitable pharmacists.

Cost offsets from implementing the IPAC model of care will be generated as the integrated pharmacists assume tasks previously undertaken by GPs, thus freeing up time for GPs. Additionally, improvement in biomedical indices for clients is likely to lead to a reduction in the need for acute health care services over time.

Appendix 17 provides a detailed explanation of the methodology used to estimate costs associated with extending the IPAC trial to embed pharmacists in all ACCHS in Australia. In brief, the proposed funding model for salary of the pharmacists adopted the IPAC methodology for allocation of pharmacist FTE and salary, with a baseline 0.2FTE allocated to each ACCHS and a further allocation according to ACCHSs' client numbers plus a rural loading added, as is applied in the Workforce Incentive Payment program.

Client numbers were estimated from: (i) data from the Australia Institute of Health and Welfare (AIHW), with assumptions made about the relative number of ACCHSs (the AIHW data combines the number of ACCHSs and state/territory primary health services), and (ii) the relative number of ACCHS clients likely to have their medication reviewed by an integrated pharmacist or have a HMR conducted annually, with these estimates based on findings of the IPAC trial.

Training for integrated pharmacists to enable them to work with complex patients and requiring an understanding of social determinants of health and the public health challenges related to Aboriginal

and Torres Strait Islander peoples, includes the creation of online or face to face training courses (drawing on existing material) plus mentorship programs and ongoing support.

Program support for ACCHS has been based on methods for medicines-related programs within ACCHSs that have been found to be effective. The timing of program support is skewed towards the earlier stages to facilitate program uptake and early implementation including recruitment of pharmacists.

Ongoing evaluation of the extended program to embed pharmacists in ACCHSs is proposed to ensure the program is meeting its stated objectives and to identify any issues affecting implementation and address these in a timely manner.

Over the projected 5-year period, total costs of implementing the extended IPAC intervention average $13.2 million per annum (Table 33).

Table 33 Financial implications of extending the IPAC intervention to all ACCHSs

Item	Year 1 ($)	Year 2 ($)	Year 3 ($)	Year 4 ($)	Year 5 ($)
Pharmacists salary	11,735,262	11,735,262	11,735,262	11,735,262	**11,735,262**
Training and support for pharmacists	1,151,000	621,000	621,000	488,750	488,750
Program support for ACCHSs	647,500	622,500	490,000	357,500	332,500
Program monitoring and evaluation	312,380	294,780	294,780	294,780	294,780
TOTAL COSTS	13,846,142	13,273,542	13,141,042	12,876,292	12,851,292

The IPAC trial was associated with an increase in the utilisation of medications and primary health care services, an important finding with the potential to contribute to more equitable, needs-based health care expenditure. The Australian Institute of Health and Welfare has estimated that the Aboriginal and Torres Strait Islander burden of disease is 2.3 times greater than the non-Indigenous burden,[167] yet underutilisation of mainstream services is reflected in ratios of Indigenous to non-Indigenous expenditure of 0.67 to 1.00 for the MBS and 0.80 to 1.00 for the PBS.[168]

The additional cost of utilisation of health services was based on scaling up costs presented in the economic evaluation (Section D) to the estimated number of ACCHS clients with chronic disease who would be likely to: (i) have their medication reviewed by an integrated pharmacist (approximately 2.6% of patients with chronic disease; n=11,000) or (ii) have a HMR conducted annually (see Section E2). The unit cost applied to calculate the total cost of HMRs assumes no 6CPA amount is claimed;

[167] Australian Medical Association. 2018 AMA report card on Indigenous health. https://ama.com.au/sites/default/files/documents/AMA%20Indigenous%20Health%20Report%20Card%202018.pdf
[168] Alford KA. Indigenous health expenditure deficits obscured in Closing the Gap reports. Medical Journal of Australia. 2015; 203(10):403.

and the additional number of HMRs is based on the increase observed during the trial period compared with the pre-trial period. Annual costs of the net cost of medicines and additional HMRs are estimated to be $5.1 million (Table 34).

Table 34 Financial implications of extending the IPAC intervention to all ACCHSs for more equitable use of PBS medicines and Home Medicines Review

Items	Year 1 ($)	Year 2 ($)	Year 3 ($)	Year 4 ($)	Year 5 ($)
Net cost of PBS medicines*	4,684,865	4,684,865	4,684,865	4,684,865	4,684,865
Cost of additional HMRs**	454,912	454,912	454,912	454,912	454,912
TOTAL	5,139,777	5,139,777	5,139,777	5,139,777	5,139,777

*Based on scaling-up of the estimated net increase in the number of medications prescribed for IPAC participants within ACCHSs. The net increase occurred in participants who had an assessment of medication appropriateness completed by integrated pharmacists. Pharmacists made recommendations for medication adjustments to prescribers (See Appendix 12).
**Based on scaling up of the observed increase in participant uptake of HMR services (based on item 900 claims) when pharmacists were integrated within ACCHSs for the IPAC trial. The additional number of HMRs will be dependent on program rules.
ACCHS= Aboriginal community-controlled health services
HMR= Home Medicines Review.
PBS= Pharmaceutical Benefits Scheme

Cost offsets from time saved for GPs across the 140 ACCHSs, assuming a conservative (and minimal) estimate of a 5% time saving, are estimated as $1,184,820 per annum. This type of cost offset may be much higher given that there was a considerable degree of variation in the estimates of GP time-saved, given by general practitioners within ACCHSs (see Section D).

E.2. USE AND COSTS OF HEALTH SERVICES

The number of clients with chronic disease accessing ACCHS services from integrated pharmacists is based on the capacity of the pharmacists to deliver services, based on the findings of the IPAC trial (irrespective of the age of participants).

The cost of implementing the IPAC intervention and embedding pharmacists in all ACCHSs, and the additional use of health services (i.e. HMRs and appropriate use of medicines) has been estimated by scaling up the findings of the IPAC intervention to clients likely to have their medicines reviewed or have HMRs conducted across all ACCHSs (Table 35).

Table 35 Use of the proposed service and additional costs of extending the IPAC intervention to all ACCHSs

Items	Year 1	Year 2	Year 3	Year 4	Year 5
Number of clients with chronic disease likely to be reviewed by an integrated pharmacist for medicines management	11,000[1]*	11,000	11,000	11,000	11,000
Number of additional HMRs	2,892	2,892	2,892	2,892	2,892
Cost of scaled-up IPAC intervention	$13,846,142	$13,273,542	$13,141,042	$12,876,292	$12,851,292
Cost of additional use of health services[1]	$5,139,777	$5,139,777	$5,139,777	$5,139,777	$5,139,777

[1] The total number of regular clients accessing ACCHSs was 409,646 (data provided by NACCHO, from AIHW statistics related to attendance of clients at Aboriginal primary health services).[169] The estimated number of ACCHS clients with chronic disease who would be reviewed by an integrated pharmacist or have a HMR conducted was based on the findings of the IPAC trial (irrespective of age).

E.3. CHANGES IN USE AND COST OF OTHER MEDICAL SERVICES

Other MBS-funded medical services were only analysed with respect to changes in MBS claim event rates and this showed no change in claims following the IPAC trial (Appendix 16). The MBS items relevant to team-based care that were examined included: 715 (Aboriginal and Torres Strait Islander health assessment); 721 (chronic disease care plan); combined 721, 723 and 732 (chronic disease care plan, team care arrangements (TCA), and review of a care plan or TCA) respectively; combined 735, 739, 743 (organizing and coordinating a case conference); combined 747, 750, 758 (participation in a case conference; and 10987, 10997 (follow-up service to item 715 and 721 that includes a medication adherence check undertaken by a practice nurse or an Aboriginal and Torres Strait Islander health practitioner). MBS items were combined as indicated due to relatively low numbers of claims for these services based on national claims data.[170] No statistically significant change in health service utilization was observed with any of the team-based care relevant MBS item numbers when event rates were examined per 100 person-years and cluster adjusted (Appendix 16).

[169] Australian Institute of Health and Welfare. Aboriginal and Torres Strait Islander health organisations: Online Services Report — key results 2017–18. 2019 [Available from: https://www.aihw.gov.au/reports/indigenous-australians/atsi-health-organisation-osr-key-results-2017-18/contents/profile-of-organisations.

[170] Department of Health. MBS Online (Medicare Benefits Schedule). Australian Government. 2020. http://www.mbsonline.gov.au/internet/mbsonline/publishing.nsf/Content/Home [Accessed April 2020]

E.4. FINANCIAL IMPLICATIONS FOR THE MBS

The IPAC Trial identified that MBS item 900 claims for participants significantly increased (3.9 times in a period of 12 months, p<0.001) from the integration of pharmacists within ACCHSs.

For an integrated pharmacist program to be delivered more broadly to the proposed population, the financial implications for the MBS (with regard to item 900) are the cost of the rebate for this service multiplied by the proposed number of beneficiaries over a 12-month period.

PBS and MBS safety net implications have not been included, as co-payments may not be applicable to the majority of clients. Based on the clinical endpoints analysis (Appendix 9), over 80% of participants were pensioners or had concessional status. There is also an absence of data to make assumptions on this issue.

A cost offset from time saved for GPs as a result of the support provided by integrated pharmacists amounts to $1,184,820 per annum. This freeing up of GP capacity will allow more time for clinical activities rather than being realised in monetary terms, hence this is not included in Table 36.

Table 36 Total costs to the MBS of extending the IPAC intervention to all ACCHSs

	Year 1	Year 2	Year 3	Year 4	Year 5
Number of services (additional HMRs)*	2,892	2,892	2,892	2,892	2,892
Costs to the MBS**	$454,912	$454,912	$454,912	$454,912	$454,912

* The calculations are based on the number of regular clients attending ACCHSs with chronic disease who would have a HMR conducted based on the capacity of the integrated pharmacists to conduct HMRs, given the additional number conducted during the IPAC trial. This was derived by multiplying as the additional capacity from the program rollout (78/12.3) by the net increase in the number of HMRs during the intervention period (annualised), (see Appendix 12), which results in an expected increase of 2,892 HMRs per annum.
**The fee for the MBS item number 900 is $157.30 multiplied by the number of potential services over 12 months.

E.5. FINANCIAL IMPLICATIONS FOR GOVERNMENT HEALTH BUDGETS

While the IPAC trial did not monitor utilisation of health care and other services beyond its focus on primary medical services (including medications), the improvement in biomedical indices is expected to be associated with a reduction in the utilisation and corresponding costs of other government funded health services including emergency department presentations and hospital admissions.

For example, preliminary analysis of the outcomes of the Western Sydney integrated care program targeting patients with chronic disease, including people with type 2 diabetes, chronic obstructive pulmonary disease and coronary artery disease or congestive cardiac failure found statistically significant reductions as follows: 34% in the number of hospital admissions, 37% in potentially preventable hospitalisations; 32% in ED presentations; and 25% in unplanned admission length of

stay.[171] While adopting different processes to achieve service improvement, the IPAC model shares the main objective of integrated care programs, namely to improve overall care for patients and achieve a better coordinated journey. An umbrella review of systematic reviews of integrated care programs found that more than half of reviews found a statistically significant improvement in at least one outcome measure, with improvements of the following order of magnitude: reductions in emergency admissions, 15-50%; all-cause readmissions, 10-30%; condition-specific readmissions, 15-50%; reported length of stay of 1 to 7 days; and lower emergency department presentations, 30-40%.[172]

Table 37 presents the financial implications for government budgets of extending the IPAC intervention to all ACCHSs, excluding the impact on the MBS and PBS (sections E1, E2 and E4).

Estimated reductions in the utilisation of hospital services from the improvement in biomedical indices achieved by the IPAC intervention were assumed to be 10%, 20% or 30%, based on findings of studies of the effectiveness of integrated care programs. These reductions were applied to estimates of the rate of hospital utilisation by the Aboriginal and Torres Strait Islander population for ACCHS clients, including hospital admissions for chronic disease (but excluding same day dialysis admissions for renal disease)[173] and emergency department presentations.[174] Costs per hospital admissions and emergency department presentations were obtained from relevant unit costs extracted from the National Hospital Cost Data Collection Round 21 tables,[175] updated from 2016/2017 to 2018/2019 prices.[176]

The resultant impact for government budgets is a reduction in hospital costs of between $0.6 million and $1.9 million per annum, varying according to the decrease in utilisation achieved, with the majority of savings arising from fewer emergency department presentations.

[171] Cheung NW, Crampton M, Nesire V, Hng TM, Chow CK. Model for integrated care for chronic disease in the Australian context: Western Sydney Integrated Care Program. 2019;43(5):565-571.
[172] Damery S, Flanagan S, Combes G. Does integrated care reduce hospital activity for patients with chronic diseases? An umbrella review of systematic reviews. BMJ Open. 2016; 6e011952.
[173] PHIDU. Aboriginal and Torres Strait Islander social health atlas of Australia. ttp://phidu.torrens.edu.au/social-health-atlases/data.
[174] Australian Institute of Health and Welfare. Emergency department care 2017–18: Australian hospital statistics. Health services series no. 89. Cat. no. HSE 216. 2018; Canberra: AIHW.
[175] Independent Hospital Pricing Authority. National hospital cost data collection, AR-DRG cost weight tables v8.0x, round 21 (Financial year2016-17).
[176] Australian Institute of Health and Welfare. Health expenditure Australia 2017-18. Health and welfare expenditure series no. 65. 2019; Canberra: AIHW.

Table 37 Financial implications for government budgets from a potential reduction in hospital costs

Items	Current utilisation of hospital services		Estimated reduction in utilisation of hospital services	
	(n)	($)	(n)	($)
Expected number of ACCHS clients to receive services from integrated pharmacists	11,000	-	-	-
ASSUMING A 10% REDUCTION				
Hospital admissions for chronic conditions	212[1]	1,189,101	21	118,910
ED presentations	7,394 [2]	5,146,224	739	514,622
Total	**-**	**6,335,325**	**-**	**633,532**
ASSUMING A 20% REDUCTION				
Hospital admissions for chronic conditions	212[1]	1,189,101	42	237,820
ED presentations	7,394 [2]	5,146,224	1,479	1,029,245
Total	**-**	**6,335,325**	**-**	**1,267,065**
ASSUMING A 30% REDUCTION				
Hospital admissions for chronic conditions	212[1]	1,189,101	64	356,730
ED presentations	7,394[2]	5,146,224	2,218	1,543,867
Total	**-**	**6,335,325**	**-**	**1,900,597**

[1] Estimates of the rate of hospital utilisation by the Indigenous Aboriginal and Torres Strait Islander Australian population applied to ACCHS clients reviewed by an integrated pharmacist, including hospital admissions for chronic disease (but excluding same day dialysis admissions for renal disease). [177]

[2] Estimates of the rate of emergency department presentations by the Indigenous Aboriginal and Torres Strait Islander Australian population applied to ACCHS clients reviewed by an integrated pharmacist. [178]

[177] Independent Hospital Pricing Authority. National hospital cost data collection, AR-DRG cost weight tables v8.0x, round 21 (Financial year2016-17).

[178] Australian Institute of Health and Welfare. Health expenditure Australia 2017-18. Health and welfare expenditure series no. 65. 2019; Canberra: AIHW.

SECTION F. OTHER RELEVANT CONSIDERATIONS

F.1 SUPPORT FOR THE PROPOSED SERVICE

We draw the attention of the MSAC to the acceptability of the proposed service to the target population. The integration of pharmacists within ACCHSs (the proposed service) received overwhelming support from the Aboriginal and Torres Strait Islander patients, health service staff, community pharmacists, and the IPAC integrated pharmacists, who participated in the qualitative evaluation of the trial (Appendix 14). The evaluation facilitated feedback from stakeholders who identified a number of benefits and positive outcomes as a result of the role. These benefits expanded to patients, health services staff (including CEOs, managers and GPs), integrated pharmacists and community pharmacists. These stakeholders supported the acceptability and continuation of integrated pharmacist services within ACCHSs.

Patients reported numerous benefits with having a pharmacist delivering services within ACCHSs. They appreciated their medications being assessed and receiving alternative or different combinations of medications or treatment regimes, and these services resulted in them *'feeling better'*. Integrated pharmacists took a holistic approach to patient care, listened to patients and better understood the social context of their lives. Some patients reported being more involved in decisions about their care as a result of support from pharmacists who sometimes sat in on consultations with them and their GP. With education received from the pharmacists, patients felt empowered to better manage their health, better understood their conditions and why they needed to take their medications and how they worked. Many patients indicated they were more adherent to their medications. The integrated pharmacists and other health services staff concurred that patients' management of the health conditions (and adherence to medications) had improved, as had their biomedical test results, particularly the HbA1C level for patients with diabetes. These qualitative reports were substantiated in the quantitative analysis for medication adherence and for biomedical outcome measures (Appendices 9, 13 and 14).

For health services staff, the main benefit with having a pharmacist integrated in their team was access to an *'in-house medicines expert'*. Integrated pharmacists provided support and advice to health services staff informally such as through *'corridor conversations'* as well as formally through medication management reviews. Integrated pharmacists and GPs reported that recommendations were commonly made by the integrated pharmacists following medication reviews.

Recommendations were perceived to be of high quality and prescriber up-take of the recommendations was reported to be high. Provision of education sessions for health services staff, including GPs, nurses and AHW/Ps) were perceived as valuable. Health services staff also benefited from the pharmacists having input into their clinical team meetings and case conferences. The pharmacists contributed to medicines safety and quality assurance activities by conducting drug utilisation reviews and assisting in reviewing ACCHS medication-related policies.

GPs reported that having the integrated pharmacist as part of the PHC team saved them time as medication queries were answered quickly, and they could refer patients to the pharmacist for education about their clinical conditions. The pharmacists could also better explain to the patient how their medications worked. Time was also saved for some GPs as they could make referrals for medication management reviews directly to the integrated pharmacist who could then facilitate transfer of the patient referrals to an accredited external community pharmacist or conduct the reviews themselves if accredited.

The majority of integrated pharmacists were able to develop meaningful relationships with patients and empower them by developing their health literacy and knowledge about their medicines. A benefit from the pharmacists' perspective was "*to sit down with the patient"* and *"spend a bit more time with patients".* The pharmacists' roles were designed to be predominantly patient-centred and the majority of pharmacists enjoyed this aspect of the role. When asked, all of the pharmacists indicated they would continue their employment if their role was continued. The integrated pharmacists enjoyed their role and experienced personal and professional satisfaction in the services they were providing.

Patients reported telling family and friends about their positive interactions and encouraged them to also see the pharmacist. This suggests that the pharmacists were accepted, practised in a way that was culturally safe and were valued by their patients. During the site visits, the majority of health services staff indicated they wanted the role to continue but that sourcing ongoing funding for this position was a barrier.

The PSA project coordinators received a number of testimonials and positive feedback submitted by various stakeholders throughout the project which supported the findings in the qualitative evaluation (Appendix 18).

Interactions with Community Pharmacy

At the commencement of the project, many ACCHSs already had strong relationships with their local community pharmacy, particularly through the Section 100 arrangements for remote area Aboriginal Health Services and Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander People (QUMAX) program. Relationships between ACCHSs and community pharmacy was further strengthened as a result of the IPAC trial.

Integrated pharmacists worked together with community pharmacists to problem solve, access discharge summaries, confirm the patient's medication history, undertake medication reconciliation by correcting errors and creating current medication lists, and facilitated provision of dose administration aids (DAAs) for health service patients. Community pharmacists reported that the integrated pharmacist role was very helpful and useful to them and it facilitated communication between the community pharmacy and GPs within the ACCHS.

Community pharmacists reported benefits from the IPAC trial that included increased referrals for them to undertake HMRs and improved their participation in HMRs. They also felt that patients were more interested in their medicines. Community pharmacists also perceived that patient knowledge of their medicines and adherence to medicines had improved since the integrated pharmacists had commenced in the ACCHSs. Participating community pharmacists believed there was a role for an IPAC-type (non-dispensing) pharmacists within ACCHSs.

F.2 Supports to be Considered For Broader Program Roll-Out

Specific issues were identified in the project that require MSAC's consideration in relation to continuation, or expansion of the proposed service. For the service to be delivered within ACCHSs, additional resource commitments will be necessary to train and support pharmacists, such as through the PSA, as well as supports to ACCHSs to deliver the integrated model of care (see **Sections C and E**). The qualitative evaluation of the IPAC trial (Appendix 14) also outlined some challenges that warrant consideration in the planning and support of program expansion that are summarised here.

Support for pharmacist recruitment and training

Pharmacist recruitment to integrated non-dispensing roles within ACCHSs will be influenced by the financing models for broader program roll-out. The selection criteria and processes undertaken throughout the IPAC trial can inform future models of recruitment (Appendix 19). Pharmacists would not need to be employed by the PSA. Principles to be considered are:

- Respecting the principles of self-determination, ACCHSs have a role in pharmacist recruitment to ensure their 'fitness for the service' with respect to suitable skills and cultural safety.
- Pharmacists are selected with skills aligned to the expected scope of practice and core roles;
- Placements within ACCHS will be influenced by the needs, capacity, and preparedness of ACCHSs;
- Community pharmacies who have well developed and respectful relationships with ACCHSs are well placed to identify pharmacists to perform integrated roles

A key outcome of the qualitative evaluation relevant to pharmacist recruitment was ensuring the pharmacist had the right *'organizational fit'* and personality to suit the ACCHS, which was just as important as their skills and experience. As well as possessing relevant clinical skills, pharmacists needed to be culturally responsive, the ability to communicate, build rapport, develop relationships and collaborate with internal and external stakeholders, be flexible, non-judgmental, and resilient. Pharmacists needed to be confident and understand the need to be proactive and engage with people to make the role more effective.

Induction to the integrated pharmacist role (provided in the project by the PSA) was important and prepared the pharmacists well (Appendix 20). Pharmacists were also provided with valuable support throughout the trial by the PSA Project Coordinators who responded to queries in a timely manner and facilitated pharmacists' participation in a peer support network using technology (Appendix 21). This enabled them to develop supportive relationships with other integrated pharmacists in the same role. Indeed, pharmacists providing an integrated service within ACCHSs would benefit from a coordinated induction to the role and ongoing support to enable them to work effectively within their respective health services.

Support for ACCHSs

For some ACCHSs, readiness for the project was a challenge (Appendix 14). Prior to the IPAC Trial there were few pharmacists working in general practices or ACCHSs nationally, with consequently very little understanding of the role of a clinical pharmacist in the primary care setting. A few ACCHSs in the project had worked with pharmacists providing HMRs for patients of their service, and staff in these services had a slightly better understanding of the services a pharmacist could deliver within a primary care service.

Support for ACCHSs in a broader roll-out of this program should be based on the six support activities provided throughout the IPAC trial (Appendix 22). This involved support from NACCHO and its Affiliates with some collaboration and technical and pharmacy-related involvement from PSA. Affiliates of NACCHO can leverage from their public health and clinical expertise and local knowledge based on their proximity and regular involvement in daily ACCHS activity to ensure local needs are optimally met. ACCHSs received support through a site visit from a NACCHO project coordinator as part of the service induction process. Some services were well-prepared for the pharmacist and understood the value of the role, however, staff in other services needed time to further understand the role and learn how to best utilise the pharmacists' expertise.

At the time of their interview for the qualitative evaluation of the IPAC Trial (after approximately six months of practice in their service), the majority of the integrated pharmacists felt accepted and well-integrated within the PHC team. Integrated pharmacists helped ACCHS staff to understand the pharmacist role by explaining how they could contribute to the PHC team and improve health outcomes for patients. This enhanced staff understanding of their role, helped with relationship building, and assisted the pharmacist to integrate into the team. Over time, these factors contributed to increased numbers of patients referred to the pharmacist. Most pharmacists had a project 'go to' person or 'champion' who assisted with their integration.

Addressing this issue for a broader roll-out of this program, will require support to be provided to clinic managers (for flow-on to other healthcare staff) to ensure they are ready for the integrated pharmacist role. In the IPAC Trial, earlier discussion with ACCHS staff about the pharmacists' role may have assisted services to better prepare before the pharmacist commenced. In a future roll-out of the proposed program, service induction strategies such as the development of ACCHS policies and procedures to prepare and inform services of the role of the integrated pharmacist, will be valuable. For example, ACCHSs must ensure they have the physical space to support clinical consultations between the patient and pharmacist and have a GP prescriber employed within the service. Programs should ideally allow a lead-in time to enable integrated pharmacists to develop relationships with staff and patients and develop a deeper understanding of the local community and health service culture prior to requiring any outcome data related to program deliverables.

Other supports that could facilitate the integration of the pharmacist role within ACCHSs included promotional resources and encouragement with integration such as pharmacists being given the same

uniform as other health staff. Promotional resources should be developed in local languages and cater to all levels of health literacy in communities where the role is situated.

Support for ACCHSs could be provided through the Affiliates of NACCHO because of their proximity and regular involvement in ACCHS activity. Affiliate staff could take a lead role and champion the expansion of the integrated pharmacist role in services. The support they could provide includes staff education about the integrated pharmacist role, assistance developing local referral processes and assessment of resources (eg. physical space and availability of uniforms) to ensure ACCHSs are adequately prepared. Affiliates could also support ACCHSs to provide pharmacist induction into the service and the local community.

The qualitative evaluation found that support from GPs and AHW/Ps were enablers to the integration of pharmacist's into the PHC team and improved patient referral processes. AHW/Ps also played a vital role assisting with patient follow-up. Clinical algorithms to support patient referral to the pharmacists within the ACCHS model of care will be valuable. Coordinating referral processes is complicated as the target population is burdened by many chronic diseases and often patients are overwhelmed with medication appointments. This means opportunistic assessments are particularly important to close the gap in access to medication-related services. NACCHO and/or Affiliates are well placed to develop generic clinical algorithms and referral resources if there a broader roll-out of the integrated pharmacist model of care within ACCHSs. These issues have also been summarised in Section C Translation (Table 19) of this submission.

F.3 SUMMARY OF QUALITATIVE EVALUATION

The qualitative evaluation of the IPAC study identified many benefits from the project and demonstrated an overwhelming support for non-dispensing pharmacist services integrated within the PHC team of participating IPAC sites and in ACCHSs more broadly. Health service staff, the integrated pharmacists and patients benefited from the initiative. Relationships between ACCHSs and community pharmacy were further strengthened by the pharmacists integrated within ACCHSs. Community pharmacists also benefited from increased referrals for, and improved participation in HMRs from ACCHSs as a result of the integrated pharmacist role.

In a future roll-out of the proposed program, service induction strategies such as the development of ACCHS policies and procedures to prepare and inform services of the role of the integrated

pharmacist, will be valuable. To inform future policy and implementation of integrated pharmacists within ACCHSs, the qualitative evaluation recommended:

1. Supportive policy to integrate the role of a non-dispensing pharmacist within ACCHSs;
2. Advocacy and support to ACCHSs to facilitate processes for integrating these pharmacists within their services;
3. Co-design of the pharmacist role with the ACCHS to ensure it meets their needs;
4. Training and support to prepare pharmacists for non-dispensing integrated roles within ACCHSs;
5. Continuing quality improvement through further research and evaluation.

It is recommended that MSAC consider these suggestions in the future design of the proposed program to support an integrated pharmacist within ACCHSs. Strategies to implement these suggestions were suggested by participants. Further details are documented in the qualitative evaluation report in Appendix 14.

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Integrating pharmacists into Aboriginal Community Controlled Health Services (IPAC project): Protocol for an interventional, non-randomised study to improve chronic disease outcomes

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Introduction

Aboriginal and Torres Strait Islander peoples' in Australian communities face many barriers accessing medicines including financial and geographic constraints, failed patient-clinician interactions, poor healthcare delivery systems and complex therapeutic medication regimens.[1,2] The physical settings of community pharmacies and informational continuity challenges with Aboriginal health services that limit the sharing of patient information, have made it difficult for some Aboriginal and Torres Strait Islander people to have productive relationships with pharmacists.[3,4] While Australian initiatives under the 6th Community Pharmacy Agreement (6CPA), the section 100 program for remote area Aboriginal health services, and the Closing the Gap (CTG) Pharmaceutical Benefits Scheme (PBS) Co-payment Measure have removed some of the financial barriers to accessing medicines,[5] the 2013-14 PBS per person expenditure for Indigenous Australians was only 33% of the expenditure for non-Indigenous Australians.[5] There is still considerable need to improve medicines access, as well as the quality use of medicines for populations that are medically underserved. Medication adherence, in general for anyone with chronic disease is poor, resulting in disease-related complications, higher levels of hospitalisation, and increased morbidity and mortality,[6] whilst the economic costs of non-adherence are very high.[7]

Innovative and culturally appropriate models of care to enhance the quality use of medicines for Aboriginal and Torres Strait Islander peoples are necessary. One model is to better integrate pharmacists within primary health care services. The National Health Service in the UK have invested heavily in such an initiative,[8] whilst New Zealand, Canada and the USA already have pharmacists providing clinical services within general practice settings.[9] In Australia, the concept has received endorsement from leading medical organizations such as the Australian Medical Association,[10] general practice groups,[11] and pharmacists.[12,13] Currently, registered pharmacists provide only limited clinical pharmacy services to Indigenous Australians due to several barriers.[14,15] These include prohibitive Home Medication Review (HMR) business rules including processes that are not always possible nor culturally acceptable.[15,16] Many Aboriginal health services provide few HMR referrals due to issues with the cultural responsiveness of pharmacists,

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and lack of pharmacist relationships with ACCHSs.[16,17] Yet, when medication reviews are delivered in culturally appropriate settings (such as in Aboriginal health services) there is great potential to increase patients' medication knowledge, medication adherence and to improve chronic disease management.[16]

Public inquiries,[18] pharmacists,[19] and independent statutory bodies such as the Australian Productivity Commission,[20] have recommended exploring better ways to utilise the full scope of pharmacist roles within collaborative clinical models. Co-location of pharmacists within general practice has enabled greater communication, collaboration and relationship building among health professionals.[12,21] Pharmacist integration within primary health care services can also improve clinical health outcomes and quality prescribing. Pharmacists that are fully integrated offer improved outcomes especially when providing holistic services to patients on multiple medications and co-morbidities.[22] Integrated pharmacists can also significantly reduce medicine errors as shown in UK general practices.[23] An economic analysis found that the integration of pharmacists in Australian general practice has the potential to be cost-effective through broader heath savings at a federal, state and consumer level.[24]

Despite the substantial interest in health reform, the impact of pharmacists on patient health outcomes when working within their scope of practice and integrated within Aboriginal health settings has never been evaluated. In order to investigate the potential gains in health outcomes arising from integrated models of care within Aboriginal health settings, the *Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) to improve Chronic Disease Management* (IPAC) Project was developed. The project is funded by the Australian Government Department of Health, under the Pharmacy Trials Program (Tranche 2) funding as part of the Sixth Community Pharmacy Agreement (6CPA) that seeks to improve clinical outcomes for patients utilizing the full scope of pharmacists role in delivering primary health care services. This Program is also supporting a study of the feasibility of a 6-step medication review service to be delivered by community pharmacy with pharmacists trained to work with clients of Aboriginal health services.[25]

The IPAC project will determine if including a non-dispensing registered pharmacist as part of the primary health care (PHC) team within ACCHSs (the intervention) leads to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples with chronic diseases. The project will target adult patients with chronic diseases to optimise the pharmacological management of their condition given that coronary heart disease and diabetes contribute 22% and 12% respectively of the mortality gap with other Australians.[26] ACCHSs provide comprehensive culturally appropriate primary health care to predominantly Aboriginal and Torres Strait Islander clients and form the vast majority of Aboriginal health services in Australia. They share a community governance model of care employing local Aboriginal and Torres Strait Islander staff, governed by elected Aboriginal and Torres Strait Islander leaders. Although funded largely by the Australian Government, they are independent not-for-profit agencies established by Aboriginal leaders from 1971 in response to significant unmet health needs.[27]

The IPAC Project makes two clinical claims. Firstly, Aboriginal and/or Torres Strait Islander adult patients with chronic disease who are managed by this model of care, receiving pharmacist services integrated within ACCHSs, will experience superior quality of care outcomes compared to usual care. Secondly, services provided by pharmacists within ACCHSs is likely to lead to superior health care service utilization (towards equity) by patients with chronic disease compared to usual care. This paper describes the development and planned evaluation of the intervention within a community-based participatory research model and complies with the SPIRIT 2013 guidelines for clinical trial protocols (Supplementary File A).[28]

Methodology

Study design

The IPAC project is a pragmatic, non-randomized, prospective, pre and post quasi-experimental study (Trial Registration Number and Register: ACTRN12618002002268). The intervention is the integration of a registered pharmacist within the ACCHS primary healthcare team for a 15-month period. Up to 22 ACCHS sites will be recruited for the project across three jurisdictions: Victoria, Queensland and the Northern Territory to ensure a sampling frame that best informs external validity of the outcomes across varied services and patient populations. Pharmacist positions will be aggregated to represent approximately 0.6 full time equivalents (FTE) per site. All eligible ACCHS sites recruited will receive the intervention.

This project characterises pharmacists to be fully integrated within ACCHSs based on a framework defining five key dimensions of 'integration'.[22] IPAC pharmacists will: function under an umbrella network of support within ACCHSs with identified positions; have shared access to clinical information systems; provide rational and continuous clinical care to patients; receive administrative and other supports from primary health care staff; and adhere to governance, cultural, and clinical protocols within ACCHSs as part of their shared vision. A sixth dimension pertains to financial integration which cannot be taken into account as the intervention is project funded. As pragmatic trials seek to determine if interventions work under usual conditions rather than under ideal conditions,[29] pharmacists will function within existing and usual service delivery systems that will vary considerably from service to service but will be focused on pre-determined core roles to structure the evaluation.

The project will adhere to Indigenous community-based participatory research (CBPR) principles, adapted from the World Health Organization guiding principles[30] as described in a previous National Aboriginal Community Controlled Health Organization (NACCHO) project.[31] This is to ensure clear benefits to project sites, acceptability and sustainability of the intervention within ACCHSs, and ultimately, transferability to other PHC services. For this reason, study outcomes will be compared before and after the intervention without the use of control sites, for within-subject comparisons (with repeated measures). Measures repeated over 15 months will assist with providing reliable post-intervention temporal trends in biometric outcome measures. The project will note changes in study sites that may occur pre to post intervention through serial health systems assessments and qualitative methods.

Project governance

The IPAC project is a partnership between community and professional representative bodies including NACCHO representing ACCHSs and the Aboriginal community, the Pharmaceutical Society of Australia (PSA), and the College of Medicine and Dentistry, James Cook University (JCU). Affiliates of NACCHO are state and territory peak bodies representing ACCHSs at this level and will act to support participating sites. The project will be coordinated by a Project Operational Team with members from the three partners. A Steering Committee with an independent Chair will oversee the project with representatives from partner organizations and the Pharmacy Guild of Australia, plus an independent pharmacist. A Project Reference Group will include representatives from all participating ACCHSs, NACCHO, and its Affiliates to advise on implementation issues. The Evaluation Team will be led by JCU with representatives from the partners, the Affiliates, and content experts. A Memorandum of Understanding was signed by all partners at the time of project development (November 2017) outlining communication and governance processes. Fig. 1 outlines the project governance structure.

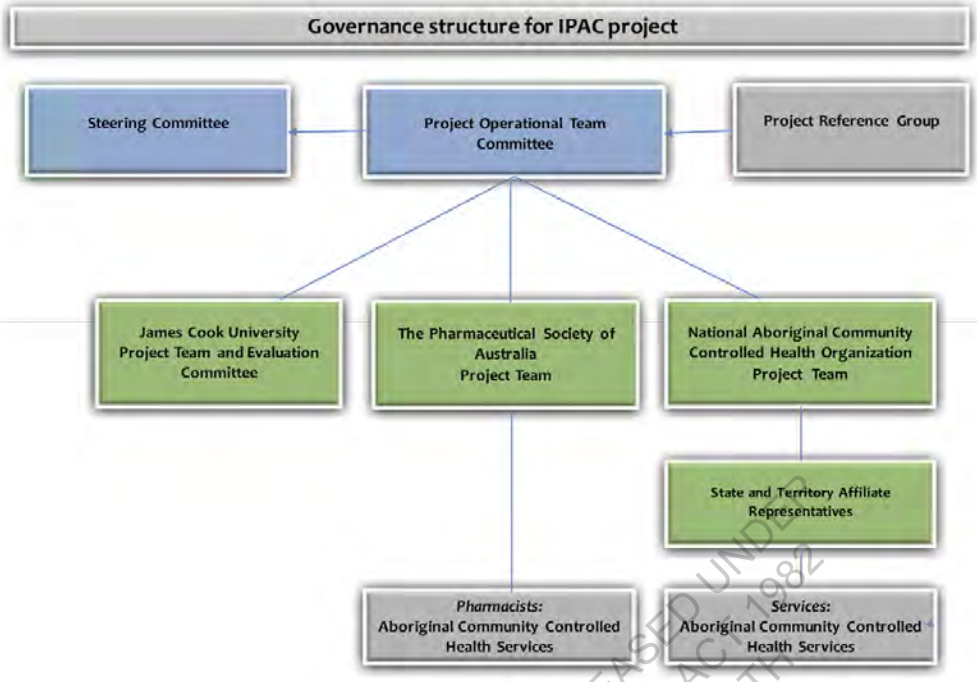

Fig. 1. The IPAC Project governance structure.

Outcomes

The primary expected outcome is an improvement in quality of care indicators (including systolic and diastolic blood pressure, glycated haemoglobin (HbA1c), lipids, estimated absolute cardiovascular disease (CVD) risk, and albumin-creatinine ratio (ACR) in patients with chronic disease.

Expected secondary outcomes include improvements in:

- estimated glomerular filtration rate (eGFR);
- prescribing indices (medication appropriateness, overuse, underuse, and medication-related problems);
- patient use of medicines (medication adherence, self-assessed health status, and patient experience);
- health service utilization indices (Medicare Benefits Schedule claims for: home medicines reviews, care plans, case conferences, team care arrangements and other items), and out-of-home medication management reviews (non-HMRs); and
- stakeholder perceptions (ACCHSs staff; community pharmacies; pharmacists).

An economic evaluation of the IPAC project will ascertain the incremental cost-effectiveness ratio of the pharmacy intervention in relation to usual practice (at baseline) to assess whether the IPAC project represents value for money from a health system perspective.

Theory of change

A theory of change model was proposed to understand the factors influencing the intervention and the underpinning assumptions, such as conditions outside project control. The model outlines that pharmacists will facilitate increased access to medication-related expertise and assessments, which when coupled with increased engagement with participants, staff and other stakeholders, will result in improved services, quality use of medicines, and chronic disease outcomes (Fig. 2).

Timeline

The Project will be conducted in three phases. The establishment phase-one (4–8 months) will comprise ACCHS and pharmacist recruitment, orientation and training, and set-up for the collection of baseline data. During the intervention phase-two (up to 15 months), integrated pharmacists will invite and seek the consent of eligible patients to receive the intervention. Site recruitment times may vary with staged implementation and up to 15 months of patient follow-up. Data analysis will occur in phase-three (6 months), with results dissemination and a final report available in 2020.

Site recruitment

Project sites will be ACCHSs that will be invited by NACCHO and their Affiliates to participate through an 'expression of interest' process if they meet the site eligibility criteria (Table 1). The project team agreed to invite services located in three jurisdictions (Northern Territory, Queensland, and Victoria) to enhance the pool of services likely to meet all the criteria. The final sites will be selected by the operational team, with assistance from Affiliates, to ensure geographical dispersal within these jurisdictions as defined by the Australian Statistical Geography Standard-Remoteness Area (ASGS-RA).[32] Service agreements will document the written consent of each participating site in the project. The proposed site distribution plan is shown in the Supplementary File B.

Pharmacist recruitment

The PSA will recruit pharmacists who fulfil the following eligibility criteria: pharmacist registration with the Australian Health Practitioners Regulation Agency (AHPRA); more than 2 years' post-registration experience; and post-graduate clinical qualifications or demonstrated clinical experience. These criteria will enable the selection of pharmacists with skills aligned to the expected scope of practice for this project. Placements within ACCHS will be influenced by the needs of ACCHSs as determined by a site visit and 'needs assessment'

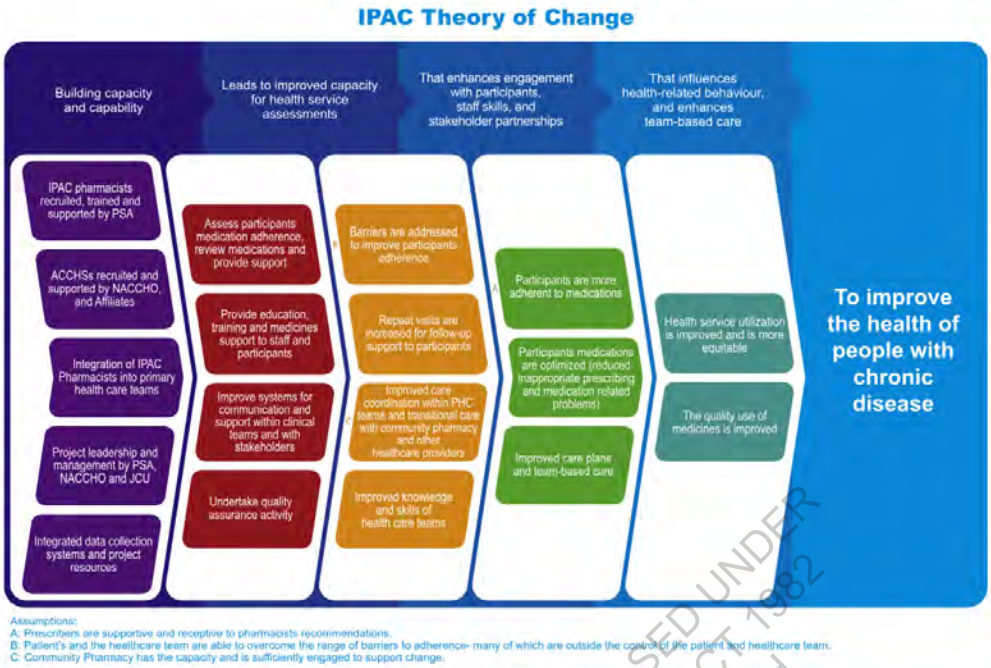

Fig. 2. Theory of change model for the IPAC project.

Table 1
Health Service criteria for participation in the IPAC Study.

To be involved in the IPAC Project the health service must:

- be an *Aboriginal Community Controlled Health Service* and funded by the Department of Health for the provision of primary health care services to Aboriginal and Torres Strait Islander peoples.
- be a member of NACCHO, and the relevant NACCHO State/Territory Affiliate.
- be located in Victoria, Queensland, and the Northern Territory.
- employ at least one full-time- equivalent general practitioner per clinic who is able to prescribe medicines to patients of that organisation.
- not currently employ a non-dispensing pharmacist at the participating clinic, undertaking similar roles.
- use Communicare or Best Practice as their clinical information system.
- participate in continuing quality improvement and reporting on the national Key Performance Indicators for at least 24 months through the use of electronic data extraction tools.
- participate in the *Quality Assurance for Aboriginal and Torres Strait Islander Medical Services* (QAAMS) program, if conducting 'point of care' testing for glycated hemoglobin and albumin-creatinine ratio.
- agree to download and install the GRHANITE® software into one computer within the practice, adhere to program business rules and guidelines, data provision requirements, and patient/service consent requirements for the evaluation of the program.
- provide the IPAC pharmacist access to a private consulting room on the clinic premises that has access to the clinical information system.
- allocate a staff member who will act as a 'go to' person to assist obtain informed patient consent.
- be an accredited practice in accordance with the *Royal Australian College of General Practitioners* Practice Standards.
- be participating or eligible to participate in the Pharmaceutical Benefits Scheme co-payment measure (practice incentive program), if in a non-remote location.
- be eligible to participate in the section 100 arrangements for the supply of pharmaceutical benefits, if in a remote location.

NACCHO = National Aboriginal Community Controlled Health Organisation.

undertaken by NACCHO. Local community pharmacies will be approached first to see if they are able to provide a pharmacist to work within the ACCHS according to service requirements of the ACCHS. If they are unable, or this is not accepted by the ACCHS in line with principles of Aboriginal self-determination, then the IPAC pharmacist may be employed directly by the PSA (see Supplementary File C).

Participant recruitment

Participant inclusion criteria comprise patients with chronic disease who have visited a participating ACCHS site at least three times in the past two years relative to the recruitment date into the study (known as 'active' or 'regular' patients). Patients must be aged 18 years and over and have a diagnosis of:

- Cardiovascular (CV) disease (coronary heart disease, stroke, hypertension, dyslipidaemia and any other CV disease),
- Type 2 diabetes mellitus,
- Chronic kidney disease, or
- Other chronic conditions and at high risk of developing medication-related problems (e.g. polypharmacy).

Convenience sampling of individual patients will occur in keeping with the pragmatic project design. Patients attending sites will be invited to see the IPAC pharmacist after being referred by a doctor, health worker or other healthcare provider. Pharmacists may also approach potentially eligible patients. Respecting patient autonomy, written consent will be required to participate in the project and to provide permission for information and health data to be used for project evaluation. A master participant information brief will inform participants of all aspects of the project to accompany the master participant consent form (Supplementary file D). Participants written consent will be sourced by pharmacists or another healthcare provider as deemed culturally appropriate within the site. The IPAC Pharmacist will record consent in the service's clinical information system (CIS). Participants will be able to withdraw from the study at any time.

Pharmacists' core roles (the intervention)

IPAC pharmacists will deliver medicines- related services within an ACCHS through a coordinated, collaborative and integrated approach to improve the quality of care of patients. The intervention will: 1) target patients, and 2) target practices (health professionals and systems) and will not include the direct supply or dispensing of medicines. The pharmacist's ten core roles during the intervention phase are shown

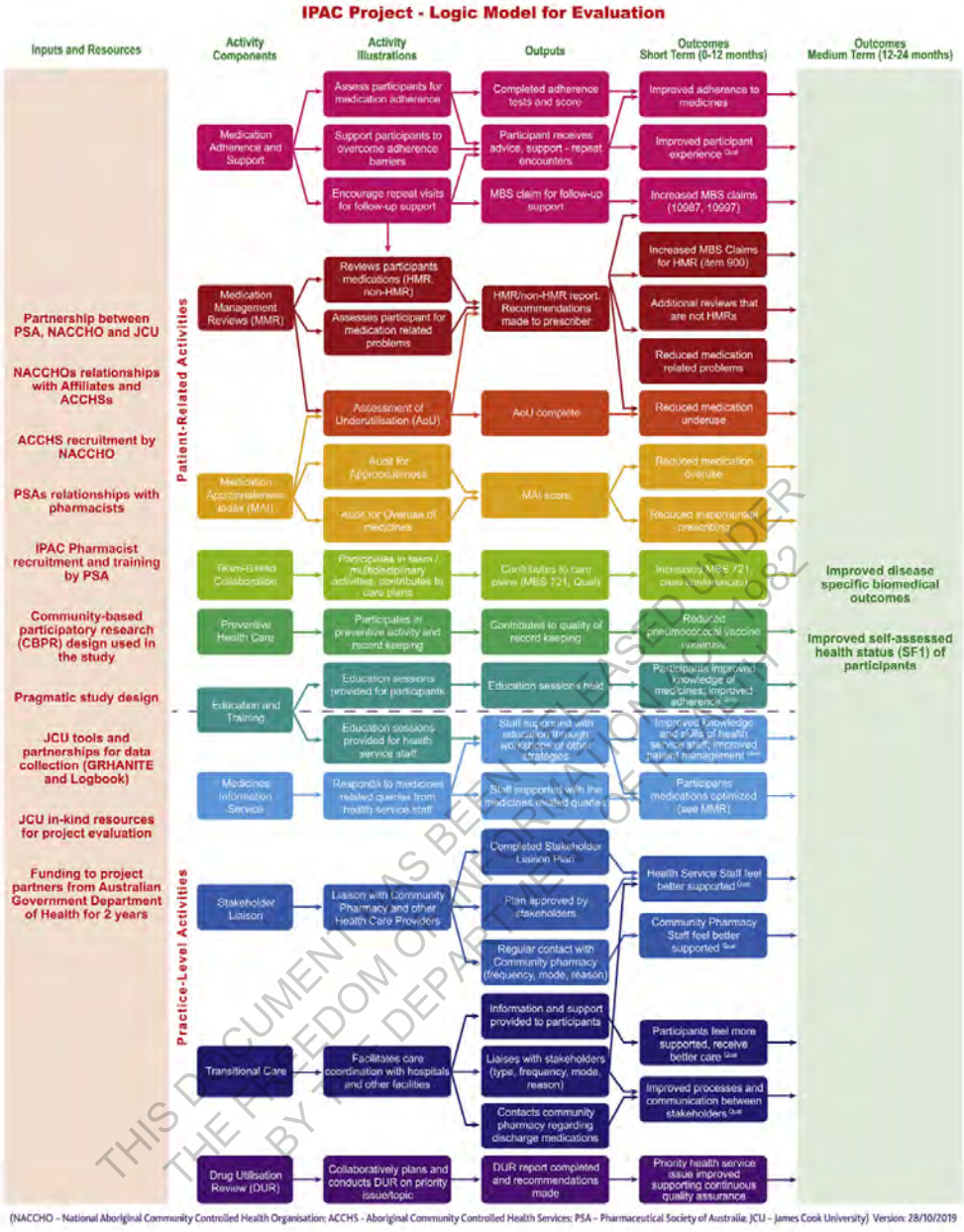

Fig. 3. IPAC Project – Pharmacists 10 core roles and the logic model for project evaluation.

in Fig. 3 as part of the project's logic model for evaluation. Pharmacists will focus on participant recruitment during the first 5 months of their tenure whilst the remainder of this period will comprise patient follow-up.

Patient- specific pharmacist activities will include conducting medication reviews (either at home or elsewhere), assessing medication adherence and medication-related problems, assisting patients with their medications, giving preventive health advice, and participating in case conferences and other team-based activity. Participants will be reviewed according to clinical needs and rules established for the Australian Medicare Benefits Schedule.

Practice-specific pharmacist activities will include responding to medication-related queries and delivering education, reviewing prescribing, conducting a drug utilization review, and liaising with community pharmacy and other stakeholders to ensure informational and management continuity of transitional care such as with hospital discharges. Pharmacists may undertake additional non-core roles as specified by services reflecting the pragmatic study design.

Pharmacist training

On-site and/or external training will be facilitated by the PSA and delivered by experienced pharmacist educators with years of experience working in partnership with ACCHSs. Learning resources will be developed specifically for the project and approved by the project team with expected learning outcomes addressing all 10 core pharmacist roles. Training will ensure pharmacist skills in cultural safety, clinical interventions, assessment of absolute CVD risk, use of CIS and other software, obtaining patient consent, recording data, and use of all evaluation tools. Training will also be provided in maintaining teamwork processes, delivering disease-specific services, and how to explain the pharmacists' role to patients. All pharmacists will be required to

Table 2
Clinical, demographic, pharmaceutical, health system, economic and qualitative study measures.

Measure	Detail	Source
Patient characteristics	age, year of birth, sex, height and weight, condition (clinical diagnosis of diabetes, hypertension, dyslipidaemia, chronic heart disease, peripheral artery disease, cerebrovascular disease, chronic kidney disease, plus other disease), smoking status, closing the gap (CTG) status, Aboriginal and Torres Strait Islander status, pension/concessional status, year of death.	GRHANITE
Encounters	Consent; number of pharmacist contacts, record status (active); patients identification number.	GRHANITE
Patient self-reported health status	Short Form Health Survey (SF1 of SF-36)	Logbook
Biomedical indices	Systolic and diastolic blood pressure, HbA1c, lipids (HDL, LDL, TG's, and TC), ACR, e-GFR	GRHANITE
Health service utilization: *Medicare Benefits Schedule*	MBS item claims: 900 (Home medications review-HMR), 721 (GPMP), 732 (GPMP review 3 months later), 715 (Health Check); plus other MBS items.	GRHANITE
Health service utilization: *Non-HMR*	Services for 'non-HMR', and follow-up to a non-HMR, or a HMR.	Logbook
Medication adherence	Self-reported: a) single-item question; b) patient survey	Logbook
Prescribing quality:		
Medication appropriateness	*Medication Appropriateness Index* (MAI)	Logbook
Medicines overuse	*Medication Appropriateness Index* (MAI)	Logbook
Medicines underuse	Potential prescribing omissions (PPO) from HMR/non-HMR, and MAI reviews.	Logbook
Medication Related Problems (MRP)	MRPs from HMR/non-HMR, and MAI reviews	Logbook
Costs	Pharmacist salaries, employment on-costs and overheads, training costs, pharmacist travel, equipment, consumables; health system costs.	Logbook
Health systems assessment	Health system covariates (service and staff characteristics, quality of care, community pharmacy liaison, etc)	Health Systems Assessment
Patient experience	Focus groups and individual interviews	Qualitative
Stakeholder experiences (IPAC pharmacists, health service staff, community pharmacists)	Focus groups, individual interviews and surveys	Qualitative
Pharmacist activities: Education and training, medicines information, team-based collaboration.	Activities undertaken	Logbook
Stakeholder liaison (community pharmacy, hospitals, medicines reconciliation)	Activities undertaken	Logbook Qualitative

ACR = albumin-creatinine ratio; BP = blood pressure; CIS = clinical information systems; CKD = chronic kidney disease; CTG= Close The Gap; CV = cardiovascular; CVA = cerebrovascular disease; DMMR = Domiciliary Medication Management Review; DVA: Dept of Veterans Affairs; e-GFR = estimated glomerular filtration rate; GPMP = General Practice Management Plan; GRHANITE = data extraction tool; HDL = high density lipoprotein; HMR= Home Medications Review; LDL = low density lipoprotein; MAI = Medication Appropriateness Index; PAD = peripheral artery disease; TC = total cholesterol; TG = triglyceride.

complete pre-reading, quiz questions, and online modules, contributing 15 h of learning time. The majority of pharmacists will then participate in facilitated 2-day group workshops (an additional 15 h), making up 30 h of training per pharmacist. Pharmacists recruited after this time will be provided with 7.5 h of face-face individual project-specific training in mutually agreed locations followed by another 7.5 h of pre-arranged on-site training with a pharmacist who has workplace skills within ACCHSs.

Data collection

Data will be collected from two existing clinical information systems (CIS) used by ACCHSs (Best Practice and Communicare) to manage patient's electronic health records, and a bespoke online database (pharmacist logbook) to record information about pharmacist activity. Demographic, biomedical and health service utilization indices will be extracted as deidentified data using an electronic tool called GRHANITE.[33] Biomedical results extracted from CISs will reflect those sourced from accredited pathology providers servicing participating ACCHSs and available to clinicians as part of standard clinical care. Anthropometric measures such as blood pressure and BMI will reflect measures entered into CISs by existing ACCHS healthcare staff. GRHANITE will extract data only for consented patients and copy it to a JCU databank employing internationally-recognised point-to-point (P2PE) encryption mechanisms to protect data in transit. The pharmacist logbook will be a secure password protected online database, accessible from any device connected to the internet, with dual recording and reporting functionality. The electronic interface will be intuitive and user-friendly to minimise the burden of data entry and reporting. The CIS patient identification numbers recorded by pharmacists in the logbook will link with patient data in the GRHANITE extractions. Consistent with CBPR principles, the raw (unanalysed) data extracted by GRHANITE from each project site is acknowledged to be owned by the ACCHS from which it was collected.

Every site will be visited twice by a NACCHO Project Coordinator to conduct a 'health systems assessment'. The initial visit will be prior to the commencement of the pharmacist, with the second visit at the end of study. The 'health systems assessment' will source service details to identify health system-related covariates, such as service size and staff numbers, ancillary services, budgets, quality improvement processes, medicines access information, use of point of care testing, and the self-assessed adequacy of existing communication with the hospital and community pharmacies.

Qualitative data will be collected through structured interviews with each IPAC pharmacist; an online survey including open-ended questions with service managers, community pharmacy, and general practitioners; and three case studies. The case studies will be sourced from three site visits (field work) and three researchers will conduct interviews and observe the activity of relevant staff. The number of interviews will be set by the number of staff working with IPAC pharmacists at each site (estimated to be between six to eight staff). The patient experience will be elicited through focus group discussions and individual in-depth interviews. Patients will be offered a $20 (AUD) gift card at the conclusion of the interview or focus group to compensate them for their time and travel. Interviews and surveys with key staff at all other sites will be conducted remotely using videoconferencing technology and an online survey.

Sample size calculation

A sample size of 732 patients with chronic disease will achieve power in excess of 80% to detect (1) an absolute CVD risk reduction of

1% (1-point difference) from baseline if a standard deviation (SD) of 2.7% was assumed[34]; (2) a clinically relevant reduction of 10 mmHg (SD 20 mmHg) in systolic blood pressure and (3) 5 mmHg (SD 10 mmHg) in diastolic blood pressure[35]; (4) a reduction in total cholesterol (−0.3 mmol/L; SD 1 mmol/l),[3637] (5) an increase in high-density lipoproteins (0.1 mmol/L; SD 0.4 mmol/l),[3637] and (6) a reduction in low-density lipoproteins (−0.3 mmol/L; SD 0.9 mmol/l)[37]; (7) a reduction in triglycerides (−0.9 mmol/L; SD 1.5 mmol/l)[3738]; and (8) a 30% decrease in ACR (SD: 23 mg/mmol)[3639]; with an overall level of significance of 0.05 (adjusted for multiple testing k = 8) using two-sided one-sample paired t-tests. A total of 119 T2DM patients will achieve power in excess of 80% to detect a decrease in HbA1c (in % units) from baseline of at least 0.5% with an assumed SD for change of 1%[36] with an overall level of significance of 0.05 using two-sided one-sample paired t-tests.

Our sample size calculations allow for an attrition rate (including missing values) of 50% and assumed a design effect of 1.75[40,41] to adjust for the cluster sampling approach. Calculations are based on a comparison of mean values in a paired analysis, and were conducted with PASS 2008 (NCSS, Kaysville, Utah, USA).

Quantitative data analysis

The effect of the pharmacist intervention will be investigated by comparing study measures (Table 2) at the endpoint with those at baseline. The baseline measures will refer to the first interaction or assessment between the patient and the IPAC pharmacist, and/or data recorded within CISs in a 12-month period preceding patient enrolment into the study. As required, participants' continuous and categorical outcome measures will be averaged to derive at baseline measures. The final assessment will refer to the most recent recorded measure prior to the end of the study. The main biomedical outcome measures are systolic and diastolic blood pressure, HbA1c, high and low-density lipoprotein, total cholesterol, triglycerides, estimated absolute CVD risk, and albumin to creatinine ratio in participants with chronic disease.

Absolute CVD risk will be calculated based on the 1991 Framingham Risk Equation (FRE)[42] to estimate the 5-year risk of a primary cardiovascular event using a composite of sex, age, systolic blood pressure, total cholesterol to HDL ratio, and diabetes plus smoking status measures, except for left ventricular hypertrophy. This equation is recommended for people without existing CVD (primary risk) who are aged 30–74 years as outlined in clinical practice guidelines for the Aboriginal and Torres Strait Islander population.[4344] It will not be applied to those with existing CVD (history of coronary heart disease, cerebrovascular disease, and peripheral vascular disease documented in the medical records)[4345] nor to others who are already at a clinically high risk for a CV event (> 15%) with *any of the following*: diabetes mellitus and age > 60 years, diabetes mellitus and microalbuminuria (urinary ACR > 2.5 mg/mmol for males and > 3.5 mg/mmol for females), estimated glomerular filtration rate < 45 mL/min per 1.73 m^2, systolic blood pressure (BP) ≥180 mm Hg, diastolic BP ≥ 110 mm Hg, and total cholesterol > 7.5 mmol/L.[43] Absolute risk estimates will not be adjusted upwards given the FRE is known to underestimate absolute CVD risk in the Aboriginal and Torres Strait Islander population as this is subject to clinical discretion.[44] Estimated GFR as reported in CISs will be used without derivation from serum creatinine measures.

Medication appropriateness will be measured by assigning a Medication Appropriateness Index (MAI) score to each medicine, based on an internationally validated tool[46] that will be used by pharmacists. The tool assesses the potential for medicine-related risks to outweigh treatment benefits to the patient. The MAI will be assessed in a subset of participants from each site shortly after recruitment and then again at the end of the study. Pharmacists will select patients who may best benefit from an assessment of their medications to reflect usual care consistent with a pragmatic trial.[29] An analysis of differences in summated mean MAI scores per patient, the mean MAI score per individual medication, and the number and proportion of participants receiving inappropriate medications will be compared at baseline and study end. Overuse of medications, defined as participants' medications deemed to be unnecessary will be measured by assigning a MAI score to three items.[47] These inform on the overuse of medications as they measure if the prescribed medicine is clinically indicated, effective, or if there is unnecessary duplication of a medicine.

The proportion of participants with a potential prescribing omission (PPO) as a measure of underutilization and the frequency of drug types omitted will be assessed. Underutilization of medicines will be defined as the omission of medicines that are clinically indicated according to pre-specified best practice recommendations.[48] Prescribing recommendations relevant to the target population will be sourced from evidence-based guidelines (including the CARPA Standard Treatment Manual,[49] National Guide to a Preventive Health Assessment for Aboriginal and Torres Strait Islander People (3rd Edition),[44] Australian Medicines Handbook,[50] and the Australian Immunisation Handbook[51]) and compiled into a reporting tool for this project. Each medication management review will assess for PPOs. Drug types will include cardiovascular and anti-hyperglycaemic medications, chemoprophylaxis for rheumatic heart disease, and other omissions. Analysis will also report the number and type of medication-related problems (MRPs) identified from medication reviews.

Two types of medication reviews will be undertaken by pharmacists: a) Home Medicines Review (HMR, also known as Medicare item 900), and b) non-HMR (a comprehensive review that does not fulfil the MBS HMR criteria, such as a review conducted outside the patient's home or by a non-accredited pharmacist). Change in the frequency of MBS claims from baseline will be measured with data sourced from CISs. The frequency and characteristics of non-HMRs will be described in the logbook including the reasons for undertaking a non-HMR over a HMR.

Medication adherence scores will be measured at least twice for each participant, at baseline and study end using self-reported, indirect methods of assessment. The extent of adherence will be assessed by a single-item question '*How many days in the last week have you taken this medication?*' This will be asked for each medicine with responses ranging from 0 to 7 days, to estimate the proportion of days with the correct number of doses taken. This is a frequent summary statistic used to quantify implementation of a dosing regimen.[52] This single question and its variations have been used in the Kanyini study involving Aboriginal and Torres Strait Islander peoples in Australia[53] and internationally.[54–56] Medication non-adherence measured objectively by gaps in prescription fills was shown to be significantly associated with self-reported non-adherence defined by at least 'two days missed' taking medicines over the past week.[54] Multi-item internationally developed psychometric tools that assess both the extent of adherence and reasons for non-adherence will not be used with patients as they have not been validated in our context,[57] use inappropriate language, and place substantial data burdens on patients. In order to develop a more comprehensive assessment of adherence-related behaviour, a patient-survey exploring the reasons for non-adherence will be developed for the IPAC project and used by pharmacists at baseline and at least one other subsequent patient encounter. These reasons are very context-specific and necessary to interpret change assumptions in our theory (Fig. 2). This survey will be evaluated as a psychometric tool to inform beliefs and behaviour about medications by assessing participants' reasons for non-adherence.

The patient's self-assessed health status will be determined using the first question of the Short Form Health Survey (SF-36) that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'. An extra response option – 'very poor' – was added (as in the SF-8 survey) to reduce the potential for respondents to overstate their health status.[58] Responses to this single-item (SF-1) question have been shown to correlate well with multi-item tools measuring the same

construct,[58] and are used in the National Aboriginal and Torres Strait Islander Social Survey.[59]

The number of claims for relevant MBS services (Table 2) such as claims for a home medicines review (item 900) rendered to each participant will be determined at baseline (12 months period before recruitment to study) and during the follow-up time. Per participant, event rates of MBS item claims will be calculated for pre and post intervention times per person-year of observation. Information on health professional and health systems supports will be collected.

Analyses will use R and Stata MP 14 software. All analyses will be adjusted for the clustering effects of the ACCHSs (primary sampling units). Collected quantitative outcome measures of participating patients will be described at baseline and at final assessment overall and stratified by type 2 diabetes mellitus and other chronic disease groups. Categorical data will be summarised using absolute and relative frequencies. The distribution of numerical data will be assessed; symmetrically distributed numerical data will be presented using mean values and standard deviations (SD) while skewed data will be summarised using median values and inter-quartile ranges (IQR).

For numerical outcome measures, differences of baseline and final assessments will be calculated and summarised depending on their distribution as either mean or median values together with respective 95%-confidence intervals (95% CI). Linear regression models (Stata svyreg command) will be applied using the calculated differences as dependent measures to investigate the effects attributable to practice-level factors, including geographical factors, service location and size, and client-level factors including age, sex, and co-morbidity, as well as other covariates appropriate to the measure being evaluated.

For binary outcome measures, differences will be calculated based on baseline and final assessments. These differences will be dichotomised into "improved" versus "unchanged or worse" and presented together with 95% CI. Conditional fixed effect logistic regression (Stata svyclogit command) will be applied to investigate effects of practice-level and client factors as described above.

SF-1 is the only ordinal outcome measure and will be analysed in a similar manner as the binary outcome measures applying ordinal logistic regression (Stata svyologit command) to investigate factors affecting the difference between baseline and final assessments.

Primary outcome measures which are assessed several times during the follow-up phase of the study for most patients will additionally be analysed using GLS random-effect panel data models (Stata xtreg or xtlogit) with robust estimates of standard errors to adjust for ACCHS clustering effects. Statistical significance will be defined at the conventional 5% level.

Qualitative data analysis

Interviews and focus group discussions will be transcribed verbatim and, with field notes, entered into NVivo 12 (QRS International) software. Themes will be identified and finalized using an inductive approach to analysis. Initial similar themes will be developed from data immersion and refined through researcher triangulation.

Cost-effectiveness analysis

The cost-effectiveness analysis will determine if the intervention is cost effective relative to usual practice (at baseline). Usual practice will be defined as care received at baseline, prior to receiving care from the IPAC pharmacist. The comparison group are patients receiving care from the IPAC pharmacist. Costs will be considered from a health system perspective and cover the value of resources involved in providing the intervention as well as changes in health service use. The primary outcome measure for the economic evaluation will use biomedical indices for subgroups of participants with specific chronic diseases to calculate the incremental cost-effectiveness ratio (ICER). The secondary outcome measure will be the change in the number of participants with at least one PPO. The incremental cost effectiveness ratio (ICER) for the difference in appropriate medication usage will be estimated, both excluding and including health system costs, using the adjusted cost and outcome data between the usual care and the intervention.

Data security

The JCU data custodian will be responsible for the protection of data from loss, misuse and unauthorised access. Electronic data extracted via GRHANITE and from the Pharmacists Logbook will be stored on password-protected internal server on JCU premises. Data accessed during the analysis phase will be stored in JCU-supported database applications only. Signed pharmacist, site and participant consent forms will be mailed by registered post, scanned and electronically transmitted to the data custodian, and stored in a secure password-protected computer. Hard copies will be stored in a secure cabinet in a lockable room and retained for seven years. Data access will be granted to the investigators established for the purpose of this project including members of the evaluation team.

Qualitative data will be recorded on a digital recorder. Photographs will be taken on a password-protected mobile phone. Consent from any participants photographed will be obtained using talent release forms. All digital files (interviews, focus groups, field notes and photographs) will be downloaded to a password-protected laptop and stored in a password-protected file immediately after field work and removed immediately from recording devices. Identifying information will be removed after interviews and focus group discussions have been transcribed. Survey data collected remotely using an online survey platform will be stored in a password-protected account until the end of the data collection period. At this time, the data will be removed from the online database and stored on a JCU secure server.

Knowledge transfer

Knowledge transfer and communication about the project will honour the agreed governance structure (Fig. 1). Project partners have a responsibility to participants, funders, and the wider community to broadly disseminate a full account of the process and findings of the study. Data dissemination activities will take account of any intellectual property restrictions and culturally sensitive data. Project results will be presented at an aggregate level and no participants or communities will be identifiable from any results approved for public release.

Ethics approval

Ethics approval for the project has been received from four ethics committees in the three jurisdictions including St Vincent's Hospital Melbourne (SVHM) Human Research Ethics Committee (HREC), Victoria (HREC/17/SVHM/280), James Cook University HREC (mutual recognition of SVHM HREC, approval HREC/H7348), Menzies School of Health Research (HREC/2018–3072) and the Central Australian HREC (HREC/CA-18-3085).

Discussion

Healthcare reform depends on ways to improve productivity and ensure the triple aim of: clinically effective healthcare, improved patient experience, and cost-effectiveness ('better health, better health care, and better value').[60] This project aims to evaluate a new integrated care model where Australian pharmacists work collaboratively with healthcare staff and patients to improve the quality use of medicines within primary health care settings that target Aboriginal peoples and Torres Strait Islanders. IPAC pharmacists will deliver ten core roles within ACCHSs including providing medication support to patients, home and non- home medication reviews to inform on quality

prescribing and potential prescribing omissions, team-based activity, preventive health support, medicines information, education and training, transitional care, stakeholder liaison such as with community pharmacy, and a quality assurance activity like a drug utilization review.

The project will recruit adults with chronic disease and patients at high-risk of developing medication-related problems and evaluate the impact of the intervention on clinical outcomes, medication adherence, measures of prescribing quality, health care service utilization, as well as patient, pharmacist, and stakeholder perceptions. The economic evaluation will be a within-trial cost-effectiveness analysis to assess whether the project represents value for money from a health sector perspective.

Following community based participatory research (CBPR) principles, this project will involve Aboriginal and Torres Strait Islander people throughout the design, implementation and evaluation stages. NACCHO will provide Aboriginal governance for all communication with ACCHSs, Affiliates and the NACCHO Board. These CBPR principles have been adapted from the World Health Organization's guiding principles involving Indigenous peoples.[30] This approach is also consistent with the National Health and Medical Research Council (NHMRC) guidelines for ethical conduct in Aboriginal and Torres Strait Islander health research so that the benefits of the research are clearly articulated, negotiated and implemented in such a way they build community capacity.[61] Pragmatic project design assists this goal by ensuring the intervention is acceptable and feasible to ACCHS governing structures and their staff, and data collection is minimally intrusive, with analyses exploring if the intervention works under usual real-life conditions. The project aims to produce generalizable knowledge applicable to other ACCHSs, Aboriginal health services delivered by State and Territory Governments, and private general practices providing services to Aboriginal and Torres Strait Islander peoples.

It is anticipated that Aboriginal and Torres Strait Islander patients receiving IPAC pharmacist services will benefit from immediate access to on-site medicines support. Patients will receive tailored and appropriate medication reviews and other integrated care supports to optimise their use of medicines, with support for improved prescribing given to clinicians. Workforce capacity within ACCHSs is expected to be enhanced as pharmacists support multidisciplinary teams with medicines use, preventive healthcare, and foster chronic disease care-related service claims through Medicare. Stakeholder relations, especially with local community pharmacies are expected to improve with more ACCHS engagement and information transfer than was previously possible. Governments and decision-makers will be able to determine whether the intervention falls within an acceptable cost effectiveness range in the context of improving specific health outcomes amongst Aboriginal and Torres Strait Islander people.

The project may face challenges such as insufficient recruitment of services or consented patients, although this may be mitigated by the CBPR and pragmatic study design. The risk that unreliable data may be extracted from CISs is reduced by restricting site inclusion criteria to health services participating in quality improvement activities. Pharmacists may also face challenges working within Aboriginal community-controlled models of care. This requires pharmacists to be a team member, to be flexible and adaptive to holistic services addressing social determinants of health, and receptive to the advice provided by experienced staff. Pharmacists may also spend time in remote and outreach services and must be willing to adapt their style and practice to an environment that best suits the patient. However, culturally responsive settings such as these will assist IPAC pharmacists to better understand the many barriers and hurdles patients face in optimising the use of medicines and help them to build solutions to address these underlying causes.

The IPAC study will be the first to explore the impact of pharmacists integrated within primary health care settings focussed on the health of Aboriginal and Torres Strait Islander peoples who are significantly medically underserved. The proposed analysis may inform new funding streams to support patient-centred care and assist funding or commissioning bodies such as Primary Health Networks (PHNs) with their workforce financing decisions. This is important given PHNs' role in supporting quality improvement, and in particular, focusing on enhancing health outcomes for the Aboriginal and Torres Strait Islander population in partnership with ACCHSs.[62] A final report will be produced by the research partners for the Australian Government as a project funded from the Pharmacy Trial Program of the Sixth Community Pharmacy Agreement.

Funding body

The project is funded by the Australian Government Department of Health, under the Pharmacy Trials Program (Tranche 2) funding as part of the Sixth Community Pharmacy Agreement (6CPA). The project funder had no role in study design, data collection, management of the project, analysis and interpretation, writing of the report, or the decision to submit the report for publication. The project funder has a role in approving reports for publication.

CRediT authorship contribution statement

Sophia Couzos: Conceptualization, Methodology, Formal analysis, Investigation, Writing - original draft, Visualization, Supervision, Funding acquisition. **Deborah Smith:** Methodology, Formal analysis, Investigation, Writing - review & editing, Visualization, Project administration. **Mike Stephens:** Conceptualization, Methodology, Writing - review & editing, Supervision, Funding acquisition. **Robyn Preston:** Methodology, Formal analysis, Investigation, Writing - review & editing. **Delia Hendrie:** Methodology, Formal analysis, Writing - review & editing. **Hannah Loller:** Methodology, Writing - review & editing, Supervision. **Megan Tremlett:** Methodology, Writing - review & editing, Project administration. **Alice Nugent:** Methodology, Writing - review & editing, Project administration. **Fran Vaughan:** Methodology, Writing - review & editing, Project administration. **Shelley Crowther:** Conceptualization, Methodology, Funding acquisition. **Douglas Boyle:** Methodology, Software, Resources, Writing - review & editing. **Petra Buettner:** Formal analysis, Writing - review & editing. **Erik Biros:** Methodology, Software, Formal analysis, Investigation, Data curation, Writing - review & editing.

Declaration of competing interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.sapharm.2019.12.022.

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INTEGRATING PHARMACISTS WITHIN ACCHSs TO IMPROVE CHRONIC DISEASE MANAGEMENT

PROJECT PROTOCOL

THE PHARMACEUTICAL SOCIETY OF AUSTRALIA, NATIONAL ABORIGINAL COMMUNITY CONTROLLED HEALTH ORGANISATION, AND JAMES COOK UNIVERSITY COLLEGE OF MEDICINE AND DENTISTRY CONSORTIUM

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Revision Chronology:

Date:	***Amended by:***	***Amendment made:***	***Version:***	***Authorised by:***
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26 March 2019	Deborah Smith	Updated Evaluation Team membership: Removal of s47F and s47F ; Addition of members to the Evaluation Team: Dr Delia Hendrie from Curtin University, s 4 from QAIHC; s47F and A/ Prof Petra Buettner from JCU;	1.5	Project Partners

		Note change of facility for s47F and s47F ; Addition of roles invited for focus groups and interview at site visits (CEOs / Managers / GPs) p 62 Addition of online questionnaire for CEOs and Managers p 63 Updated Steering Committee Membership details		
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Funding for this Project is provided by the Australian Government Department of Health, under the Pharmacy Trials Program (Tranche 2) funding as part of the Sixth Community Pharmacy Agreement (6CPA). The financial sponsor is the Australian Government. The Grant Agreement is signed between the Trial Sponsor/Grant recipient and the Commonwealth of Australia as represented by the Department. The 6CPA is a five-year agreement (to June 2020) between the Commonwealth of Australia (as represented by the Australian Government Department of Health) and the Pharmacy Guild of Australia.

Glossary

6CPA	The Sixth Community Pharmacy Agreement
ACE	Angiotensin converting enzyme inhibitor
ACCHO	Aboriginal Community Controlled Health Organisation
ACCHS	A comprehensive primary health care service delivering culturally appropriate care to predominantly the Aboriginal and Torres Strait Islander community, that has been developed by Aboriginal peoples for Aboriginal peoples.
AIHW	Australian Institute of Health and Welfare
AHW	Aboriginal Health Worker
AMSANT	Aboriginal Medical Services Alliance of the Northern Territory
ARB	Angiotensin receptor blocker
ASGS	Australian Statistical Geography Standard
ATSIHP	Aboriginal and Torres Strait Islander Health Practitioner
CAT4	Clinical Audit Tool developed by Pen Computing Systems Pty Ltd
CBPR	Community-based participatory research
CHD	Coronary heart disease
CVD	Chronic Kidney Disease
CMD	College of Medicine and Dentistry, James Cook University
CQI	Continuing Quality Improvement
CVD	Cardiovascular disease
DAA	Dose Administration Aid (e.g. Webster pack, blister pack)
DMMR	Domiciliary Medication Management Review
FTE	Full time equivalent
GP	General practice
GRHANITE	Data Extraction Tool developed by the Research Information and Technology Unit of the Faculty of Medicine, University of Melbourne
HCH	Health Care Home
HMR	Home Medicine Review
HREC	Human Research Ethics Committee
ICER	Incremental cost-effectiveness ratio
JCU	James Cook University

KPI	Key Performance Indicator/s
MAI	Medication Appropriateness Index. A validated tool to measure the quality of medicines prescribing for each patient. Each medicine is assigned a weighted score and scores can be aggregated for multiple medicines.
MBS	Medicare Benefits Schedule
MMR	Medication Management Review. An umbrella term used to describe pharmacist-led medication management services including HMRs and MURs.
MUR	MedsCheck/Diabetes Meds Check are 6CPA in-pharmacy MMR services
NACCHO	National Aboriginal Community Controlled Health Organisation Ltd
NEAF	National Ethics Application Form
NHA	*National Health Act 1953* (the Act that governs PBS supply and includes section 100 remote Aboriginal Health arrangements)
nKPI	National Key Performance Indicator/s reported by Aboriginal health services to the Australian Government
PAT CAT	Practice Aggregation Tool for the Clinical Audit Tool developed by Pen Computing Systems Pty Ltd
PBS	Pharmaceutical Benefits Scheme
PHN	Primary Health Network/s
PIP	Practice Incentive Payment
PR	Participatory Research
PRG	Program Reference Group
PSA	The Pharmaceutical Society of Australia
QAIHC	Queensland Aboriginal and Islander Health Council
QI PIP	Quality Improvement Practice Incentive Payment
QOC	Quality of care
QUM	Quality Use of Medicines
QUMAX	6CPA QUM program for Aboriginal and Torres Strait Islander peoples
The Guild	The Pharmacy Guild of Australia
T2DM	Type 2 diabetes mellitus
VACCHO	Victorian Aboriginal Community Controlled Health Organisation
WHO	World Health Organisation

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1. Overview

The *Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management* (IPAC) project is a large project that will determine if including a registered non-dispensing practice pharmacist as part of the primary health care team within Aboriginal community controlled health services (ACCHSs) leads to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples.

The project will explore improvements in prescribing by doctors, if patients are more likely to take their medicines, and if indicators of their health are improving over time, by measuring these factors before and after the pharmacist is appointed.

Practice pharmacists will provide relevant healthcare activities within their scope of practice to patients, but they will also provide education and training to existing staff within the services as appropriate, improve relations with community pharmacies to overcome barriers that patients may face in accessing medicines, and assist in managing medications at transitions of care (such as discharge from hospital). This project will also explore the cost-effectiveness of pharmacist integration within these services.

This project is a tripartite partnership between the Pharmaceutical Society of Australia (PSA), the National Aboriginal Community Controlled Health Organisation (NACCHO), and James Cook University (College of Medicine and Dentistry).The project will involve up to 22 ACCHSs invited to participate in the project from three jurisdictions- Queensland, Victoria, and the Northern Territory.

The Australian Government under the Pharmacy Trials Program of the 6th Community Pharmacy Agreement has funded the project for 29 months.

This document details this project, and its guiding principles. This Protocol complies with the principles of the SPIRIT 2013 guidelines for clinical trial protocols.[1] The trial is registered with the Australian and New Zealand Clinical Trials Registry (Trial Registration Number and Register: ACTRN12618002002268).

1.1 Purpose of the Project Protocol

This protocol has been developed to provide a framework for the management and conduct of the IPAC project to guide the participation of all Aboriginal Community Controlled Health Services (ACCHSs) as project sites.

This protocol documents the specific requirements of the project and has been developed through input from the Evaluation Team and Project Partners, which include the NACCHO, with NACCHO Affiliates- the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); the Queensland Aboriginal and Islander Health Council (QAIHC), and the Aboriginal Medical Services Alliance in the NT (AMSANT).

The Protocol will be provided to the NACCHO Board for endorsement.

1.2 Summary of the Project Protocol

Title of the study:

Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC)

Background:

Aboriginal and Torres Strait Islander peoples experience a much higher burden of chronic disease due to cardiovascular, diabetes, and other health problems, and yet have poorer access to needed medicines.[2] [3] Adverse health outcomes from these illnesses are minimised if prescribing quality is improved, and patients are better supported with medicines use, which is a key health equity issue.

Non-dispensing pharmacists are not currently funded consistently or reliably to work within primary health care settings in the public health sector in Australia. Despite this, several ACCHSs across Australia have innovatively sourced funds and/or developed partnerships with community pharmacy's to source pharmacists in non-dispensing roles. This project is modeled on these pharmacists' roles and international research evidence. There is extensive global evidence that practice pharmacists co-located within general practice clinics can enhance chronic disease management and quality use of medicines.[4]

The National Aboriginal Community Controlled Health Organisation (NACCHO) has promoted the need for this project for many years. The project will help the Australian Government make decisions about the role practice pharmacists may play as members of primary health care teams within ACCHSs and potentially other settings in Australia.

Project Governance and Collaboration:

This project is a partnership between the Pharmaceutical Society of Australia (PSA), the National Aboriginal Community Controlled Health Organisation (NACCHO), and James Cook University (College of Medicine and Dentistry), guided by a Memorandum of Understanding that outlines communication and governance processes.

The PSA, as the lead agency, is responsible for managing the Funding Agreement with the Australian Government Department of Health, and service agreements with partners and ACCHSs, and will coordinate the appointment of practice pharmacists, their recruitment, selection, placement, and training. The NACCHO will provide Aboriginal governance leadership for the project and coordinate all communication with ACCHSs, Affiliates and the NACCHO Board. JCU will undertake the project evaluation, having developed the research methodology based around a pragmatic, community-based participatory research model.

Other Aboriginal community representative bodies involved include the VACCHO; QAIHC, and AMSANT. These organisations are NACCHO Affiliates and will be responsible for state-based service support to registered ACCHSs, and provide guidance to the project as members of the evaluation team.

Ethics approval:

Ethics approval will be sought from the following Human Research Ethics Committees for the project:

- St Vincent's Public Hospital HREC (Victoria)
- James Cook University HREC (Qld)
- Menzies School of Health Research HREC (NT)
- Central Australia HREC (NT)

Project Objectives:

The aim of this project is to improve quality of care outcomes for Aboriginal and/or Torres Strait Islander adult patients with chronic disease by integrating a practice pharmacist within the primary health care team of ACCHSs.

Study Design:

There are three project phases over a 29-month project duration: Phase 1: Establishment (4-8 months); Phase 2: Implementation/intervention (up to 15 months); Phase 3: Analysis and Reporting (6 months).

The project will invite ACCHSs in geographically diverse settings Victoria, Queensland, and Northern Territory that initially meet the established site eligibility criteria to participate as project sites. Up to 22 ACCHSs will be able to participate. Each service will be offered a practice pharmacist (aggregated 0.57 FTE across 22 sites each for 15 months duration) under a service agreement with the PSA. Service selection aims to recognise the diversity of Aboriginal peoples and Torres Strait Islanders and models of care across Australia, to deliver an impact assessment that can best be generalizable to other Australian sites/settings in the future.

The IPAC project is a pragmatic, non-randomized, prospective, pre and post quasi-experimental study with a cost-effectiveness analysis, where the pharmacist intervention will be added to standard primary health care practice within ACCHSs. The trial will adopt a community-based participatory research (CBPR) design, to ensure clear benefits to project sites, to ensure acceptability and sustainability of the intervention within ACCHSs, and ultimately, transferability to other PHC services.

All eligible ACCHS sites will receive the intervention, with study measures referring to periods prior to and after implementation, activities within ACCHSs, and aggregated ACCHSs. Outcome measures will focus on Aboriginal and Torres Strait Islander patients with chronic disease (>=18 years of age) who are regular patients of the ACCHSs, including indices of best practice prescribing, and quality of care measures. Deidentified patient data will be collected from the clinical information systems (CIS) of ACCHSs pertaining to consented patients through an electronic data extraction tool known as GRHANITE. Additional deidentified data on patients and health systems interactions will be collected by practice pharmacists through an electronic log-book. Qualitative and cost-effectiveness analysis data will be collected during site visits.

Data analysis:

Analysis will comprise comparative assessment of mixed data and subsets, contextual assessments, findings and evaluation limitations, CBPR methodology, and policy implications and interpretation. A cost-effectiveness analysis will explore if the intervention was cost effective relative to standard practice (at baseline). Quantitative analyses will use mixed effects models and quantify the variability attributable to practice-level and client-level factors. For qualitative analysis, themes will be developed and finalized through the constant comparison method, and refined through coder triangulation.

The project results will be reported at an aggregate level, and will not identify individual participants, communities, or ACCHSs.

Funding:

The Australian Government under the Pharmacy Trials Program of the Sixth Community Pharmacy Agreement has funded the project for 29 months.

2. Background

Aboriginal and Torres Strait Islander peoples experience a much higher burden of chronic disease due to cardiovascular, diabetes, and other health problems, and yet have poorer access to needed medicines. Adverse health outcomes from these illnesses are preventable if prescribing quality is improved, and patients are better supported with medicines use, which is a key health equity issue.

This project aims to significantly improve Aboriginal and Torres Strait Islander medication understanding, adherence to treatment, and improve the quality of care that is delivered by integrating pharmacists within Aboriginal Community Controlled Health Services (ACCHSs). Providing practice pharmacists with the appropriate cultural, communication, clinical systems training, and integration within ACCHSs, may significantly improve the quality of health care received and experienced by Aboriginal and Torres Strait Islander peoples.

2.1 Background to the development of the project

On 1st March 2016, the NACCHO Board of Directors strongly endorsed the need to develop a project proposal to explore the role and impact of pharmacists employed by ACCHSs as members of the primary healthcare (PHC) team.

This project was developed as a result of that call by Aboriginal health leaders, and links with community, regional, jurisdictional and national Aboriginal health priorities.

In November 2016, all three NACCHO Affiliates and NACCHO provided letters of support for the development of the project proposal that was submitted to the Australian Government Department of Health in December 2016. The November 2016 letters of support provided by ACCHS Affiliates and the NACCHO Board of Directors gave in-principle support to the draft project proposal at that time (see Appendix).

The project partners established a Memorandum of Understanding in November 2017, to guide the development of the project (see Appendix).

2.2 Aboriginal Community Controlled Health Services

ACCHSs were first established in 1971 in response to the poor quality of health services they were receiving and the significant financial, cultural and social barriers to health care access experienced by Aboriginal and Torres Strait Islander people. ACCHSs are operated by the local Aboriginal and Torres Strait Islander community to deliver holistic, comprehensive and culturally-appropriate *primary health care* to the community they serve. ACCHSs are culturally safe environments that support an Aboriginal patients' sense of choice and power.

2.3 Pharmacists within ACCHSs

The pharmacists integrated within the ACCHS will be immersed in the ACCHS model of care and the systems that have been shown to provide effective primary health care to Aboriginal people and Torres Strait Islanders.

Several ACCHSs across Australia have sourced adhoc funding to employ pharmacists in similar and also quite different roles in these settings, but these appointments are few in number. These pharmacists may already have significant experience working with ACCHSs in the past. Pharmacists will be inducted for cultural safety training into the ACCHS as all staff working within these services.

Pharmacists working within ACCHSs will provide the patients, staff and their service with valuable skills congruent with the identified needs of the service. They will assist

individual patients with their medication needs as well as support chronic disease care, including prevention and management, as part of the primary health care team.

They will play an important role in assisting the ACCHS with the range of medicines related health policies and programs dependent on their geographical location. In particular, practice pharmacists will be able to support Home Medicines Review (HMR) programs and medication management reviews on-site within services.

Medication management reviews conducted within the ACCHS and HMRs for Aboriginal and Torres Strait Islander patients have the potential to increase patients' medication knowledge, medication adherence and thus improve chronic disease management, particularly when these are delivered in a culturally appropriate way.[5]

Currently, concerns have been raised about the low uptake of HMRs provided to Aboriginal and Torres Strait Islander peoples, largely due to lack of health provider awareness, lack of health professional training, and the logistics of navigating the HMR program rules. ACCHSs provide few HMR referrals due to complexities of patients' needs, shortage of time and lack of trust in pharmacists' ability to appropriately manage their patients.[6] [7] Because of their immersion into the ACCHS model of care, integrated pharmacists are clearly in the best position to deliver holistic medication management services to ACCHS clients.

Practice pharmacists can also provide valuable medication-related education for Aboriginal and Torres Strait Islander people and health professionals.[8] Pharmacists have been shown to provide safe and effective medicine use, increased patient and health staff medication knowledge, and are particularly needed in remote areas, where there is often a scarcity of medical practitioners and lack of continuity of health professional staff.[9]

Practice pharmacists within ACCHSs will be able to perform an important liaison role with community pharmacy to enhance a patients access to medicines, medication adherence, continuity of care, and assist in transitions of care (such as discharge from hospital). ACCHS practice pharmacists will be well placed to appraise a community pharmacy's value proposition to an ACCHS and then broker the best outcome for both parties.

2.4 Gaps in current healthcare management

Adherence to a medication regimen is central to good health outcomes. Medication adherence for many people with chronic disease is extremely poor, resulting in disease-related complications, higher levels of hospitalisation, and increased morbidity and mortality.[10] The economic costs of non-adherence are high.[11]

Aboriginal and Torres Strait Islander patients have been subject to lack of appropriate or tailored information, and lack of health professional engagement and patient support.[12,13] Disparities in health literacy have been identified for Aboriginal and Torres Strait Islander clients[14] and the cultural appropriateness of some pharmacies has been identified as a problem across Australia.[15] [16]

Barriers to accessing medicines for remote Aboriginal and Torres Strait Islander people may include financial and geographic constraints, failed patient-clinician interactions, poor healthcare delivery systems and complex therapeutic medication regimens.[17] Other barriers include economic hardship or poverty, racism, dispossession, the stigma associated with a diagnosis of chronic disease, educational disadvantage, shared crowded households, increased patient mobility, and inadequate health professional support.[18,19]

Currently, inter-professional communication about medicines is often incomplete or ineffective. Dispensing protocols, the lack of pharmacist interaction and cultural training, and the physical settings of community pharmacies have made it difficult for some Aboriginal and Torres Strait Islander people to have productive relationships with their community pharmacists.[20]

While some 6CPA initiatives, S100 and the Closing the Gap (CTG) PBS Co-payment measure have removed some of the financial barriers to accessing medicines, the 2013-14 PBS per person expenditure for Indigenous Australians was only 33% of the expenditure for non-Indigenous Australians.[21] There is still considerable need for improvement.

Currently, registered pharmacists are providing limited clinical pharmacy services to Aboriginal Australians due to barriers to service provision.[22] [23] These barriers include, but are not limited to, the absence of pharmacist-ACCHS relationships and prohibitive HMR business rules including HMR processes that are not always possible nor culturally acceptable.[24] [25]

A doctor working in a ACCHS may call on the specialist skills of an embedded AHW, nurse, physiotherapist or psychologist through the Medicare Benefits Schedule (MBS),[26,27] yet a pharmacist can't easily be included in the practice team to review and advise on the person medicines regimen. Given the central role of medicines in the care and treatment of Aboriginal and Torres Strait Islander people with chronic disease, this acts as a barrier to optimising the quality of care.

Investigations conducted by NACCHO have estimated there are currently approximately 10 pharmacists working on average 30 hours per week within ACCHSs in Australia. The majority of these practitioners rely on remuneration from the ACCHS global budget or specific grant funding.[28] The absence of remuneration for practice pharmacist-delivered services has been identified as the biggest barrier to the advancement to this area of practice in Australia.[29,30] This is despite the fact that over 300 pharmacists have registered their interest in working in collaborative practice models.

2.5 International and cost-benefit evidence for practice pharmacists

The integration of pharmacists within the general practice setting has been adopted by the National Health Service (NHS) in the UK.[31] Many other countries, including New Zealand, Canada and USA, have pharmacists providing clinical services in general practice settings.[32] In Australia, the concept has received endorsement from leading medical organisations such as the Australian Medical Association.[33] [34] The growth of the model, however, has been limited to a small number of practices due to the absence of funding. This is in contrast to the UK, where significant national investment has occurred as a result of the overwhelmingly positive response from clinics.[35]

Co-location also enabled greater communication, collaboration and relationship building among the health professionals.[36, 37] Practice pharmacists are shown to increase medication review recommendations by the GP.[38] Moreover, the 2010 UK PINCER and PRACTICE studies[39,40] found that pharmacists play a critical role in reducing medicine errors in general practice.

GP-based practice pharmacists in the UK have been said to "*contribute hugely to patient care and support the medicines optimisation agenda. Patient empowerment is enabled and patients have a forum whereby complex medicines-related queries can be answered, thus supporting adherence and improvement in health outcomes*."[41]

In addition to this existing evidence, a 2015 report by Deloitte Access Economics (DAE) demonstrated that the integration of pharmacists in general practice has the potential to generate $1.56 in health system savings for every $1 invested in the

program.[42] The analysis estimated that investment in the program would cost the Government $969.5 million over four years, however, this investment is more than offset by the broader heath savings at a federal, state and consumer level.[43]

Integrating pharmacists in general practice is expected to yield a net saving of $544.87 million to the health system over four years. Specifically, these savings are expected to result from[44]; hospital savings of $1.266 billion; PBS savings of $180.6 million; individual savings of $49.8 million; and MBS savings of $18.1 million – due to reduced number of GP attendances following a moderate or severe adverse drug event. This initiative may contribute to a more sustainable PBS and MBS as well as minimising upward pressure on patient co-payments, improving future access and affordability for Australians.

3. Project Objectives

3.1 Project Objective

This project aims to explore if quality of care outcomes for Aboriginal and/or Torres Strait Islander adult patients with chronic disease can be improved by integrating a practice pharmacist within the primary health care team of Aboriginal Community Controlled Health Services (ACCHS), when compared with prior care.

3.2 Clinical claim

This project makes two clinical claims:

1. Patients who are managed by this model of care, involving delivery of services by a pharmacist integrated within Aboriginal Community Controlled Health Services (ACCHS), experience either equivalent or superior quality of care outcomes for Aboriginal and/or Torres Strait Islander adult patients with chronic disease compared to baseline data representing pre-intervention.

2. Appropriate funding for services provided by pharmacists within ACCHSs is likely to lead to superior health care service utilisation (towards equity) of patients with chronic disease compared to utilisation at baseline (pre-intervention).

3.3 Expected project outcomes

Our expected project outcomes are:

Primary outcomes: improvements in *quality of care outcomes* (biomedical measures such as BP, HbA1c, lipids, CV risk assessment (levels and risk), and albumin-creatinine ratio (ACR) for patients with chronic disease.

Expected secondary outcomes include improvements in:

- estimated glomerular filtration rate (eGFR);
- *prescribing indices* (measures of medication appropriateness such as indicators of optimum medication use and the Medication Appropriateness Index, measures of overuse, and underuse);
- *patient use of medicines* (patient survey for *medication adherence*);
- *health service utilisation indices* (MBS Domiciliary Medication Management Reviews or Home Medication Reviews (HMR), and non- HMR (out-of-home interviews; chronic disease care MBS claims such as care plans and follow-up visits; chronic care indicators, and preventive care indicators);
- *perceptions of stakeholders* (ACCHSs staff; community pharmacies; pharmacists);
- *cost-effectiveness* of the intervention: Economic (cost –effectiveness analysis):
  - The incremental cost-effectiveness ratio of the pharmacist intervention will be compared with the comparator.

3.4 Intervention

The study intervention is a registered practice pharmacist integrated within the primary health care team of an ACCHS for up to a 15-month period (aggregated to represent 0.57 FTE per site at 22 ACCHS sites).

3.5 Comparator

To investigate the effect of pharmacist intervention, study measures at intervention will be compared with those at baseline. The baseline measures will refer to the first interaction between the patient and the practice pharmacist, plus study measures in the period 12 months preceding initial patient interaction with the practice pharmacist. These measures refer to deidentified data extracted from the clinical information system (CIS) within the ACCHS [using a data extraction tool (DET) called GRHANITE].

4. Project participants

This project involves the following participants:

1. The project partners
2. ACCHSs
3. Patients attending ACCHSs
4. Practice Pharmacists
5. NACCHO Affiliates.

4.1 The project partners/team

This project partners include the Pharmaceutical Society of Australia (PSA), the National Aboriginal Community Controlled Health Organisation (NACCHO), and James Cook University (College of Medicine and Dentistry), guided by a Memorandum of Understanding that outlines communication and governance processes.

The project partners are the Project Team and are members of the Evaluation Team, the Steering Committee, and the Project Operational Team *(see earlier).*

4.2 ACCHSs as Project Sites

Site participants will include 22 ACCHS sites in Victoria, Qld and the NT. (A letter of support from NACCHO representing ACCHSs across Australia is in the Appendix).

4.2.1 Site inclusion criteria:

ACCHSs will be invited to consider participation in the project through an initial 'expressions of interest' process managed by NACCHO (see 4.2.2). To be involved services will need to meet the following conditions:

- The health service must be an "ACCHS". This means an Aboriginal Community Controlled Health Organisation funded by the Australian Government Department of Health for the provision of primary health care services to Aboriginal and Torres Strait Islander peoples.
- The ACCHS is located in Victoria, Queensland, and the Northern Territory.
- The ACCHS employs at least one (1) full-time- equivalent (FTE) general practitioner per clinic who is able to prescribe medicines to clients of that organisation.
- The ACCHS does not currently employ a non-dispensing practice pharmacist at the participating clinic.
- The ACCHS uses a clinical information system such as Communicare, Best Practice, and Medical Director.
- The ACCHS has participated in continuing quality improvement and reporting on the national Key Performance Indicators for at least 24 months through the use of electronic data extraction tools.
- The ACCHS is participating in the *Quality Assurance for Aboriginal and Torres Strait Islander Medical Services* (QAAMS) program, if it is conducting 'point of care' testing.
- The ACCHS agrees to download the GRHANITE data extraction tool into one computer within the practice, adhere to program business rules/protocol and guidelines, data provision requirements, and patient/service consent requirements for the evaluation of the program.

- The ACCHS can provide the practice pharmacist access to a private consulting room on the clinic premises that has access to the clinical information system used by the practice.
- The ACCHS can allocate a staff member who will act as a 'go to' person to assist the practice to obtain informed patient consent.
- The ACCHS is a member of NACCHO, and the relevant NACCHO State/Territory Affiliate.
- The ACCHS is an accredited practice in accordance with the RACGP Practice Standards.
- In non-remote locations, the ACCHS must be participating or eligible to participate in the PBS co-payment measure (practice incentive program).
- In remote locations, the ACCHS must be eligible to participate in the remote Section 100 arrangements for the supply of pharmaceutical benefits

4.2.2 Site recruitment

ACCHSs will be invited to participate in the project by NACCHO and Affiliates through an 'expression of interest' process. The 'expression of interest' process will explain to ACCHS the process that will be used for site selection. See also Figure 11 (p83) for a map outlining the recruitment process.

Health service inclusion criteria will be used to select sites. The Project Operational Team, Chaired by the NACCHO Deputy CEO will review the expressions of interest and decide if a temporary Panel made up of Affiliate representatives is necessary to select the most suitable sites to participate in the project. As the recruitment process for sites will be staggered (see 5.2), this process will be repeated.

The proposed site distribution plan reflects the diversity in geographical location required for this project and is shown in Figure 1. Service location will be defined by the ASGS- Modified Monash Method classification or the Australian Statistical Geography Standard-Remoteness Area (ASGS-RA, 2016).[45] The site distribution plan will influence and limit the selection of sites.

Figure 1. Proposed site distribution plan*

	Urban	regional	remote	total
NT		1	5	6
Qld	3	3	2	8
Vic	5	3		8
	8	**7**	**7**	**22**

**May be modified after further consultation with Affiliates.*

ACCHSs that are not selected to be part of the project will be informed in writing as to the outcome of the selection process, together with the reasons for not being selected.

4.2.3 Formalisation of participation

When NACCHO receives an expression of interest from an ACCHS, and the ACCHS is agreed to being a suitable site, the NACCHO Project Coordinator will contact the

ACCHS and explain the project further to provide instructions on the process required to establish the site participation.

After this consultation, a *Site Agreement*, *Site Consent form*, and *Site Participation Brief* will be provided to the ACCHS (see 11.3, and see draft *Site Consent Form* in the Appendix). Once this is signed and agreed, the project officers will institute a process for practice pharmacist recruitment and placement within the ACCHS.

A site visit will be arranged to undertake a Site Needs Assessment and a Health Systems Assessment (see 13.3, and 8.8 respectively) at the time that the practice pharmacist commences. At least two (2) face-to-face ACCHS site visits will be conducted by the NACCHO Project Coordinator during the Implementation Phase of the project (see 13.3).

Participating ACCHSs will also be invited to be members of the Project Reference Group managed by NACCHO *(see earlier).*

4.3 Patients attending ACCHSs as participants

Patient participants will be patients who have visited selected ACCHS sites ≥3 times in the past 2 years (relative to the beginning of this study) with chronic disease (known as 'active' or 'regular' patients).

This is consistent with the definition of a regular client that has been agreed nationally for reporting against the national key performance indicators (nKPIs) required by the Australian Government. This definition is also consistent with that of the Royal Australian College of General Practitioners of someone with an active medical record.[46] An adult is a person aged 18 years and older.

This project will target patients with certain chronic diseases to optimize the pharmacological management of their condition. This is based on an AIHW analysis that showed that most of the mortality gap due to chronic disease can be attributed to certain diseases including:

- Coronary heart disease (explains 22% of the mortality gap due to chronic disease)
- Diabetes (explains 12%)
- Chronic lower respiratory disease such as chronic obstructive pulmonary disease (explains 6%), and
- Cerebrovascular diseases, such as stroke (explains 5%).[47]

As most of the patients attending ACCHSs are of Aboriginal and Torres Strait Islander origin (81%),[48] this group will comprise most of the patients recruited in this project.

These patients are well known to the services that generally rely on self –identification consistent with the national standard identification question *"are you of Aboriginal or Torres Strait Islander origin?"*.[49] This is generally supplemented by additional evidence of Indigeneity such as evidence of Aboriginal descent. The clinical information systems (CIS) of ACCHS contain identifiers for the patient's Indigeneity.

4.3.1 Individual participant inclusion criteria

Participant inclusion criteria include those:

Aged 18 years of age and over with:

- Cardiovascular disease (coronary heart disease, stroke, hypertension, dyslipidaemia and any other CV disease)
- Type 2 diabetes mellitus,
- Chronic kidney disease,
- Other chronic conditions at high risk of developing medication-related problems (e.g. polypharmacy).

Patient consent will be required to participate in this project, which will require the patient's progress to be monitored based on deidentified data extraction from clinical information systems within each ACCHS (see 11.3).

4.3.2 Individual participant recruitment

Convenience sampling of individual participants is a characteristic of the pragmatic project design. Patients attending the ACCHSs will be invited to be seen by a practice pharmacist after being referred by a doctor, health worker or other healthcare provider. However, some guidance for participant selection is necessary to ensure that patients who are most in need are offered the services of the pharmacist. These are defined by the participant inclusion criteria.

The practice pharmacists (with assistance from trained ACCHS staff) may also approach patients attending the clinic who meet the individual participant criteria.

These patients will be asked if they wish to be attended to by the practice pharmacist. The process for participant recruitment will be flexible according to the preferred process recommended by the ACCHS.

A process that may be used to refer patients to the practice pharmacist will be suggested to ACCHSs as shown in Figure 8 (see 11.7).

As the pharmacist will be on-site in the clinic for up to 15 months, patients can consider participation in this Project during this time. Early participation will be encouraged to ensure patients can benefit most from the services of the pharmacist during this time.

4.3.3. Participant follow-up

Practice Pharmacists will follow-up participants as per usual clinic processes (pragmatic study design). These follow-up mechanisms may vary from service to service. Participants will be reviewed according to clinical needs and Medicare rules, and may include 3-monthly, 6-monthly or an annual review by the pharmacist.

The pharmacist will use the CIS within the ACCHS to record follow-up clinical details like other healthcare staff. The pharmacist will also record follow-up details in the pharmacist log-book as is appropriate for the type of review being conducted (such as medication appropriateness index measurements).

The pharmacist log-book (like the data extraction from the CIS) will use the unique patient ID extracted from the CIS. No identifying information will be collected in the log-book. This will also ensure the log-book data can be matched with the CIS data for that participant whilst maintaining confidentiality through de-identification (see 8.2, and 10.5).

4.4 The practice pharmacists as participants

Practice pharmacists will be appointed within participating ACCHSs at an aggregated 0.57 FTE for up to a 15-month period (per site) at 22 ACCHS sites.

4.4.1 Practice Pharmacist inclusion criteria

Pharmacists' eligibility criteria for the project will include:

- current registration with the Australian Health Practitioners Regulation Agency (AHPRA) as a pharmacist;
- more than 2 years post-registration experience;
- post-graduate clinical qualifications or demonstrated clinical experience (e.g. hospital or HMRs).

The need for post-graduate qualifications will be dependent on ACCHSs preference regarding the applicant and an adequate supply of accredited and experienced pharmacist applicants.

The PSA confirms that the proposed activities are consistent with the existing scope of practice of pharmacists as defined by the PSA Competency Standards endorsed by the Australian Health Practitioner Registration Agency.

4.4.2 Pharmacist recruitment

Pharmacist recruitment will be influenced by the needs of ACCHSs. The PSA will work with ACCHSs and the NACCHO Coordinator to undertake a Needs-Assessment of ACCHSs with regard to placing a pharmacist in that service (see 13.3). By considering ACCHSs needs, the availability of local pharmacist services and project inclusion criteria, suitable pharmacist candidates will be identified.

Local community pharmacies will be first approached to see if they are able to provide a pharmacist to work within the ACCHS according to service requirements of the ACCHS. If they are unable to or this is not accepted by the ACCHS in line with principles of self-determination, then the ACCHS may employ a pharmacist directly. The PSA operate a list of pharmacists who are interested in being employed within ACCHSs.

PSA will manage all aspects of employment for the pharmacists; including payroll, superannuation and leave.

4.5 NACCHO Affiliates as participants

State and Territory Affiliates of NACCHO (QAIHC, VACCHO and AMSANT) will represent ACCHSs in respective jurisdictions as members of the Evaluation Team and Project Reference Group. Affiliates have already nominated appropriate staff members to represent them in the Evaluation Team *(see earlier)*.

Letters of support from Affiliates for the development of this project have been acquired (*see Appendix*).

Service Agreements will be developed with Affiliates to support their role in this project, and to provide salary support for a 0.2-0.4 FTE project officer for the duration of the

project. These part-time appointments may likely back-fill staff within Affiliates to support the roll-out of the project.

The participating Affiliates will support ACCHSs in this project through this project officer and/or through nominated public health medical officer support (see *Evaluation Team members*). ACCHSs are members of Affiliates and therefore already receive regular support to deliver their services.

Affiliate staff will be able to support agreements, answer queries and solve problems at the local level. Affiliates will be able to communicate with Evaluation Team members and PSA, NACCHO, and JCU project officers and/or the Project Operational Team (which will meet fortnightly).

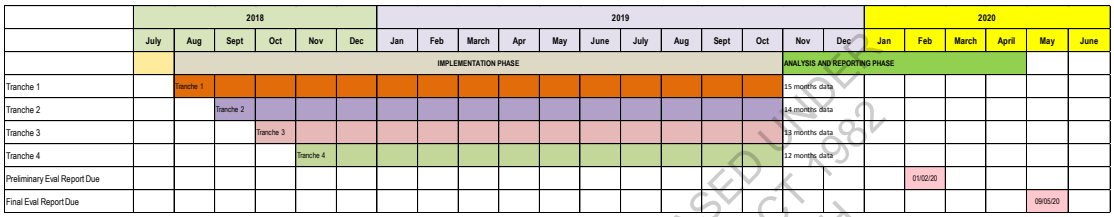
Affiliates will assist ACCHSs to nominate a 'go-to' person as a contact point if the service agrees to participate in the project. This person can also contact Affiliates and any of the project officers, at any time, to discuss progress with the project on site. Project officers will maintain regular contact with 'go to' persons and ACCHSs during the project.

5. Timelines and Project Phases

The project will take 29 months over three phases with staggered recruitment of pharmacists and sites to achieve an average of 0.57 FTE pharmacists /site over a period of 15 months (equivalent to 15 months/site).

The project period is from December 2017- 30 April 2020. The project timeline is shown in Figure 2. The project timeline may be amended to accommodate delays in the project start time.

Figure 2. IPAC Project Timeline.



5.1 Project phases

There are three project phases over a 29-month project duration:
Phase 1: Establishment (4-8 months);
Phase 2: Implementation/intervention (up to 15 months);
Phase 3: Analysis and Reporting (6 months).

In *phase one* of the project (month 1 to 8), the project partners will commence pharmacist recruitment, prepare pharmacist training, finalise consent forms and service agreements (patients and services), prepare additional ethics applications (and amendments) for all jurisdictions, register eligible ACCHSs following an expression of interest and selection process, and upload service software (GRHANITE) into agreed/consented sites.

In *phase two* (month 9 to 23), pharmacists will be trained off-site and on-site (core roles) and appointed to commence work within ACCHSs *(see 6.6).* Patients referred to the pharmacist will be asked to participate in the project *(see 11.3).*

Baseline study measures for each consented participant will be extracted from the existing ACCHS clinical information systems (CIS) using the GRHANITE data extraction tool (*see 8.1*). *Qualitative data* will be collected from three site-visits towards the end of the practice pharmacist tenure within the ACCHSs. These sites will be selected after consultation with the Project Reference Group (*see 8.10).*
Pharmacists will record practice, patient and systems-related activity in an online log-book (*see 8.2).*

In *phase 3* (month 24-29), the project-related data will be cleaned and analysed. Concurrent facilitated discussions within the team and with partners will also be occurring during this period. The community-based participatory research methodology of the trial will be recorded and documented. A draft final report will be produced after 3 months (January-February 2020) with final report by April 2020.

5.2 Staggered commencement of ACCHSs (Tranches)

As 22 ACCHSs will be invited to take part in the project, the commencement time will be staggered into 4 'tranches'. This means that Tranche 1 ACCHSs will start in August 2018, then Tranche 2 will start one month later, and so on. Depending on site recruitment rates, there may be a need for additional tranches of ACCHSs. The Project Reference Group will be comprised to suit the participating Tranches of ACCHSs.

Time frames for the project have been developed with NACCHO to be workable, and ensure as little impost on participating ACCHSs. Staggered recruitment and commencement of ACCHS sites allows services time to prepare and consider the project. Staggered commencement will ease introduction to the project and enable sufficient time for other ACCHSs to opt-into the project if they feel it is workable for them and based on feedback from earlier Tranche sites.

6. Practice Pharmacists Roles and Training

6.1 Core practice pharmacist roles within ACCHSs

Practice pharmacists will aim to augment current practice within primary health care services, and introduce new services not currently delivered within ACCHS settings. The practice pharmacist will undertake core roles and additional roles as specified by services and the service agreement which will reflect the pragmatic approach to the intervention and evaluation of 'real-life' health service roles.

There are 10 core roles that are non-dispensing, for which practice pharmacists are registered to deliver. These include activities targeted *towards patients*, and *health professionals and health systems.*

These 10 core roles include:

- Activity targeted towards patients includes: the assessment of medication management, optimization of medicines, in the home or out-of-home settings (such as the clinic), resolution of medication related problems, arrangements for multiple follow-up encounters with patients. (Core roles 1-5).
- Activity targeted towards health professionals and systems includes: recommendations to clinicians, adhoc and specific education sessions/training and support, liaison with community pharmacy and other healthcare service providers. (Core roles 6-10).

The pharmacist 10 core roles include:

1. Medication Management Reviews
2. Team-based collaboration
3. Medication adherence assessment & support
4. Medication appropriateness audit, and Assessment of Underutilisation
5. Preventative health care
6. Drug Utilisation Review
7. Education and training
8. Medicines information service
9. Medicines stakeholder liaison
10. Transitional care

These are expanded in Table 1. *The Logic Model for Evaluation that maps the pharmacists roles is also included in the Appendix*).

Table 1. Ten (10) Core Pharmacists roles in the IPAC project

SUMMARY OF PRACTICE PHARMACISTS CORE ROLES

Core Role #	Focus	Theme	Core activity	Process*	Output/Outcome
1 (a)	Patient	**Medication Management Reviews**	**Pharmacist reviews the medication the patient is taking. The pharmacist initiates and facilitates a medication management review- which may be a Home Medicines Review (HMR) or a non-HMR (medication management review not conducted in the patient's home)**	Targets HMR and Non-HMR for participants (*as per patient inclusion criteria)*.	Medication optimisation, Direct improvement in biometric data, Reduction in inappropriate polypharmacy, Number and type of pharmacist recommendations made in the medication management plans.
1 (b)	Patient		**Pharmacist reviews the patient who had a HMR after 12 months and a Non-HMR after 3-6 months.**	Undertakes participant-follow up	Outcomes as above
1 (c)	Patient		**Pharmacist ensures the MMR is claimed by the practice when completed (as a DMMR item 900)**	Pharmacist will work with the practice staff to support MBS claims.	Increased claims for DMMR
2	Patient and practice	**Team-based collaboration**	**Pharmacist participates in clinic activities that support team-based chronic disease care plans, and cardiovascular (CV) risk assessment**	Contributes to clinic efforts to undertake GP Management care plans (GPMP), and efforts to measure and stratify CV risk	Improved chronic disease management (GPMP, case conferencing, etc), Improved CV risk assessment, Team-based care is enhanced.
3 (a)	Patient	**Medication adherence assessment & support**	**Pharmacist assesses the medication adherence of the patient being seen**	Conducted at first and subsequent consultations of participants (eg those having an HMR/non-HMR, and/or those being assessed for other reasons)	Improved participant adherence; direct improvements in biometric data
3 (b)	Patient		**Pharmacist improves the patient's experience with their medicines**	Uses appropriate strategies to support chronic disease self-management (self-care) and medication adherence	Improved participant experience and adherence; new resources to Improve patient health literacy about self-care and/or medicines use
4	Patient and Practice	**Medication appropriateness audit**	**Pharmacist assesses 'medication appropriateness, overuse of medicines and underutilisation of medicines' as an audit of a sample of patients with chronic disease.**	A sample of 30 participants are audited using MAI tool and are assessed for the underuse of medicines.	Improvements in prescribing (medication appropriateness) and reduction in suboptimal prescribing.

5	Patient and practice	**Preventative health care**	**Pharmacist provides preventive interventions to patients**	Pharmacist uses the opportunity to promote preventive interventions with every participant contact.	Reduction in pneumococcal vaccine underuse; change in item 715 claims; qualitative perceptions of interactions participants have with other healthcare providers and the practice pharmacist.
6	Practice	**Drug Utilisation Review**	**Pharmacist conducts a DUR to audit and improve a priority issue at the service**	A DUR (ie a quality assurance activity) is conducted after identifying a priority issue within the ACCHS. Interventions are recommended in collaboration with the practice staff.	Pharmacist perceptions if the DUR improves the standard of care at the practice.
7	Practice	**Education and training**	**Pharmacist conducts education sessions at the service**	Co-designed with ACCHS	Description of this specific activity. Additional information from focus groups with staff can elicit if staff felt their learning had improved.
8	Practitioner	**Medicines information service**	**Pharmacist provides medicines related information to staff within the service and responds to clinician medicines enquiries.**	Ad hoc provision of advice to clinical staff about medications. E.g. PBS queries, dose titration, interactions, new and emerging drugs, out of stock, etc	Description of this specific activity. Pharmacist may describe evidence of an outcome in the logbook. Additional information from focus groups with staff can elicit if staff felt they were supported.
9	System	**Medicines stakeholder liaison**	**Pharmacist develops a written stakeholder liaison plan supporting engagement with community pharmacies.**	A written plan will support the provision of referrals and communication of all relevant patient information (such as for HMRs) with community pharmacy	Descriptive. Pharmacist may describe evidence of an outcome in the logbook.
10	System	**Transitional care**	**Pharmacist facilitates care coordination with relevant hospitals; residential aged care facilities, etc.**	Adhoc care coordination to ensure seamless care across community and hospital settings by relaying all relevant information including contact details, current medications list, management plan, monitoring requirements	Perceptions of improved transitional care communication through qualitative data.

**# References to the term 'patient' refers to general interactions and activities with those patients attending the ACCHS. The Practice Pharmacist will be attending to 'patients' as well as 'participants'. The term 'participant' refers specifically to patients who have consented to participate in this Project. Deidentified data will only be collected with regard to 'participants'.*

The ACCHS pharmacist will deliver clinical pharmacy services from or within an ACCHS through a coordinated, collaborative and integrated approach with an overall goal to improve the quality of care of patients.[50]

The pharmacist employed within the ACCHS would deliver medication advice and education to consumers and staff, and work with both consumers and other health professionals to improve medication adherence and reduce medication misadventure through tailoring medication regimens and overseeing medication management processes.

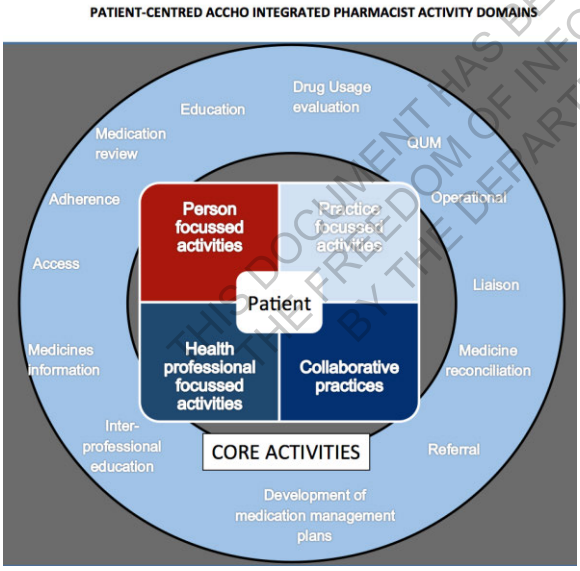
Other activities that pharmacists would deliver within an ACCHS include health promotion, disease prevention initiatives, and assistance with self- management and judicious use of medicines.

As a core role, the pharmacist will be required to respond to medication enquiries from patients and health professionals such as general practitioners and Aboriginal and Torres Strait Islander Health Workers/Practitioners, conduct staff education, review prescribing, mentor new prescribers, participate in case conferences, liaise across health sectors, undertake medication management reviews, and evaluate drug utilisation to ensure optimal therapy.[51]

As part of their collaborative work, an important element of the practice pharmacist's role is liaison with local community pharmacists to ensure continuity of care, and assist in transitions of care.

The practice pharmacist's core roles have also been shown diagrammatically as Figure 3.

Figure 3. Pharmacist core roles within primary healthcare services.



6.2 Examples of practice pharmacists activities

The terminology used to describe the activities a practice pharmacist undertakes have been explained in Table 2, with examples.

Table 2: Examples of practice pharmacist activities.

Activities	Examples of activities
Inter-professional education	Professional development of ACCHS staff on new evidence and guidelines
Medicines Information	Responding to adhoc medicine queries, PBS queries, specific medication concerns from GPs e.g. switching antihypertensives, anticoagulants, opioid equivalence
Access	Private consultations for medication-based concerns for patients
Adherence	Optimising medication regimens and supporting patient needs
Medication management reviews	Providing in-practice referral based medicine reviews, prompt medication reviews and advice, monitoring and advising on prescribing behaviour, providing home medication reviews
Patient education	Counselling, patient education sessions
Quality use of medicines	Assessing judicious medication choices, safety, and appropriateness with documentation and patient follow-up on adverse drug events, and making recommendations to prescribers about suboptimal prescribing (polypharmacy and underutilisation)
Operation	Increasing practice efficiency and freeing up GP time, sourcing medications, storage, supply.
Liaison	Facilitating seamless care with community pharmacists and hospitals
Medicines reconciliation	Assisting patients navigate the health system and medication changes between health settings
Referral	Referral to community pharmacy and other health care providers
Continuing Quality Improvement	Auditing medication management reviews, auditing and updating practitioners' medicines-related clinical records entries e.g. medicines allergy status, correct cancellation of ceased drugs, correct inclusion of current medications
Development of medication management plans	Recommendations to prescribers, collaborative care arrangements, case conferencing
Shared medical appointments	Organising and attending disease-specific shared appointments

6.3 Flexibility with core practice pharmacist roles

Whilst the project has developed 10 core pharmacists roles which form the foundation for the impact and outcome evaluation, each participating ACCHS has the flexibility to utilise the services of the pharmacist according to service and client priorities at the local level.

Practice pharmacists will be supported to adapt to cultural ways of delivering primary health care within each service. Each ACCHS will be different and reflect the unique ways of providing culturally appropriate healthcare.

This is vital to respect Aboriginal staff and services expertise on what may work best in each particular community setting. However, it also provides a pragmatic evaluation opportunity to document the diversity in pharmacist core roles and in the patient journey. This will be possible through qualitative evaluation, but also through pre-post Health Systems Assessments (*see 8.8, 8.10*).

The practice pharmacist will be supported to adapt to their role as directed by the staff and CEO. For example, some ACCHSs may require pharmacists to work specifically with chronic care coordinators, whilst others may be more flexible. Other roles pharmacists could undertake include point-of-care testing (e.g. blood pressure, blood glucose, INR) and monitoring, clinical audits, health assessments, immunisation, transitional care and facilitation of shared medical appointments.[52,53]

Culturally mediated differences in the model of care for pharmacists roles are important outcomes of this project and will be captured in the qualitative evaluation (see 8.10).

6.4 Pharmacists access to clinical information systems

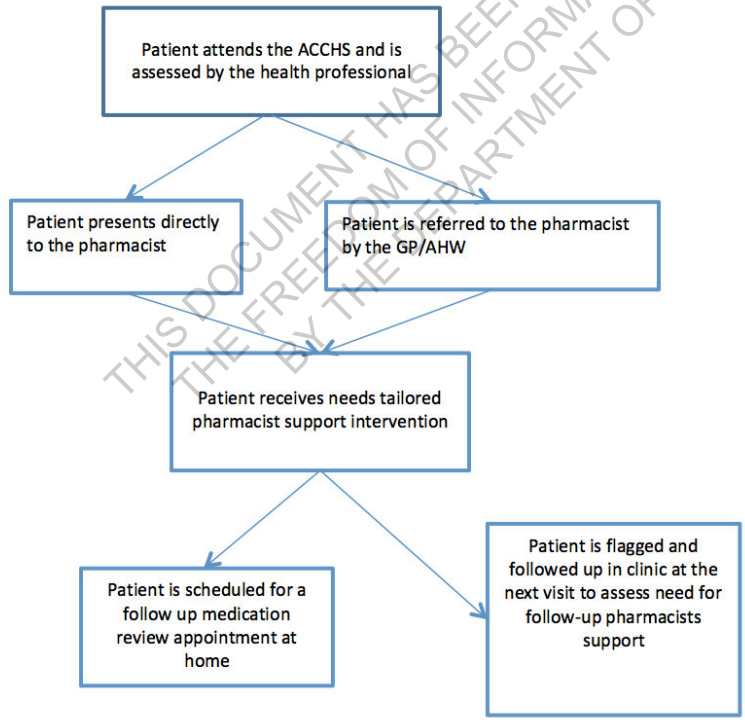
Pharmacists will require access to the patient's medical file to assess the patients history and enable meaningful, informed clinical interventions and enhances pharmacist–GP communication and collaboration.[54,55] Full access by the pharmacist to the patient's medical records is a necessity in order to provide optimal patient care.[56]

ACCHSs will be supported to configure their CIS so that the practice pharmacist has access to and can enter clinical information when assessing patients. Depending on the type of CIS used by the ACCHS, practice pharmacists may be allocated a 'job role' or 'user group' on the CIS to identify them as a practice pharmacist. This will require set-up prior to the patient seeing any patients, and will be managed during Needs Assessment and Health System Assessment site visits (see 13.3, and 8.8).

6.5 The patient journey with the practice pharmacist

ACCHSs will identify workplans and systems that will best suit the role of the practice pharmacist. Referral pathways for patients to be seen by the practice pharmacist will be established by ACCHSs depending on how patients are referred within sites. For example, patients in some ACCHSs may be first seen by an Aboriginal Health Worker (AHW) or Aboriginal and Torres Strait Islander Health Practitioner (ATSIHP) before being seen by a general practitioner. An example of the expected patient journey is shown in Figure 4. *(See also 11.3).*

Figure 4. Example of the patient journey.



6.6 Training of practice pharmacists

Practice pharmacists will be required to work with complex patients, sometimes with multiple chronic diseases, and to understand how their needs fit into the cultural and social environment of the community. ACCHS pharmacists will require an understanding of the social determinants of health, health promotion and

general public health challenges relating to Aboriginal and Torres Strait Islander people. Continuity of care will require an understanding of ACCHSs recall and reminder systems and how healthcare and wellbeing services are coordinated within the entire community. Practice pharmacists will need to be familiar with and use clinical information systems (electronic health records) within ACCHSs.

Work within a culturally responsive health care setting will assist practice pharmacists to understand the reasons for a client's non-attendance and help them to build solutions to address the underlying cause. The practice pharmacist must be flexible, adaptive and receptive to the advice provided by experienced staff within ACCHSs, and they must adapt to being a team member. Pharmacists may also spend time in remote and outreach services and must be willing to adapt their style and practice to an environment that suits the client. This may be outside, in a patient's home, from an outreach vehicle or caravan, via teleconference and with family members, and external staff such as interpreters or hospital-based Aboriginal Health Liaison Officers.

6.6.1 Process for training of pharmacists

The PSA will deliver the training to practice pharmacists. Training will be a three-step process.

Step 1: Cultural training.

This training will be provided at the foundation workshop by experienced facilitators, to provide an overview of practicing as a pharmacist in a culturally safe manner. Pharmacists will also be provided health specific cultural safety training from a trainer local to the ACCHS, if available. Pharmacists who commence after the foundation workshop will undertake locally specific cultural safety training and an online cultural safety course approved by NACCHO.

Step 2: Foundation Training.

All pharmacists will be required to complete pre-reading, quiz questions, and online modules, and this will contribute up to 15 hours of learning time. The majority of pharmacists will then participate in foundation training through facilitated 2-day group workshops (an additional 15 hours), making up 30 hours of training per pharmacist.

Pharmacists recruited after this time will be provided with 7.5 hours of face-face individual project-specific training in mutually agreed locations followed by another 7.5 hours of pre-arranged on-site training with a pharmacist who has workplace skills within ACCHSs.

This training will introduce the skills required to undertake the 10 core roles. This will include an introduction to the project protocol, CIS and other software used by ACCHSs, introduction to the Pharmacists log-book software, processes for recording of data, obtaining patient consent, and use of the evaluation tools (medication adherence and MAI), and developing a work plan to undertake core roles and to record data.

Step 3: On-site training within the ACCHSs.

ACCHSs will provide the pharmacists with site specific training, e.g. local team process.

Training will be consistent with the PSA *Guide to providing pharmacy services to Aboriginal and Torres Strait Islander people.*[57]

6.6.2 Approval of training materials

The training materials to be developed and the training plan will be finalised during the establishment phase of the project. The materials will be approved by the Project Operational Team and Steering Committee.

6.7 Mentor and peer support for Pharmacists

The PSA will manage a network of mentors (subject matter experts who are pharmacists) and the pharmacist support and training process. Each pharmacist will be offered one expert mentor to be appointed mutually between PSA and NACCHO. NACCHO will provide support to practice pharmacists through the *NACCHO-PSA ACCHO Pharmacist Leadership Group*. This group meets via teleconference quarterly and will meet as needed.

Peer support for all participating pharmacists will be provided through the *PSA Mentoring Program* in collaboration with NACCHO. The program will source mentor pharmacists from the joint *NACCHO-PSA ACCHO Pharmacist Leadership Group* and other pharmacists with relevant experience in the ACCH sector. The structured PSA Mentoring Program platform consists of several validated mentoring components, including:

- Applications – made on a set format by prospective mentors and mentees online, at a dedicated PSA web page.
- Enrolment – intake will be aligned between NACCHO-PSA ACCHO Pharmacist Leadership Group mentor application and mentee applications
- Matching – mentees will be matched with appropriate mentors by NACCHO and PSA. A mentor or mentee can reject the first matching if needed.
- Meetings – a minimum of four meetings (including the initial meeting) form the interaction for the program. A personal learning plan, including the core pharmacist roles, will be discussed and drafted during this initial meeting. Meetings will be held over the telephone or same time electronic communication devices or face to face if convenient.
- Online training and peer interaction – provided through the Mentoring Hub and available to mentors and mentees. Mentors and mentees can confer, provide support and share resources, as a group or one-on-one.
- Counselling – mentors will not provide advice on areas that are personal or health related for the mentee.

6.8 Reports of Practice Pharmacist misconduct

Complaints or allegations of professional misconduct relating to the conduct of a practice pharmacist can be relayed by ACCHSs or Affiliates to NACCHO, or the Project Partners or the Project Operational Team. Any such notices will be initially referred to the PSA. The PSA may discuss with the Project Operational Team or may recommend reporting to AHPRA where applicable. See also section 10.10.

7. Study design and measures

The IPAC project is a pragmatic, non-randomized, prospective, pre and post quasi-experimental study with a cost-effectiveness analysis, where the practice pharmacist intervention will be added to standard primary health care practice within ACCHSs.

The project will adhere to community-based participatory research (CBPR) principles, to ensure clear benefits to project sites, to ensure acceptability and sustainability of the intervention within ACCHSs, and ultimately, transferability to other PHC services.

All eligible ACCHS sites will receive the intervention, with study measures referring to periods prior to and after implementation.

7.1 Community-based participatory research study design

The CBPR principles to be adopted in this project are summarised in Box 1. This has been adapted from the WHO guiding principles for CBPR.[58]

Box 1. Community-based participatory research guiding principles for this PTP trial[59]

2 Condensed framework: guiding principles for participatory health research involving research institutions, Indigenous peoples and their representative bodies*

Theme	Subsection	The guiding principles refer to:
1. Consultation and approval	1.1–1.3	Initiation of research and making contact
	1.4–1.5	Approval for the research to proceed
2. Partnerships and research agreements	2.1–2.4	Equality of research relationships, joint preparation of a research agreement and research proposal
	2.5–2.6	Development of agreed research processes
	2.7–2.8	Joint obligations towards the research
3. Communication	3.1	Clarification of, and respect for, the lines of authority of the partners
	3.2	Committee selection by Indigenous peoples (for communication, facilitation and promotion); the committee should represent all relevant community-controlled organisations
	3.3–3.4	Maintenance of communication, including progress reports, results and implications of the research
4. Funding	4.1–4.2	A joint commitment to fund seeking, and agreement of sources in advance
	4.3	Research institutions' obligation to ensure Indigenous peoples are involved where resources or capacity are lacking
5. Ethics and consent	5.1–5.2	Respect for ethical guidelines, approval from human research ethics committees and Indigenous-controlled ethics committees
	5.3	Research commencing only after ethics approval is received and signed agreements are finalised
	5.4	Research conforming to additional protocols of the Indigenous peoples involved
	5.5	Consent for research at various levels: individual (study participants), representatives of Indigenous peoples, and the umbrella Indigenous organisation
	5.6	A jointly agreed consent-seeking process
	5.7	Umbrella Indigenous organisation demonstrating the collective consent of Indigenous peoples
6. Data	6.1–6.2	Intellectual property rights, benefit sharing and boundaries pertaining to information use
	6.3	Confidentiality and limiting access to research data
	6.4	Joint review and interpretation of data before publication
	6.5	Authorship or acknowledgement of participants in joint research
	6.6	Formatting data and reports for independent use by Indigenous peoples
	6.7	Indigenous ownership of data and authorisation for further use
7. Benefits of the research	7.1	Obligation for research to provide short-term and long-term benefits for Indigenous peoples, including provision of health care where lacking
	7.2	Disclosure of potential economic benefits of the research
	7.3	Research benefits including training, employment, general capacity building and improved health status or services (or prospects for such improvement)

* Adapted from the World Health Organization, 2003.[7] See Appendix 1 for the full framework. ◆

7.2 Pragmatic study design

Pragmatic trials seek to determine if interventions work under usual conditions rather than under ideal conditions.[60] ACCHSs will integrate the practice pharmacist within their existing and usual service delivery systems. These systems and patient needs will vary considerably from practice to practice, which will create variability in the role of the practice pharmacist (see section 6). This permits practice pharmacists to flexibly meet the priorities of health services and the needs of patients without enforcing activities for the sole purpose of data collection.

Data will be collected from ACCHSs in ways that are feasible and within scope to source. Mixed methods of analysis will be used to elicit the variability of health service processes and outcomes. This will inform on the practicalities of the role of practice pharmacists, their daily activities, how their work is integrated within the primary health care team, and the acceptability of their role to Aboriginal and Torres Strait Islander peoples and ACCHS staff.

This approach is also consistent with the National Health and Medical Research Council (NHMRC) guidelines for ethical conduct in Aboriginal and Torres Strait Islander health research that recognises that the benefits of the research should be clearly articulated, negotiated and implemented in such a way that it will build community capacity.

The pragmatic features of this project are summarised in the Table 3.

Table 3. Adapted[61] pragmatic methodology for this PTP program.

Domain	Evaluation plan
Service eligibility	Eligibility criteria for participating ACCHSs are defined to reflect the conditions required for usual activity.
Participant eligibility criteria	Practice pharmacists will integrate within the primary health care team delivering services according to patient needs and clinician requests. Certain patients will be targeted as high priority (inclusion criteria), but other patients may receive services. Patient eligibility for data analysis pertains to 'regular patients' of the ACCHS, and describe baseline and outcome measures for patients specifically seen by the practice pharmacist.
Intervention flexibility	Practice pharmacist activities will include core tasks and duties but will remain flexible.
Intervention flexibility practitioner expertise	Practice pharmacists must hold specific qualifications and accreditation status.
Comparison intervention	Usual practice will be considered the comparator that will comprise baseline measures (pre-intervention) within each ACCHS, and aggregated measures for all ACCHSs.
Follow-up intensity	Patients in receipt of medication management reviews will be followed up for repeat review at usual intervals specified by

	Medicare, plus at intervals necessary for quality care. Data collection will be minimally intrusive to ensure usual practice. Existing clinical information systems will extract de-identified patient data, and using an installed data extraction tool (DET) software. This is minimally intrusive and will not impact on any staff activity.
Primary trial outcome	The primary outcome is clinically meaningful, and can be assessed under usual conditions, without the need for special tests or training beyond what is currently provided to staff within ACCHSs. The DET will be installed through telephone support externally.
Practitioner adherence to study protocol	Training will be provided to practice pharmacists prior to starting. There may be no need for additional strategies to maintain or improve practice pharmacist adherence to their core roles.
Analysis of primary outcome	The analysis will explore if the intervention works under usual conditions.

7.3 Study measures

In order to meet the project objective, a number of study measures will be collected. These include clinical, demographic, prescribing, and economic characteristics related to the primary health care of patients with the specified eligibility criteria.

The list of selected study measures, and the source of the data is shown in Table 4.

Data will be extracted for consented patients only (see 11.7). Additional economic measures will be sourced with Site Consent (see 11.3).

Table 4: Clinical, demographic, pharmaceutical, health system, and economical measures assessed in this study.

Measure	Detail	Source
Patient characteristics	age, year of birth, sex, height and weight, condition (clinical diagnosis of diabetes, hypertension, dyslipidaemia, chronic heart disease, peripheral artery disease, cerebrovascular disease, chronic kidney disease, plus other disease), smoking status, closing the gap (CTG) status, Aboriginal and Torres Strait Islander status, pension/concessional status, year of death.	GRHANITE
Encounters	Consent; number of pharmacist contacts, record status (active); patients identification number.	GRHANITE
Patient self-reported health status	Short Form Health Survey (SF1 of SF-36)	Logbook
Biomedical indices	Systolic and diastolic blood pressure, HbA1c, lipids (HDL, LDL, TG's, and TC), ACR, e-GFR	GRHANITE
Health service utilisation: *Medicare Benefits Schedule*	MBS item claims: 900 (Home medications review-HMR), 721 (GPMP), 732 (GPMP review 3 months later), 715 (Health Check); plus other MBS items.	GRHANITE
Health service utilisation: *Non-HMR*	Services for 'non-HMR', and follow-up to a non-HMR, or a HMR.	Logbook
Medication adherence	Self-reported: a) single-item question; b) patient survey	Logbook
Prescribing quality:		
Medication appropriateness	*Medication Appropriateness Index* (MAI)	Logbook

Medicines overuse	*Medication Appropriateness Index* (MAI)	Logbook
Medicines underuse	Potential prescribing omissions (PPO) from HMR/non-HMR, and MAI reviews.	Logbook
Medication Related Problems (MRP)	MRPs from HMR/non-HMR, and MAI reviews	Logbook
Costs	Pharmacist salaries, employment on-costs and overheads, training costs, pharmacist travel, equipment, consumables; health system costs.	Logbook
Health systems assessment	Health system covariates (service and staff characteristics, quality of care, community pharmacy liaison, etc)	Health Systems Assessment
Patient experience	Focus groups and individual interviews	Qualitative
Stakeholder experiences (IPAC pharmacists, health service staff, community pharmacists)	Focus groups, individual interviews and surveys	Qualitative
Pharmacist activities: Education and training, medicines information, team-based collaboration.	Activities undertaken	Logbook
Stakeholder liaison (community pharmacy, hospitals, medicines reconciliation)	Activities undertaken	Logbook Qualitative

ACR= albumin-creatinine ratio; BP= blood pressure; CIS= clinical information systems; CKD= chronic kidney disease; CTG= Close The Gap; CV= cardiovascular; CVA= cerebrovascular disease; DMMR= Domiciliary Medication Management Review; DVA: Dept of Veterans Affairs; e-GFR= estimated glomerular filtration rate; GPMP= General Practice Management Plan; GRHANITE = data extraction tool; HDL= high density lipoprotein; HMR= Home Medications Review; LDL= low density lipoprotein; MAI= Medication Appropriateness Index; PAD= peripheral artery disease; TC= total cholesterol; TG= triglyceride

7.4 Relationship between study measures and the project objective

All the study measures relate to *'quality of care' outcomes* (the project objective). They include indices to assess change:

- in the quality of prescribing,
- the quality of medicines support through indicators of health service utilization,
- the quality of the patient, service and stakeholder experience, and
- ultimately an effect of these improvements on biometric indices as a measure of health outcome.

7.5 Relationship between the study measures and pharmacists core roles

The study measures are related to the pharmacist's core roles (see 6.1). Table 5 provides a summary of these measures linked to core roles.

Table 5: Data sources to evaluate the pharmacist core roles.

Data source	**Description:**
GRHANITE DET	Used to evaluate core roles #1-2.

PHARMACIST LOGBOOK & MAI AUDIT LOG	The data collected from this logbook will inform the evaluation for core roles # 1-10. The collection of Non-HMR data (medication management reviews not conducted in the patient's home) will also inform the evaluation of core roles #1-2.
ACCHS HEALTH SYSTEMS ASSESSMENT DATA	The data collected from participating ACCHS enables comparisons between sites and cost-effectiveness analysis.

DET= Data Extraction Tool; MAI= medication appropriateness Index

8. Data collection

8.1 GRHANITE Data Extraction Tool

Only the study measures as shown in Table 4 will be extracted from the CIS used by ACCHSs for each consented patient who has been attended to by a practice pharmacist.

These include: unique patient ID, patient characteristics, indices for contact/demographics, biomedical, prescribing, and measures of health service utilization (MBS items, eg home medicines reviews, and out-of-home medicines reviews).

Data will only be extracted for the 15-month duration of the project, and 12-month pre-intervention period.

This data will be extracted from the CIS using the GRHANITE data extraction tool (DET). This is a minimally intrusive preprogrammed extraction of deidentified electronic data comprising only items that have been ethics approved. The tool was developed by the University of Melbourne, Health and Biomedical Informatics Centre. Over 1000 health services across Australia have used/are using this tool for quality improvement and research activity.

8.1.1 Deidentified and ethical data extraction

GRHANITE™ strictly conforms to extract only data that has been approved by ethics committees. It provides ethical and secure mechanisms for the provision of data from the CIS.

If an individual gives their permission to be involved in a project, GRHANITE can read this consent information if it is recorded in the clinical notes. Patients who have not consented will not have their data interrogated, even if deidentified. This is an ‘opt-in’ consent process.

The CIS at sites can be interrogated for unique 'strings' that can be added by practice pharmacists in various locations in the CIS. Examples include codes for non-HMRs, medication adherence, and other indicators of pharmacist activity. This ensures linkage between the intervention and outcome indicators, and more efficient use of pharmacist time with regard to data entry.

All data extracted by GHRANITE is deidentified. No identified patient data will be received by the evaluation team. Patient names, dates of birth, address or other identifying information are not extracted.

Data items will be allocated a unique patient ID code in order to enable deidentified linkage with the medication appropriateness index, and assessment of underutilisation measures recorded in the pharmacist logbook (see 8.2).

8.1.2 Support with the use of GRHANITE

ACCHSs participating in this project will be supported to upload the GRHANITE DET into their computers. The tool can be uploaded electronically or by installing software received in the post. Telephone support will be provided to ACCHSs to enable this.

The project Evaluation Team includes the developer of the GRHANITE DET as a co-investigator. This will ensure that the ACCHSs receive the optimal support they need with installation and any problem solving.

8.1.3 Patient consent for electronic data extraction

Patient consent will be required from all patients in all jurisdictions to permit the extraction of deidentified data using the DET. GRHANITE will include only consented patients in the data transfer (see 11.7)

8.1.4 Transfer of GRHANITE data

GRHANITE employs a number of internationally-recognised encryption mechanisms to protect data in transit. The extracted study measures from the ACCHS CIS (baseline and intervention) will be extracted and electronically transferred from the ACCHSs CIS and curated at the central facility (James Cook University) in a secure data repository. The JCU repository runs GRHANITE software for importation and only this machine holds the decryption keys to the data. Because the decryption keys are only present on the JCU repository, the data is secure in transit.

GRHANITE will enable weekly data extracts from the CIS during the 15-month intervention phase. File transfer from all ACCHSs with GHRANITE installed will be automatic.

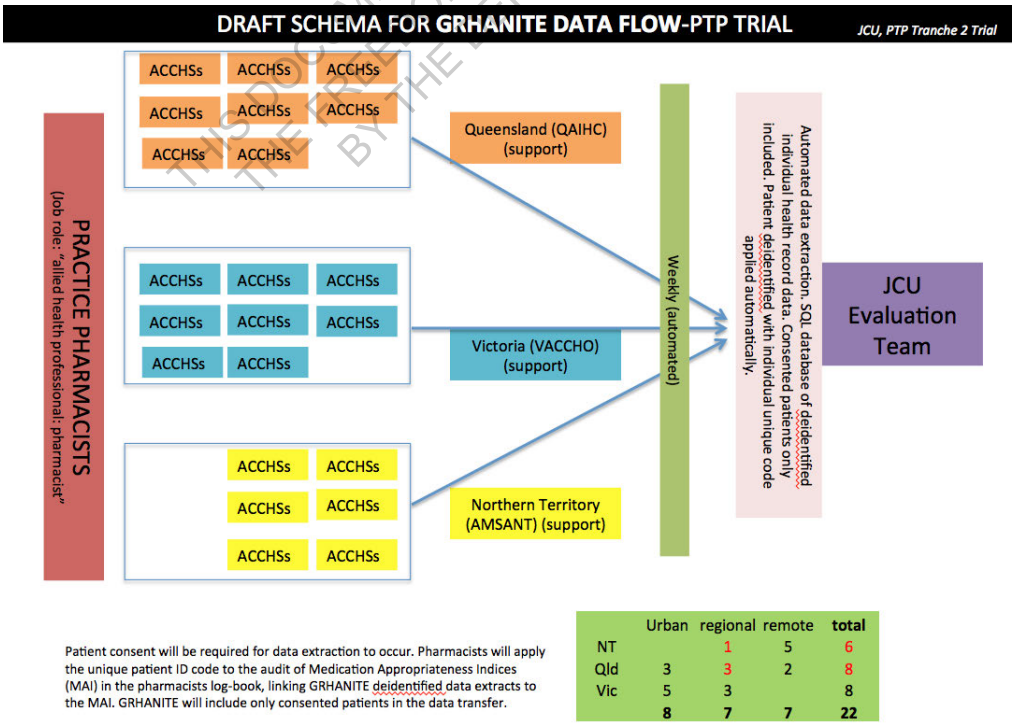
GRHANITE software will not operate if copied or moved from one computer to another.

All installations require a unique authorizing license. This license is secured for the project through a subcontracting arrangement between JCU and the University of Melbourne. Access to the data collected for this project will be managed as outlined in 10.9.

8.1.5 Schema for GRHANITE data flow

A schema to illustrate how data will flow from ACCHSs to the data repository is shown as Figure 5.

Figure 5. Schema for data flow (GRHANITE)



	Urban	regional	remote	total
NT		1	5	6
Qld	3	3	2	8
Vic	5	3		8
	8	7	7	22

8.2 Pharmacists Log-book data

Additional deidentified data on patients and health systems interactions will be collected by practice pharmacists through an electronic log-book. This system will be an online secure database requiring practice pharmacist secure log-in. It will be used by practice pharmacists to record deidentified daily activity. Each electronic log-book entry will be able to be interrogated by the JCU data custodian.

The daily-recorded activity will refer to 10 core pharmacists' roles and comprise qualitative and quantitative data measures. An outline of the measures is shown in Table 6. The logbook will record if any education sessions were delivered for staff within the ACCHS, if a quality assurance activity at the practice (drug utilization review) was undertaken, and examples of liaison with community pharmacy or hospitals.

The electronic interface will be user-friendly to minimise the reporting burden of practice pharmacists.

Table 6. Measures to be collected by practice pharmacists in the electronic pharmacist log-book

Core roles #1: Medication Management Reviews	Details of HMR and non-HMRs and follow-ups Date of HMR and data entry Reasons for choosing to do the particular medication review If HMR, conducted by the IPAC pharmacist or an external pharmacist? Details of AoU
Core roles #2: Team-based collaboration	Date of activity Did activity relate to specific patients Staff involved Duration
Core roles #3: Medication adherence assessment & support	Date of activity Responses to patient survey questions SF1 responses
Core role #4: Medication Appropriateness Index (MAI) Audit, and Assessment of Underutilisation (AOU)	The unique patient ID (extracted from the CIS) for 30 patients. *[This ensures the patient is deidentified and the MAI score, and AOU results can be linked to GRHANITE data extraction. See 8.1 for more detail]*
	Date the MAI and AOU were undertaken
	The MAI measurement questions answered for each medicine and their scoring and comments (see Table 7)
	The results of the AOU ('no prescribing omission' or 'prescribing omission')
	Description of any medication omissions (list of underused medications)
	Prescribing recommendations accepted (ye/no) upon review of MAI and AOU
	Time spent to complete MAI and AOU
Core role #5: Preventative health care	Recorded under #2 'Team-based collaboration' or #5 'Education and Training'
Core role #6: Drug Utilisation Review (DUR) (a QA activity)	date of development of DUR
	description of the DUR;
	summarise the plan of action;
	proposed changes to be made to the standard of care;
	evidence of change in the practice (over time) as a result of the DUR. *[A pdf of the plan could also be emailed with the monthly upload]*
	Time taken to conduct the DUR
	date of the education session held and time taken;

Core role #7: Education and training	Topic/s covered;
	number and job roles of staff in attendance.
Core role #8: Medicines information service	description of the event (options to include: *PBS query, query about drug interactions, advice about new and emerging drugs, etc*);
	job role of the staff the information was provided to;
	evidence this event led to an outcome.
	Time spent for medicines information service
Core role #9: Medicines stakeholder liaison	date of development of the plan;
	what is the plan for?;
	expected outcome from the plan;
	name of community pharmacy/pharmacist involved in the plan;
	number of ACCHS interactions with community pharmacy (in the reporting period);
	evidence this plan led to an outcome (if available).
	Time spent to develop the plan
Core role #10. Transitional care liaison	Type of hospital/organisation engaged;
	number of transitional care activities with the organisation (eg medicines reconciliations; discharge medication discussions, etc)
	Total time spent for transitional care activity; and other evidence of engagement

8.3 Measures of suboptimal prescribing

Suboptimal prescribing will be evaluated in the following ways:

- *Overuse* (polypharmacy, defined as >= 5 medications per patient, and as measured in the Medication Appropriateness Index)
- *Inappropriate use* (prescribing that does not agree with accepted medical standards, or poses more risks than benefits, as measured in the Medication Appropriateness Index)
- *Underuse* (missing drugs that the patient needs, termed 'potential prescribing omissions', as measured by an assessment of underutilisation)

The project will assess measures in all three categories using data from clinical information systems at sites, as well as from data collected by pharmacists.

Inappropriate use will be measured using the Medication Appropriateness Index (MAI). Three (3) items in the MAI will be used to measure overuse of medicines, as well as measures of polypharmacy (the number of medicines per patient) from the prescribing indices as extracted by the DET. An assessment of the underutilisation of medicines will be determined at the time the audit for the MAI is conducted.

8.4 Medication Appropriateness Index data

The pharmacists log-book will enable practice pharmacists to record the results of the measurement of the 'medication appropriateness index' (MAI) for each of 30

participants. A MAI is a more detailed and comprehensive assessment of the appropriateness of a patient's medication.[62]

Of the participants seen by a practice pharmacist, 30 participants per site (per FTE pharmacist) will have their medications intensively appraised as part of this type of medication management review.

The MAI will be measured in the first three months of the intervention phase (baseline) and recorded in the pharmacists' logbook. These audited participants will have their MAI assessed again 12 months later (within the implementation phase).

8.4.1 Measuring the MAI

The medication appropriateness index (MAI) [63] is a scoring method to assess medication appropriateness at baseline and follow-up. The index has been internationally validated and widely used to assess the potential for improvement in prescribing quality due to a clinical pharmacist intervention.[64] Instructions for the use of the index and how pharmacists can be trained to undertake scoring have been sourced from the author in Canada.[65]

For each medicine taken by the participants, the pharmacist will assign a score with the scores weighted as shown in Table 7. The total score is then added. A score of 18 represents maximal inappropriateness with regard to the medication. The mean score can then be calculated for all the drugs the patient is taking, and an overall score noted.

Practice pharmacists do not need to do the calculation. This will be measured by the evaluators.

The pharmacists' log-book will facilitate the electronic scoring for the MAI for each medicine. This will be measured for each of the 30 patients being audited, at two points in time:

- at baseline (month 1-3), and
- at 12-months later.

Table 7. How the MAI will be scored

*1. Is there an indication for the drug?	A_____ Indicated	B_____	C_____3 Not Indicated
*2. Is the medication effective for the condition?	A_____ Effective	B_____	C_____3 Ineffective
3. Is the dosage correct?	A_____ Correct	B_____	C + or C - 2 Incorrect
4. Are the directions correct?	A_____ Correct	B_____	C_____2 Incorrect
5. Are the directions practical?	A_____ Practical	B_____	C_____1 Impractical
6. Are there clinically significant drug-drug interactions?	A_____ Insignificant	B_____	C_____2 Significant
7. Are there clinically significant drug-disease/condition interactions?	A_____ Insignificant	B_____	C_____2 Significant
*8. Is there unnecessary duplication with other drug(s)?	A_____ Necessary	B_____	C_____1 Unnecessary
9. Is the duration of therapy acceptable?	A_____ Acceptable	B_____	C_____1 Not acceptable
10. Is this drug the least expensive alternative compared to others of equal utility?	A_____ Least expensive	B_____	C_____1 Most expensive

Red score is aggregated (per medicine) to determine the total MAI score for the patient (the total result can range from 0-infinity). Scores in columns A and B are weighted zero.

* Rows represent the MAI ratings for medication overuse (combined MAI scores for question, 1, 2, 8)[66]

8.4.2 Undertaking and reporting the MAI result within the ACCHS

- The MAI assessment does not require the participant to be present. No personal information about participants is contained in the log-book.
- The medications of 30 participants (per FTE pharmacist) will need to be assessed within the first 3 months of the implementation phase in the service, and reassessed 12 months later.
- The date of the MAI measurement will be recorded in the pharmacists log-book.
- Practice pharmacists will enter the unique patient ID code for each of the participants who have had an MAI measured into the pharmacists log-book. This will link the GRHANITE deidentified data extracts to the MAI scores. (This step is necessary as clinical information systems do not easily facilitate pharmacists to measure and record scores for medication appropriateness, so a pharmacist logbook is necessary to collect and record this data referring only to the unique patient ID).
- Practice pharmacists will ensure that the participants clinical record notes that an MAI was conducted.
- Practice Pharmacists will follow-up participants as per usual clinic processes.
- Practice pharmacists will ensure that the MAI assessment takes account of additional clinical information such as an assessment of the participant's *absolute cardiovascular risk* when assessing medications for the AOU.
- It is expected that the practice pharmacist will communicate the findings of the MAI to the prescribing team within the ACCHS for each participant, so that appropriate clinical action is taken.

8.5 Assessment of underutilization (AOU)

An Assessment of Underutilization (AOU) will be determined at the time of the audit for the MAI. The same participant's being audited for the MAI will be assessed for the underutilization of medicines.

The MAI does not measure underuse of medicines. However, pharmacist evaluation of underuse of medicines (medicines that have been omitted despite being indicated and potentially beneficial) is also possible during this audit.

The proportion of participants with a potential prescribing omission (PPO) as a measure of underutilization and the frequency of drug types omitted will be assessed. Underutilization of medicines will be defined as the omission of medicines that are clinically indicated according to pre-specified best practice recommendation.[67 68 69 70]

Ratings for individual items will be dichotomised into 'no prescribing omission' or 'omission of an indicated drug'. The outcome measure will be the "proportion of patients with at least one medication omission detected'.

8.5.1 Measuring the AOU

The project will define evidence-based indicators of common prescribing omissions for the conditions listed in the patient inclusion criteria for this project. This list will be influenced by the validated indicators developed in European START randomized controlled trials.[71] [72] These indicators are organized into physiological systems to

assist with use. An extract of the current version of sample START indicators to determine potential prescribing omissions is shown in Table 8.

Table 8. Extract of evidence-based criteria checklist for prescribing omissions (updated Version 2 START criteria).

Section A: Cardiovascular System
2. Aspirin (75 mg – 160 mg once daily) in the presence of chronic atrial fibrillation, where Vitamin K antagonists or direct thrombin inhibitors or factor Xa inhibitors are contraindicated.
3. Antiplatelet therapy (aspirin or clopidogrel or prasugrel or ticagrelor) with a documented history of coronary, cerebral or peripheral vascular disease.
4. Antihypertensive therapy where systolic blood pressure consistently > 160 mmHg and/or diastolic blood pressure consistently >90 mmHg; if systolic blood pressure > 140 mmHg and /or diastolic blood pressure > 90 mmHg, if diabetic.
5. Statin therapy with a documented history of coronary, cerebral or peripheral vascular disease, unless the patient's status is end-of-life or age is > 85 years.
6. Angiotensin Converting Enzyme (ACE) inhibitor with systolic heart failure and/or documented coronary artery disease.
7. Beta-blocker with ischaemic heart disease.
8. Appropriate beta-blocker (bisoprolol, nebivolol, metoprolol or carvedilol) with stable systolic heart failure.
Section F: Endocrine System
1. ACE inhibitor or Angiotensin Receptor Blocker (if intolerant of ACE inhibitor) in diabetes with evidence of renal disease i.e. dipstick proteinuria or microalbuminuria (>30mg/24 hours) with or without serum biochemical renal impairment.
Section I: Vaccines
1. Seasonal trivalent influenza vaccine annually
2. Pneumococcal vaccine at least once after age 65 according to national guidelines

However, the START criteria are not applicable to the Australian Aboriginal and Torres Strait Islander context and exclusively refer to pharmacotherapy for the elderly. For this reason, a list will be created drawing from current high-value prescribing recommendations from Australian best practice guidelines to be appropriate to the health context involving Aboriginal and Torres Strait Islander peoples who have chronic disease at younger ages.

Prescribing recommendations relevant to the target population will be compiled and sourced from evidence-based guidelines (including the CARPA Standard Treatment Manual,[73] National Guide to a Preventive Health Assessment for Aboriginal and Torres Strait Islander People (3rd Edition),[74] Australian Medicines Handbook,[75] and the Australian Immunisation Handbook[76]). Each medication management review will assess for PPOs. Drug types will include cardiovascular and anti-hyperglycaemic medications for primary and secondary CVD prevention and optimal management of T2DM and CKD, pneumococcal vaccination, chemoprophylaxis for rheumatic heart disease, and other omissions.

Recommendations from clinical practice guidelines will be selected if they were unambiguous and represent high-value interventions known to be underused.[77] The recommendations will be arranged into pharmacotherapeutic criteria to benefit Indigenous Australians with the listed conditions, and the selection will be kept small in order to minimise the reporting burden on pharmacists. These criteria have now been compiled and are shown in the Appendix.

Pharmacists will need to be aware of the clinical condition of the participant, their medications and medication history in order to identify a PPO.

The pharmacists log-book will facilitate the electronic reporting of the AOU of the participant's medicines. The AOU will be measured for each of the participant's being audited for an MAI, at two points in time:

- at baseline (month 1-3), and
- at 12-months later.

The log-book will facilitate data entry for each participant as:

- no prescribing omission, or
- omission of an indicated drug.

8.5.2 Undertaking and reporting the AOU result within the ACCHS

- The AOU assessment does not require the participant to be present.
- The date of the AOU measurement be recorded in the pharmacists log-book.
- Practice pharmacists will enter the unique patient ID code for each of the 30 participant's who have had an AOU measured, into the pharmacists log-book. (These should be the same participant's as those who are being assessed for the MAI).
- Practice pharmacists will ensure that the participants clinical record notes than an AOU was conducted.
- It is expected that the practice pharmacist will communicate the findings of the AOU to the prescribing team within the ACCHS for each participant, so that appropriate clinical action is taken.

8.6 Measures of health service utilisation

Measures of health service utilization will include Medicare claims data for Home Medicine Reviews and other Medicare items.

8.6.1 Medicare data

Medicare claims data will be extracted from the CIS using the GRHANITE DET. The data will include claims for completed Home Medication Reviews (HMR), and chronic disease management plans, as well as other markers of health service use. (See Table 4).

The data extractions only pertain to participants.

Descriptive information about HMRs will be collected in the pharmacist logbook.

8.6.2 Non-HMR data

As there is no Medicare rebate for a medication management review that is not conducted as a Home Medicines Review, this project will document this service as a 'non-HMR'. A non-HMR is defined as:

- comprising some or all the elements of a HMR, but not fulfilling all relevant MBS HMR criteria.

For many Aboriginal and Torres Strait Islander patients, the offer of a HMR may be inappropriate.[78] A number of barriers have been identified to undertaking HMRs. These have been summarized in Table 9.

Table 9. The offer of a HMR may be inappropriate in these situations.

a) If the patient has no fixed address;

b) If the patient is at risk of forgoing a HMR if it is not conducted opportunistically (e.g. unlikely to keep an appointment);

c) If conducting a home visit is culturally inappropriate (even with an AHW);

d) If the patient lives far away or travel poses a risk for staff due to distance or unsafe and difficult road conditions;

e) If there is a language communication barrier in the home setting (i.e. No-one at home to help translate);

f) If there is a need for visual or learning resources that are not accessible in a home visit situation.

Practice pharmacists will be encouraged to undertake a medication management review in more appropriate settings such as the clinic according to the wishes and circumstances of the participants.

8.6.3 Documenting a non-HMR in the CIS of the ACCHS

Medication management reviews not conducted in the participant's home will be documented as a 'non-HMR' in the clinical information system for that participant within the ACCHS. This will indicate the participant has had a 'non-HMR'.

Descriptive information about the non-HMR will be collected in the pharmacist logbook.

8.7 Measures of medication adherence

8.7.1 Self-report of Medication Adherence

Medication adherence will be measured at least twice for each participant, at baseline and study end using self-reported, indirect methods of assessment. Pharmacists will ask patients questions about missed doses and if they have difficulty taking their medicines. This will help prescribers and pharmacists to identify modifiable factors that affect patient adherence and to assist individual patients to overcome any difficulties they report.

The practice pharmacist will record the responses in a designated place in the Pharmacist Log Book. Participants will be asked these questions when they have a repeat medication review or any subsequent consult with the pharmacist. Pharmacists will record that they have assessed for adherence in the CIS using a code.

8.7.2 Measures of medication adherence

The extent of adherence will be assessed by a single-item question *'How many days in the last week have you taken this medication?'* This will be asked for each medicine with responses ranging from 0-7 days, to estimate the proportion of days with the correct number of doses taken. This is a frequent summary statistic used to quantify implementation of a dosing regimen.[79] This single question and its variations have been used in the Kanyini study involving Aboriginal and Torres Strait Islander peoples in Australia[80] and internationally.[81 82 83]

Multi-item internationally developed psychometric tools that assess both the extent of adherence and reasons for non-adherence will not be used with patients as they have not been validated in our context,[84] use inappropriate language, and place substantial data burdens on patients.

In order to develop a more comprehensive assessment of adherence-related behaviour, a patient-survey exploring the reasons for non-adherence will be developed for the IPAC project and used by pharmacists at baseline and at least one other subsequent patient encounter. These reasons are very context-specific and necessary to interpret change assumptions in our theory of change (see Appendix). This survey will be evaluated as a psychometric tool to inform beliefs and behaviour about medications by assessing participants' reasons for non-adherence. The patient survey has now been compiled and is shown in the Appendix.

8.8 Health systems assessment data

To identify health system-related covariates, every participating ACCHS site will be visited twice to conduct a health systems assessment (HSA):

- at the time of, or just prior to the appointment of the pharmacist, and
- repeated towards the end of the implementation phase (month 12-15).

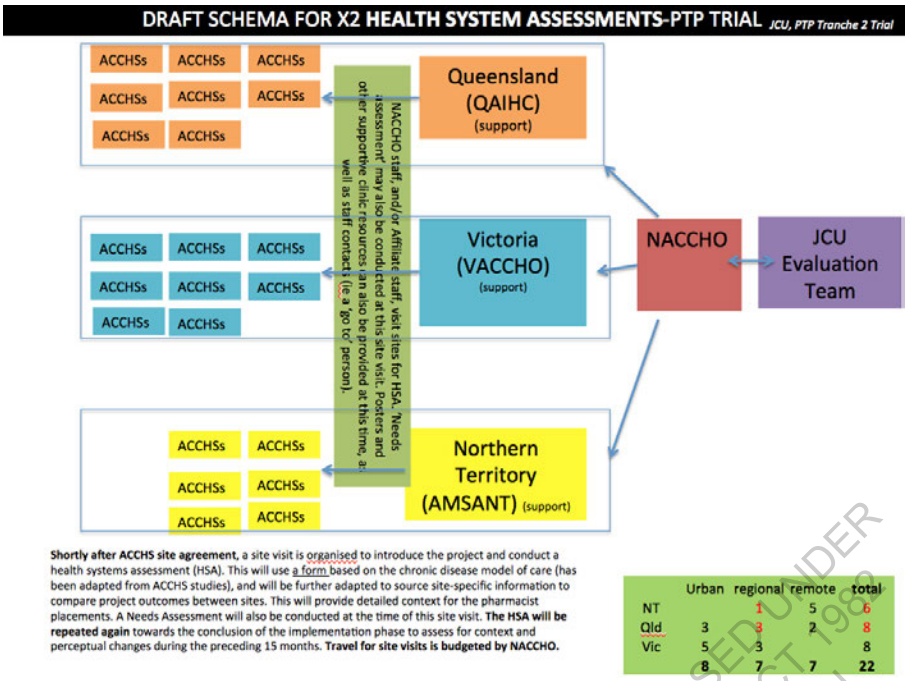
The 'health systems assessment' will source information about service size and function within the ACCHS. Each ACCHS is different in many ways. The project needs to understand how many staff (and types) are employed within the ACCHS, the total service population, the total service budget, Aboriginal governance structures, health services on offer, CQI processes, models of care such as outreach, if home medicines reviews are conducted and how, type of CIS used, recall systems in place, the adequacy of existing communication with the hospital, and community pharmacy/ies, medicines access information, use of point of care testing, regional services available such as specialist and allied health visits, and how the ACCHS will implement and define the core roles of practice pharmacists.

A site visit for this assessment will be conducted by the NACCHO Project Coordinator with assistance from Affiliate staff. This may comprise the first visit to the ACCHS, and coincide with the Needs Assessment (see 13.3.3). A meeting with key informant staff in a focus group setting within the ACCHS may be needed.

The health systems assessment will adapt the Kanyini Health Assessment Form[85] (which itself has been adapted from the Wagners Chronic Disease Model for health systems assessment).[86] Permission to adapt and use the form has been provided by Prof Alex Brown from SAHMRI.[87] The HSA form has now been compiled and is shown in the Appendix.

An outline of the process to conduct the HSA is shown in Figure 6.

Figure 6. Process for conducting a health systems assessment within each ACCHS.



The HSA will also inform service location (which will inform the ASGS- Modified Monash Method classification[88] and Index of relative socioeconomic disadvantage by postcode, and the index for Indigenous Relative Socioeconomic Outcomes). *See also Section 11 regarding site visits.*

8.9 Patient experience measures and self-assessed health status

The IPAC project will explore the overall 'quality of care' experience from the participants perspective after receiving care from the IPAC pharmacist. The 'patient experience' will be elicited through qualitative data collection through focus group discussion at three Sites (see 8.10).

The patient's self-assessed health status will be determined using the first question of the Short Form Health Survey (SF-36) that asks: *'In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'. An extra response option – 'very poor' – was added (as in the SF-8 survey) to reduce the potential for respondents to overstate their health status.[89]

Responses to this single-item (SF-1) question have been shown to correlate well with multi-item tools measuring the same construct,[90] and are used in the National Aboriginal and Torres Strait Islander Social Survey.[91]

8.10 Qualitative data

There are three main sources of qualitative data for the evaluation of the intervention:

- General sources of data (Pharmacists Logbook analysis, qualitative data from Health Systems Assessment, and 'patient experience' survey data *(see relevant Sections)*
- Site-visit fieldwork
- Remote data collection.

8.10.1 Site-visit fieldwork for qualitative evaluation

Three (3) ACCHSs, one in each jurisdiction, will be visited as 'case study' sites for qualitative data collection. ACCHSs will be invited after being purposively selected for on-site field visits in partnership with NACCHO and the Affiliates. The Project Operational Team and Project Reference Group will assist with site selection. ACCHSs can also nominate to be considered for these site visits.

These services will be urban, rural or remote to ensure an understanding of the phenomenon (an in-service Pharmacist) in different settings.

Site-visit field-work will be undertaken over a three-day period at each service by three researchers experienced in health services research, in partnership with the ACCHS and with the assistance of Pharmacist and clinic staff. They will conduct interviews and observe the activity of relevant staff. The number of interviews will be set by the number of staff working with IPAC pharmacists at each site (estimated to be between six to eight staff). Patients will be offered a $20 (AUD) gift card at the conclusion of the interview or focus group, to compensate them for their time and travel.

It is expected that this fieldwork will anytime from June- October 2019.

A summary of the site-visit fieldwork data collection process is shown in Table 10.

Table 10: Summary of the qualitative analysis to be undertaken in three 'case-study' sites.

Time	Data collection method	Example:
Day 1	**In-depth semi-structured interview with the Practice Pharmacist**	To elicit perceptions of: • Team-based care and their clinical role • The degree of integration • The effectiveness of the role To describe: • What and why certain processes were adopted • Why new resources were needed To map: • The patient journey and the interactions they had with patients, other healthcare providers and community pharmacies. • To describe case studies
Day 2	**Non-participant observation of Pharmacist for one work day (**Shadowing)	• The qualitative researcher will "shadow" the Pharmacist for one day taking detailed field notes and recording observations of workflow and patient interactions. • Observation will be guided by an observation guide (developed by the Evaluation Team) and the interview with the Pharmacist.
Day 3	**Focus Group Discussion with patients**	• 6 to 8 participants • Purposively selected (those who have experience with Pharmacist) • Semi-structured with an interview guide (developed by the Evaluation Team) and the interview with the Pharmacist.

	In-depth semi-structured interview with one patient	• Purposively selected having experience with Pharmacist • Semi-structured with an interview guide (developed by the Evaluation Team) and the interview with the Pharmacist.
Day 4	**Focus Group Discussion or individual interview/s with Aboriginal Health Workers/Practitioners/CEOs/ Practice Managers / GPs**	• 6 to 8 participants • Purposively selected for knowledge of role of the pharmacist and patient journey • Will aim to elicit 'a map' of the interactions patients have and other healthcare providers have with the practice pharmacist, and with community pharmacies. • To elicit case studies.
During the 4 days	**Photographs, collection of relevant documents**	Photographs will be taken of any signs and posters, outlining the role of the Pharmacists. Examples of documents, and patient health promotion materials outlining the role of the pharmacist; newsletter articles and other documents will also be collected

8.10.2 Qualitative data collected remotely

Other qualitative data will be collected remotely through one-hour sessions held using webinar, skype, video conferencing or phone discussion. The same qualitative evaluation team will conduct individual interviews and focus groups to ensure consistency and data quality.

It is expected this data collection will occur during June- August 2019 once all ACCHSs have had a Pharmacist in their service for at least 6 months.

Participants will be recruited upon invitation by NACCHO, during this period.

A summary of the process for collecting qualitative data remotely is shown in Table 11.

Table 11. Summary of the process for collecting qualitative data remotely

Data collection method	**Example:**
Individual Interviews with all participating pharmacists	To elicit perceptions of: • Team-based care and their clinical role • The degree of integration • The effectiveness of the role To describe: • What and why certain processes were adopted • Why new resources were needed To map: • The patient journey and the interactions they had with patients, other healthcare providers and community pharmacies. To describe case studies.
Online questionnaire with GPs within ACCHS sites	As above with specific GP focus.
Online questionnaire of Community Pharmacists	To elicit perceptions of:

	• Transitional care arrangements, stakeholder engagement and collaboration
Online questionnaire of CEOs and Managers	To elicit perceptions of: • Team-based care and their clinical role • The degree of integration • The effectiveness of the role • Overall satisfaction

8.11 Cost-effectiveness data

The cost-effectiveness analysis will determine if the intervention is cost effective relative to standard practice (at baseline).

The two comparison groups will include:

- Group 1: Standard care (defined as care received at baseline, prior to receiving care from a Practice Pharmacist)
- Group 2: Patients receiving care from a Practice Pharmacist

The direct costs of providing the pharmacist intervention in each practice will be estimated. As Group 1 care is defined as standard practice, it will be assumed that no additional costs were incurred. The pharmacist intervention costs will consist of pharmacist salaries, on-costs associated with the pharmacists' employment, overheads associated with employing the pharmacists, training of the pharmacists, time of other professionals within the ACCHS meeting with the pharmacists (if available), costs of pharmacist travel and equipment and consumable purchases related to delivering the pharmacist service.

8.11.1 Outcome measures of economic analysis

The primary outcome measures for the economic evaluation will be biomedical indices for (i) all IPAC participants (using generic biomedical indices) and (ii) subgroups of participants with specific chronic diseases(using condition-specific outcomes) .

The secondary outcome for the economic evaluation will be the number of patients in each practice at baseline and post-intervention with medication underutilisation. Medication underutilisatin will be reported as change in the number of participants with at least one PPO.

8.11.2 Source of cost-related data

The sources of cost will be obtained as follows (Table 12):

Table 12: Source of information for economic analysis

Cost	Source
Pharmacist salary, on-costs and overheads	PSA (project accounting data)

Training of the pharmacists	PSA (project accounting data)
Time of other professionals within the ACCHS meeting with the pharmacists	Pharmacist logbook
Costs of pharmacist travel	Pharmacist logbook and PSA (project accounting data)
Equipment and consumable purchases related to delivering the pharmacist service	Pharmacist logbook and PSA (trial accounting data)

8.11.3 Sources of effectiveness-related data

This will be sourced from the GRHANITE data extraction (see 8.1), and Health Systems Assessment data (see 8.8).

9. Data Analysis

9.1 Quantitative data analysis

Biometric indices will inform on improvements arising from the intervention compared with baseline as outlined in the Theory of Change and Logic Model (see Appendix).

The effect of the pharmacist intervention will be investigated by comparing study measures at the endpoint with those at baseline. The baseline measures will refer to the first interaction or assessment between the patient and the IPAC pharmacist, and/or data recorded within CISs in a 12-month period preceding patient enrolment into the study. Participants' continuous and categorical outcome measures will be averaged to derive at baseline measures. The final assessment will refer to the most recent recorded measure prior to the end of the study.

The main biomedical outcome measures are systolic and diastolic blood pressure, HbA1c, high and low-density lipoprotein, total cholesterol, triglycerides, estimated absolute CVD risk, and albumin to creatinine ratio in relevant subgroups of participants with chronic disease. The change in these measures over time will be examined for participants with chronic disease and for participants with T2DM.

Absolute CVD risk will be calculated based on the 1991 Framingham Risk Equation (FRE)[92] to estimate the 5-year risk of a primary cardiovascular event using a composite of sex, age, systolic blood pressure, total cholesterol to HDL ratio, and diabetes plus smoking status measures, except for left ventricular hypertrophy. This equation is recommended for people without existing CVD (primary risk) who are aged 30-74 years as outlined in clinical practice guidelines for the Aboriginal and Torres Strait Islander population.[93 94] It will not be applied to those with existing CVD (history of coronary heart disease, cerebrovascular disease, and peripheral vascular disease documented in the medical records)[95 96] nor to others who are already at a clinically high risk for a CV event (>15%) *with any of the following*: diabetes mellitus and age >60 years, diabetes mellitus and microalbuminuria (urinary ACR >2.5 mg/mmol for males and >3.5 mg/mmol for females), estimated glomerular filtration rate <45 mL/min per 1.73 m^2, systolic blood pressure (BP) ≥180 mm Hg, diastolic BP ≥110 mm Hg, and total cholesterol >7.5 mmol/L.[97] Absolute risk estimates will not be adjusted upwards given the FRE is known to underestimate absolute CVD risk in the Aboriginal and Torres Strait Islander population as this is subject to clinical discretion.[98] Estimated GFR as reported in CISs will be used without derivation from serum creatinine measures.

An analysis of differences in summated mean MAI scores per patient, the mean MAI score per individual medication, and the number and proportion of participants receiving inappropriate medications will be compared at baseline and study end. Overuse of medications, defined as participants' medications deemed to be unnecessary[99] will be measured by assigning a MAI score to three items.[100] These inform on the overuse of medications as they measure if the prescribed medicine is clinically indicated, effective, or if there is unnecessary duplication of a medicine.

Self-assessed health status (SF1) and indices of health service utilisation (Medicare) and measures of medication adherence will be analysed for change from baseline.

The number of claims for relevant MBS services such as claims for a home medicines review (item 900) rendered to each participant will be determined at baseline (12 months period before recruitment to study) and during the follow-up time. Per participant, event rates of MBS item claims will be calculated for pre and post intervention times per person-year of observation. Information on health professional and health systems supports will be collected. The frequency and characteristics of non-HMRs will be described in the logbook including the reasons for undertaking a non-HMR over a HMR.

Analyses will use R and Stata MP 14 software. All analyses will be adjusted for the clustering effects of the ACCHSs (primary sampling units). Collected quantitative outcome measures of participating patients will be described at baseline and at final assessment overall and stratified by type 2 diabetes mellitus and other chronic disease groups. Categorical data will be summarised using absolute and relative frequencies. The distribution of numerical data will be assessed; symmetrically distributed numerical data will be presented using mean values and standard deviations (SD) while skewed data will be summarised using median values and inter-quartile ranges (IQR).

For numerical outcome measures, differences of baseline and final assessments will be calculated and summarised depending on their distribution as either mean or median values together with respective 95%-confidence intervals (95% CI). Linear regression models (Stata svyreg command) will be applied using the calculated differences as dependent measures to investigate the effects attributable to practice-level factors, including geographical factors, service location and size, and client-level factors including age, sex, and co-morbidity, as well as other covariates appropriate to the measure being evaluated.

For binary outcome measures, differences will be calculated based on baseline and final assessments. These differences will be dichotomised into “improved” versus “unchanged or worse” and presented together with 95% CI. Conditional fixed effect logistic regression (Stata svyclogit command) will be applied to investigate effects of practice-level and client factors as described above.
SF-1 is the only ordinal outcome measure and will be analysed in a similar manner as the binary outcome measures applying ordinal logistic regression (Stata svyologit command) to investigate factors affecting the difference between baseline and final assessments.

Primary outcome measures which are assessed several times during the follow-up phase of the study for most patients will additionally be analysed using GLS random-effect panel data models (Stata xtreg or xtlogit) with robust estimates of standard errors to adjust for ACCHS clustering effects. Statistical significance will be defined at the conventional 5% level.

A Statistical Analysis Plan will outline more detail of these analyses.

9.2 Qualitative data analysis

For qualitative trial outcomes, the discussions will be transcribed verbatim. Themes will be developed and finalized through the constant comparison method. Initial similar themes will be inductively developed from data immersion and refined through coder triangulation. Data will be stored, and analysed with NVivo 12 (QRS International) software.

9.3 Cost-effectiveness analysis

The cost-effectiveness analysis will compare costs and outcomes in the pre- and post-trial periods using paired data.

For the primary economic evaluation, outcomes will comprise relevant biomedical indices and will be compared for (i) all IPAC participants (e.g. using systolic blood pressure as an outcome measure that is available for all participants) and (ii) subgroups of participants (e.g. using HbA1c for participants with diabetes).

For these analyses, the numerator of the incremental cost-effectiveness ratio (ICER) will reflect total costs for the relevant participant group and the denominator will be the appropriate biomedical index for that group.

$$\text{ICER} = \frac{Total\ costs\ of\ pharmacy\ intervention - Total\ costs\ at\ baseline}{Change\ in\ biomedical\ index}$$

For the secondary economic evaluation (i.e. based on the subgroup of enrolled participants who had a complete assessment of medicines underutilisation), the outcome measure of potential prescribing omissions (PPOs) will be compared for three groups of participants if possible: (i) those with a baseline and final MAI review (ii) those with a baseline and final HMR review and (iii) those with a baseline and final non-HMR review. The outcome measure will be calculated based on the proportion of participants who changed from having at least one PPO to no medication omission.

This ICER will show the incremental cost to have one less person with a PPO. The numerator will reflect total costs for participants with both baseline and final medication reviews. The denominator will be calculated from the proportion of participants who changed from at least one PPO to no omission, multiplied by the corresponding number of participants.

$$\text{ICER} = \frac{Total\ costs\ of\ pharmacy\ intervention - Total\ costs\ at\ baseline}{Proportion\ of\ patients\ who\ changed\ from\ a\ PPO\ to\ no\ PPO\ times\ no.of\ participants}$$

Unadjusted and adjusted comparisons of costs and outcomes for each target group will be conducted using appropriate statistical tests.

The incremental cost effectiveness ratios will be estimated both excluding and including health system costs using the adjusted cost and outcome data.

The sensitivity of the results to different assumptions, such as changes in pharmacist salary, training costs or time spent conducting medication reviews, will be tested with one-way sensitivity analysis.

Cost-effectiveness acceptability curves will be constructed to demonstrate the probability that the incremental costs and outcomes gained from the pharmacy intervention is cost-effective within an acceptable cost effectiveness range in the context of improving specific health outcomes amongst Aboriginal and Torres Strait Islander people.

9.4 Policy analyses

Analyses will also include reporting of the CBPR methodology, and health policy implications for the pharmacist workforce as well as national nKPIs and quality improvement.

9.5 Sample size for the study

A sample size of 732 patients with chronic disease will achieve power in excess of 80% to detect (1) an absolute CVD risk reduction of 1% (1-point difference) from baseline if a standard deviation (SD) of 2.7% was assumed[101] [102]; (2) a clinically relevant reduction of 10mmHg (SD 20 mmHg) in systolic blood pressure and (3) 5 mmHg (SD 10 mmHg) in diastolic blood pressure;[103] [104] (4) a reduction in total cholesterol (-0.3mmol/L; SD 1 mmol/l), [105] [106] (5) an increase in high-density lipoproteins (0.1 mmol/L; SD 0.4 mmol/l),[107] [108] and (6) a reduction in low-density lipoproteins (-0.3 mmol/L; SD 0.9 mmol/l);[109] (7) a reduction in triglycerides (-0.9mmol/L; SD 1.5 mmol/l);[110] [111] and (8) a 30% decrease in ACR (SD: 23 mg/mmol);[112] [113] with an overall level of significance of 0.05 (adjusted for multiple testing k=8) using two-sided one-sample paired t-tests.

A total of 119 T2DM patients will achieve power in excess of 80% to detect a decrease in HbA1c (in % units) from baseline of at least 0.5% with an assumed SD for change of 1% [114] with an overall level of significance of 0.05 using two-sided one-sample paired t-tests.

Our sample size calculations allow for an attrition rate (including missing values) of 50% and assumed a design effect of 1.75[115] [116] to adjust for the cluster sampling approach. Calculations are based on a comparison of mean values in a paired analysis and were conducted with PASS 2008 (NCSS, Kaysville, Utah, USA).

10. Data Storage and Management

10.1 Guiding documents and legislation

Processes related to data ownership and management is consistent with the policies and guidelines of the lead evaluation organisation (JCU) and ACCHS related policies.

The policies that this project adheres to include:

- *The Code for the Responsible Conduct of Research* (JCU) [This Code has been adapted from the Australian Code for the Responsible Conduct of Research ["the National Code"], developed jointly by the National Health and Medical Research Council, Australian Research Council and Universities Australia, and published in 2007]. https://www.jcu.edu.au/policy/research-management/code-for-the-responsible-conduct-of-research
- The *Intellectual Property Policy and Procedure* (JCU). https://www.jcu.edu.au/policy/research-management/intellectual-property-policy-and-procedure
- *National Aboriginal and Torres Strait Islander Health Data principles*, endorsed by Australian Health Ministers Advisory Council (AHMAC) in 2006 (*see Appendix*)
- Primary Health Networks and Aboriginal Community Controlled Health Organisations – Guiding Principles. http://www.health.gov.au/internet/main/publishing.nsf/Content/PHN-Accho
- *Values and Ethics: Guidelines for Ethical Conduct in Aboriginal and Torres Strait Islander Health Research*, endorsed by NHMRC in 2003. https://www.nhmrc.gov.au/guidelines-publications/e52
- *National Statement on Ethical Conduct in Human Research (2007)* - Updated May 2015. https://www.nhmrc.gov.au/guidelines-publications/e72

10.2 Intellectual Property

Intellectual property as outlined in the Funding Agreement with the Australian Government Department of Health means all copyright and rights resulting from intellectual activity but does not include moral rights (the right of attribution and/or integrity of authorship of copyright material and the right not to have authorship falsely attributed) or rights in relation to confidential material.

The ownership of data and materials that are produced from this project is subject to the clauses in the Funding Agreement. Intellectual property rights in materials created as arising from activity in this project (but not raw unanalysed data extracted using GRHANITE), will be vested in respective organisations: JCU, the PSA, and NACCHO with license granted to PSA.

10.3 ACCHS ownership of data

Data collected in each Project site is acknowledged to be the property of the specific ACCHS. The raw (unanalysed) data extracted by GRHANITE and collected is acknowledged to be owned by the ACCHSs from which it was collected.

This is in keeping with the guiding documents in 10.1. For example Primary Health Network Guiding Principles state: *"recognize that data generated by ACCHOs is owned by ACCHOs.*"

The ACCHS will be asked to grant the PSA (and in turn, NACCHO and the JCU) a perpetual, irrevocable, royalty-free and licence fee-free, non-exclusive licence (including a right of sub-licence) to use and analyse the raw (unanalysed) extracted data that arises from participation in the IPAC Project in accordance with this Project Protocol.

The PSA will grant the ACCHS a perpetual, irrevocable, royalty-free and licence fee-free, non-exclusive licence (including a right of sub-licence) to use, reproduce, modify, adapt, analyse, publish, perform, broadcast, communicate and exploit (but not commercialise) the local feedback provided by the Project Partners to the ACCHS (if requested) in accordance with ACCHS Site Agreements once the Australian Government Department of Health have approved public releases of results or information arising from activity in the IPAC Project.

10.4 Confidentiality of ACCHS data extracted from GRHANITE

Individual patients participating in this project will not be able to be identified. This is secured through the use of the GRHANITE data extraction tool and because deidentified GRHANITE data will only be extracted from consented patients. GRHANITE data received by the evaluation team will not be able to be reidentified.

All data collected by GHRANITE and forwarded to the evaluation team is deidentified. Data items are allocated a unique patient identification (ID) code. The tool provides ethical and secure mechanisms for the provision of data. Patient names, dates of birth, address or other identifying information are not extracted. The number of fields and the types of data extracted for this project have been described earlier (Table 4, section 8.1). GRHANITE strictly conforms to what is approved by ethics committees.

10.5 Confidentiality of ACCHS data extracted from Pharmacists log-book

With regard to the Medication Appropriateness Indices (MAI) in the pharmacists log-book, pharmacists will apply the unique patient ID code to the audit of 30 participants, thereby linking GRHANITE deidentified data extracts to the MAI scores. This step is necessary as clinical information systems do not easily facilitate pharmacists to measure and record scores for medication appropriateness, so a pharmacist logbook is necessary to collect and record this data referring only to the unique patient ID.

GRHANITE will include only participants in the data transfer. GRHANITE employs a number of internationally-recognised encryption mechanisms to protect data in transit. GRHANITE software will not operate if copied or moved from one computer to another. All installations require a unique authorising license. Over 1000 health services across Australia have used/are using this tool for quality improvement and research activity.

10.6 Confidentiality from pharmacists and in reports

Practice Pharmacists participating in this project will sign a *Practice Pharmacist Participant Consent Form* prior to participating in the project stating: *"I will have access to the clinical information system and will utilise the information contained within to undertake my clinical duties, and to support the data collection required for this Project."*

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Individual ACCHSs and communities will not to be identified in any reports, publications or conference presentations of data from this project, unless this has been requested/approved by the ACCHS.

Project results will be reported at an aggregate level, and will not identify individual participants, communities, or ACCHSs, without their consent.

10.7 Security of ACCHS data

As the leading research organisation, JCU (the Repository Body) will be responsible for the protection of data from loss, misuse and unauthorised access. The following position from within the JCU Evaluation Team will be responsible for this role:

- Data Custodian: Biostatistician (Erik Biros)

Further, the Project Operational Team, Chaired by the Deputy CEO of NACCHO, will be consulted in all matters brought to its attention with regard to concerns about data security. Mechanisms for these communications are explained in section 10.10.

10.8 Data storage and transportation

10.8.1 Consent Forms

Completed Participant and Site Consent Forms will scanned by the practice pharmacist and electronically transmitted to the data custodian (Biostatistician: Erik Biros). The forms will be stored electronically in a secure computer under the management of the data custodian on the property of College of Medicine and Dentistry, James Cook University.

10.8.2 GRHANITE data and Pharmacist Log-book data

Electronic data extracted from CIS and the Pharmacist log-book will be stored on password-protected internal server on JCU premises. Data accessed during the analysis phase will be stored in JCU-supported database applications only.

10.8.3 Health systems assessment data, Needs Assessment information

Health Systems Assessment (HSA) data, and Needs Assessment information collected from site visits will be collected on paper-based forms, (or in electronic format for the HSA). Any electronic forms will be stored in a password-protected computer.

Paper-based forms collected by project staff from sites will be transported in a locked briefcase, scanned and stored in electronic format in a secure computer under the management of the data custodian on the property of College of Medicine and Dentistry, James Cook University.

Paper-based patient experience surveys (if collected) will be scanned to JCU Data Custodian, or posted in registered mail, and similarly stored in a secure computer under the management of the data custodian.

10.8.4 Qualitative data

Qualitative data will be collected in 2019 (see Section 8.10), and stored and transported as follows:

- Qualitative interviews and focus group discussions (including webinar or electronic interviews) will be recorded on a digital recorder and stored in a password-protected file.
- Photographs will be taken on a password-protected mobile phone.
- Field notes will be recorded on a digital recorder and in a notebook (non-participant observation/pharmacist shadowing).
- During field work all digital files (recorded interviews, field notes and photographs) will be downloaded to a password-protected laptop and stored on a password-protected file immediately after interviews or field work.
- All electronic files (digital recordings and photos) will be removed from recording devices (recorder and mobile phone) immediately once transferred to the laptop.
- All electronic files will be stored on password-protected computers during and after the project (under the control of the data custodian).
- Identifying information will be removed from data collected immediately after the interviews and focus group discussions have been transcribed.
- Paper copies of any identifiable project data will be stored in a locked filing cabinet, in a lockable room (ie. Field notes, paper-based forms, and photographs).
- Electronic questionnaire data collected will be stored in a password-protected 'Survey Monkey' account until the end of the data collection period. At this time, the data will be downloaded and stored on a password-protected computer, in a file accessible only by the data custodian.

10.9 Access to Data

10.9.1 Evaluation Team access to data

Data access will be granted to Project Partners and writing teams established for the purpose of this Project who will comprise members of the Evaluation Team. Approval for data access will be given for reasons meeting the specific objectives of this project, and consistent with the Funding and Service Agreements with the Australian Government Department of Health. Requests for access to data will need to be submitted to the Data Custodian (Biostatistician: Erik Biros).

Additional requests for access to data from within the Evaluation Team or Project Partners *that may not meet the specific objectives of this project*, must be made to the Project Operational Team for approval prior to the release of the data, and must be approved by a relevant HREC.

10.9.2 ACCHS request to access data

ACCHS sites that request access to data arising from their participation in this project will be able to access data related to their ACCHS, in acknowledgment of the ACCHS's ownership of the raw, unanalysed data extracted from CISs using GRHANITE.

These requests can be made to the Project Operational Team or its members, or directly through the NACCHO Affiliate or Project Officers involved in this project. The

request must also include documentation of intended data use and must align with project objectives. Requests to access the data that *does not align* with the project objectives will need HREC approval.

10.9.3 Affiliates request to access data

As per 10.9.2, Affiliates will be able to request access to data at their jurisdictional level (State/Territory). This request must be in writing and align with the project objectives. Data will only be able to be provided as it pertains to the deidentified data extracted from GRHANITE, and specific to the jurisdiction. Requests for access to data will need to be submitted to the Data Custodian (Biostatistician: Erik Biros). This data is de-identified, is not reidentifiable, and will be aggregated. Any other requests for access to data that may not meet the specific objectives of this project, must be made to the Project Operational Team for their consideration, and must be approved by a relevant HREC.

10.9.4 External requests to access data

External requests comprise requests from other organizations and research agencies not participating in this project. External requests to access data from this project will need to be submitted to the Project Operational Team.

NACCHO will recommend that external agencies seek approval from Affiliates and from participating ACCHSs relevant to the request. Approval will not be granted for the release of data if it is not approved by NACCHO. There may be a need to seek approval from the Australian Government Department of Health if this is a condition in the Funding Agreement for this project.

All external requests will need to have HREC approval prior to the release of this data.

10.10 Reporting breaches in data security, research misconduct or complaints

Project partners, project staff, and project participants can report any breaches in data security or research misconduct or complaints. Reports can be made to:

- project partners/staff,
- Affiliates,
- NACCHO directly, and/or
- Designated HREC representative.

Reports will be forwarded to the Project Operational Team and forwarded to the Deputy CEO of NACCHO.

The JCU *Code for the Responsible Conduct of Research* outlines a framework for receiving and investigating allegations of research misconduct and data security breaches. The data custodian (Biostatistician- Erik Biros) will be notified of any such reports and manage them in accordance with this Code.

10.11 Data Retention, Storage and Disposal

Consistent with the JCU *Code for the Responsible Conduct of Research,* data will be retained for a minimum period of 7 years from the end of the year of publication of the last refereed publication or other form of public release to an audience external to JCU.

Electronic data will be stored on password-secured databases only. Paper-based documents will be scanned and stored electronically, and the paper documents labeled with the data custodians name, date, and 'IPAC project', stored in a locked cabinet in a secure room not generally accessible, and marked as 'confidential'. The data custodian (Biostatistician- Erik Biros) will be responsible for data storage consistent with the JCU *Code for the Responsible Conduct of Research.*

After the minimum period of storage, the data may be considered for disposal if there is a written request to the Evaluation Lead, from both the NACCHO and the PSA for the disposal of the data. As the raw unanalyzed data extracted by GHRANITE is owned by the ACCHSs, JCU will seek instruction from NACCHO and each ACCHS as to the ongoing use or destruction of this data. The Evaluation Lead will authorize the data custodian to delete the data if this is instructed by NACCHO, in accordance with the JCU *Code for the Responsible Conduct of Research.*

10.12 Data Dissemination

Data dissemination refers to knowledge transfer and communication regarding the project. Project partners have a responsibility to the project participants, funders, and the wider community to disseminate a full account of the process and findings of the study as broadly as possible. This account should be compete, and where applicable, include negative findings and results contrary to the clinical claims. Data dissemination activities will take account of any intellectual property restrictions and culturally sensitive data.

Project results will be presented at an aggregate level, exploring regional and/or jurisdictional level variations, as well as national findings. No participants or communities will be identifiable from any results that are publicly released.

10.12.1 Approval for the release of information

10.12.1.1 Approval from the Steering Committee

Subject to the contractual obligations in the Funding Agreement (A2. 1.2), the Australian Government Departments "prior written approval to any public disclosure of the results or findings" arising from this project is required. Accordingly, project partners will seek the approval of the Steering Committee for public disclosure of the results or findings of this project.

10.12.1.2 Approval of project partners

Project partners will seek each other's approval before requesting permission from the Steering Committee for the release of project related information. This may occur at Project Operational Team meetings or out-of-session through email and other forms of communication.

Approval of project partners will be assumed when no feedback to the request for approval is received in 14 days.

Subject to the contractual obligations in Annexure A (Supplementary Conditions) in the Funding Agreement (A2. 1.4), once research "is published (with the Australian Government Department's approval)," the partners "do not need to seek the Department's approval for further publication of that research".

The partners will not unreasonably withhold permission for the release of project related information.

10.12.1.3 Approval of ACCHSs and Affiliates
The approval of the Chief Executive Officer (CEO) of the relevant ACCHS will be sought for the release of any information that identifies that ACCHS (such as qualitative information as approved by the CEO).
The approval of the CEO of the relevant Affiliate will be sought for the release of any aggregated information that identifies the Affiliate and jurisdiction.
These representative bodies have the right to veto, refuse permission for publication, or suggest changes to the public release of information containing their aggregated data, if the information is considered sensitive.

The project partners will ensure representative bodies have sufficient time for the approval for release of public information. ACCHSs and Affiliates will be encouraged (where feasible) to participate in conference presentations where they occur in their locality.

10.12.2 To ACCHSs and Affiliates
Subject to conditions of approval for reporting, examples of knowledge transfer include:
- The Project Reference Group will be provided with updates on progress with the project and extracts of reports arising from the project.
- Summary results to individual ACCHSs (pertaining to their own data) may be provided upon request to the Project Operational Team if this is possible.
- Extracts of reports arising from this project will be summarized in plain language and disseminated according to usual NACCHO communication mechanisms, such as email, the *NACCHO News*, and NACCHO website, including communication with any relevant special interest groups supported by NACCHO.
- Presentations detailing progress and results will be communicated at NACCHO and/or Affiliate Conferences and Annual Meetings.

10.12.3 To Practice Pharmacists
Subject to conditions of approval for reporting, examples of knowledge transfer include:
- Extracts of reports arising from this project will be summarized and be provided to a support network - the *ACCHO Pharmacist Leadership Group* managed by NACCHO and the PSA.

10.12.4 To the general public
Subject to conditions of approval for reporting, examples of knowledge transfer include:
- Presentation at conferences and workshops
- Submission of journal articles for publication
- Opportunistic use of unpaid media, such as radio, television, and print media interviews
- Generation of media releases to communicate broad, national aggregated results.

10.12.5 To respective project partner organisations

Extracts of reports arising from this project, and full reports will be presented at NACCHO Board of Directors meetings, PSA meetings, and Evaluation Team, and relevant College of Medicine and Dentistry (JCU) meetings.

10.12.6 To the funding body (Australian Government Department of Health)

Reports prepared for the Australian Government Department of Health will be in accordance with the contractual obligations in the Funding Agreement.

10.13 Authorship

All authors of publications must meet the criteria for authorship, disclosure, scientific integrity, and other requirements of peer-reviewed scientific journals.[117] The *International Committee of Medical Journal Editors* (ICMJE) recommends that authorship be based on the following 4 criteria:

- Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
- Drafting the work or revising it critically for important intellectual content; AND
- Final approval of the version to be published; AND
- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Contributors who meet fewer than all 4 of the above criteria for authorship will not be listed as authors, but they will be acknowledged. These activities include: general supervision of a research group or general administrative support; and writing assistance, technical editing, language editing, and proofreading.

Authorship will be invited to all those who meet the criteria for authorship. The corresponding author will obtain written permission from authors who will be included as an author and from those individuals to be acknowledged.

11. Ethics approval and consent processes

11.1 Ethics approval

The Project Partners will seek ethics approval from four Human Research Ethics Committees (HREC):

- St Vincent's Public Hospital HREC *(participates in the National Mutual Acceptance of Human Research Ethics Applications- HREA, and also requires a Victorian Specific Module to be completed)*
- James Cook University HREC
- Menzies School of Health Research HREC
- Central Australian HREC

11.2 Tiers of consent

The project partners participant consent process respecting Aboriginal community control principles includes four tiers:

- Aboriginal collective consent at the national level through NACCHO (NACCHO is a project partner),
- NACCHO Affiliate consent at a jurisdictional level (Affiliates are project participants),
- local community collective consent from individual ACCHSs (services are project participants), and
- informed consent from individual patients being attended to by practice pharmacists (patients are project participants).

These tiers of consent are consistent with the NHMRC Values and Ethics Guidelines (2003) and WHO principles for CBPR involving Indigenous peoples (2003).[118]

11.3 Site Agreements, Site Consent, and Site Brief

Participation of each Affiliate and ACCHS will proceed through:

- A Site (Service) Agreement
- Written informed consent (Site Consent).

The Service Agreement will comprise a legal contractual agreement pertaining to the delivery of project support and funding for a project officer. It will be signed by each CEO of each participating ACCHS and Affiliate. The PSA will issue the Site Agreements with the assistance of NACCHO.

The Consent form (for Site Consent) outlines the conditions of participation as negotiated with each ACCHS site. It will be accompanied by a Site Participation Brief that includes a summary of the project, purpose and aims; data collection methods, data use, and other relevant issues pertaining to the participation of the ACCHS, as recommended by the NHMRC.

Data collection will not commence until these Agreements with Affiliates and each ACCHS project site have been agreed. This protocol includes a potential Site Consent Form (Appendix).

11.4 Site support

Each Affiliate that participates in the project will receive:

- Remuneration to participate in the project (see section 4.4). This can be used to employ a part-time project officer (or to back-fill existing staff).
- Involvement of nominated staff as members of the Evaluation Team in the project (see preamble to this Protocol).
- An opportunity to review project findings and provide feedback (see section 8).
- Customised reports specific to the jurisdiction (if requested).

Each ACCHS that participates in the project will receive:

- The services of an on-site accredited practice pharmacist (see section 6) for a 15-month duration.
- The opportunity to select their preferred practice pharmacist.
- A 'Needs Assessment' site visit to ascertain any specific needs of ACCHS. (see 13.3)
- A facilitated 'training' site visit to support and prepare the practice pharmacist within the primary healthcare team (see section 6).
- Resources to support the practice pharmacist, such as medication management guides.
- A supportive mentor for the practice pharmacist (see 6.7).
- Installation of the GRHANITE data extraction tool in the CIS and licence for its use for 15 months (see 8.1).
- Two site visits to explore Health Systems Assessment (see 8.8).
- A Health Systems Assessment Report for CQI use.
- Involvement of a nominated staff member to be a member of the Project Reference Group in the project (see Preamble to this Protocol).
- An opportunity to review project findings and provide feedback (see 13.1).
- Customised reports specific to the participating ACCHS (if requested).

11.5 Complaints mechanism for sites

A process for complaints about the project is outlined in section 10.10.

11.6 Withdrawal of site participation

ACCHSs and Affiliates that are participants reserve the right to withdraw their participation in the project in accordance with their service agreements. If an ACCHS site withdraws, the ACCHS will be asked to provide a written reason for the withdrawal, to the PSA (for the contract) and the Project Operational Team. The ACCHS will be asked whether they agree to the continued use of the data collected in this Project prior to their withdrawal of Site Consent.

The withdrawal of the Site from the project will mean the withdrawal of the site support specified in section 11.4.

The withdrawal of the Site will be reported to all relevant HRECs when the Project's annual report is due.

11.7 Individual consent

Individuals will only participate following their informed consent. Written consent will be sought from each individual who agrees to receive the services of the practice

pharmacist and be part of this Project. The information about the project will be provided in written and verbal formats. This will include a clear explanation as to what participation involves, and how the information arising from their participation will be used. It will not be possible to provide results that relate to a specific participant, as data collection will be completely deidentified.

Informed consent will include the provision of verbal and written information about the purpose and aims of the project, who is funding and running the project, what participation involves (including any risks and benefits), ownership and storage of information, use and release of information and confidentiality. This is in the form of a *Participant Information Brief.*

If the individual elects to participate they will be asked to indicate in writing their understanding of each piece of information, and sign their name to having:

(1) Understood the information provided, and asked any questions concerning this;

(2) Agree to have their deidentified health information extracted from the clinical information system and provided for the purposes of the evaluation;

(3) Agree to the information being stored, used and published; and

(4) Freely give consent to participate in this project.

The participant information sheet will refer to the use of deidentified data extraction from ACCHS clinical information systems. Data extraction will cover the 15-month duration of the project as well as the period 12 months prior to first pharmacist contact.

The draft Participant Consent Form, and Participant Information Brief is shown in the Appendix.

11.7.1 Process for seeking Individual consent

The process for seeking individual consent is shown in Figure 8. The proposed process for seeking individual client consent has been developed in consultation with NACCHO Affiliates on the Evaluation Team. The process respects the systems that ACCHSs may wish and choose to adopt.

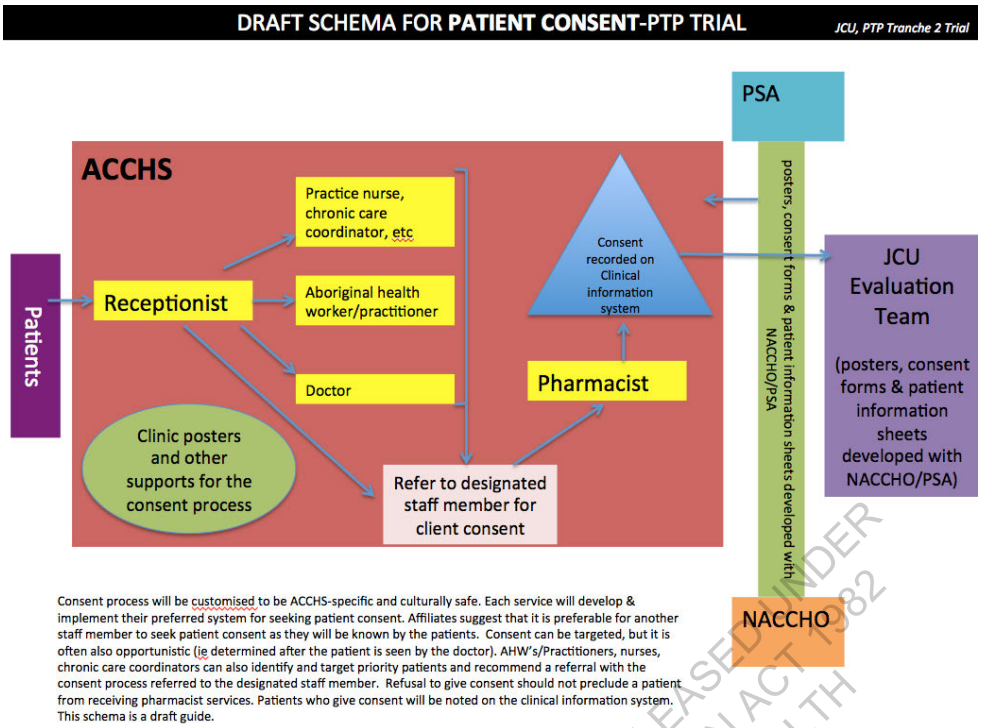
The process involves the practice pharmacist who will be trained to seek the participant's consent. Training for seeking participant consent will also be provided to other staff that may be designated by the ACCHS to seek the participant's consent for cultural appropriateness reasons.

This consent form will then be signed and dated by the patient, a witness, and the designated staff member seeking patient consent. The consent form will be stored in a locked briefcase by the practice pharmacist.

A written copy of the verbal information will be provided to the patient, including details to raise questions or complaints arising from participation in the project.

Consent will then be recorded on the clinical information system and GRHANITE will extract information only from consented patients.

Figure 8. Proposed process for seeking individual consent within ACCHSs



11.8 Individual consent for qualitative evaluation

Consent from patients/participants participating in the qualitative parts of the evaluation (see 8.10) will be obtained specific to this part of the evaluation. The qualitative evaluation will be undertaken during 2019.

Consent forms and information sheets will be developed for:

- Pharmacist interviews (case study visit and participants interviewed through webinars, skype, videoconferencing or phone contact)
- Focus-group participants (patients who are participants, Aboriginal Health Workers/Practitioners)
- Online survey with GPs within ACCHS sites
- Online survey with CEOs and Managers
- Online survey of community pharmacists.

HREC approval will be sought for this part of the project evaluation when these consent forms and Information Sheets are completed.

11.9 Individual withdrawal

Individual participants will also be informed at the time of consent, that if they choose to participate, they may withdraw at any stage without consequence. Individual participants reserve the right to withdraw their participation in the project at any stage. If an individual withdraws, they will be asked to provide a reason for the withdrawal. This discussion may be had with a designated staff member within the ACCHS or the practice pharmacist. The individual will be asked whether they agree to the continued use of the data collected prior to their withdrawal of their Consent.

All patients who wish to see the practice pharmacist will not have these services withheld if they refuse to participate in this Project. Aggregated information about

participants who withdrew their consent will be reported to all relevant HRECs when the Project's annual report is due.

12. Governance process

12.1 Memorandum of Understanding

Core principles, recitals and a commitment to communication between project partners (PSA, NACCHO and JCU) have been incorporated into a signed Memorandum of Understanding (MOU). See Appendix.

The project partners are committed to undertaking the Project as a community-based participatory research (CBPR) model. This is defined as:

> *"a partnership approach to research that equitably involves, for example, community members, organizational representatives, and researchers in all aspects of the research process and in which all partners contribute expertise and share decision making and ownership".*[119]

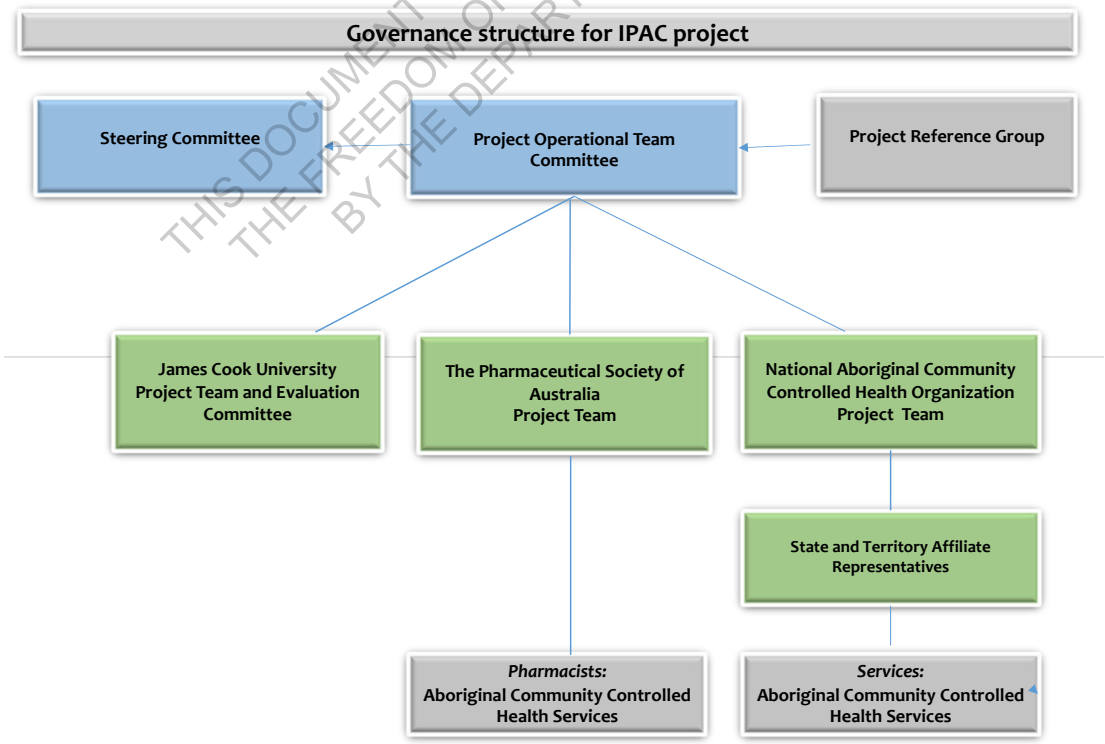
12.2 Project partners

An overview of the project partners, project leaders, staff and structures providing oversight in the project is shown as Figure 9.

The Chair of the Project Operational Team is the NACCHO Project Lead (NACCHO Deputy CEO, Ms Dawn Casey).

The Chair of the Project Reference Group will be a nominated member of the NACCHO Board of Directors.

Figure 9. Governance and partnership structure of the IPAC project



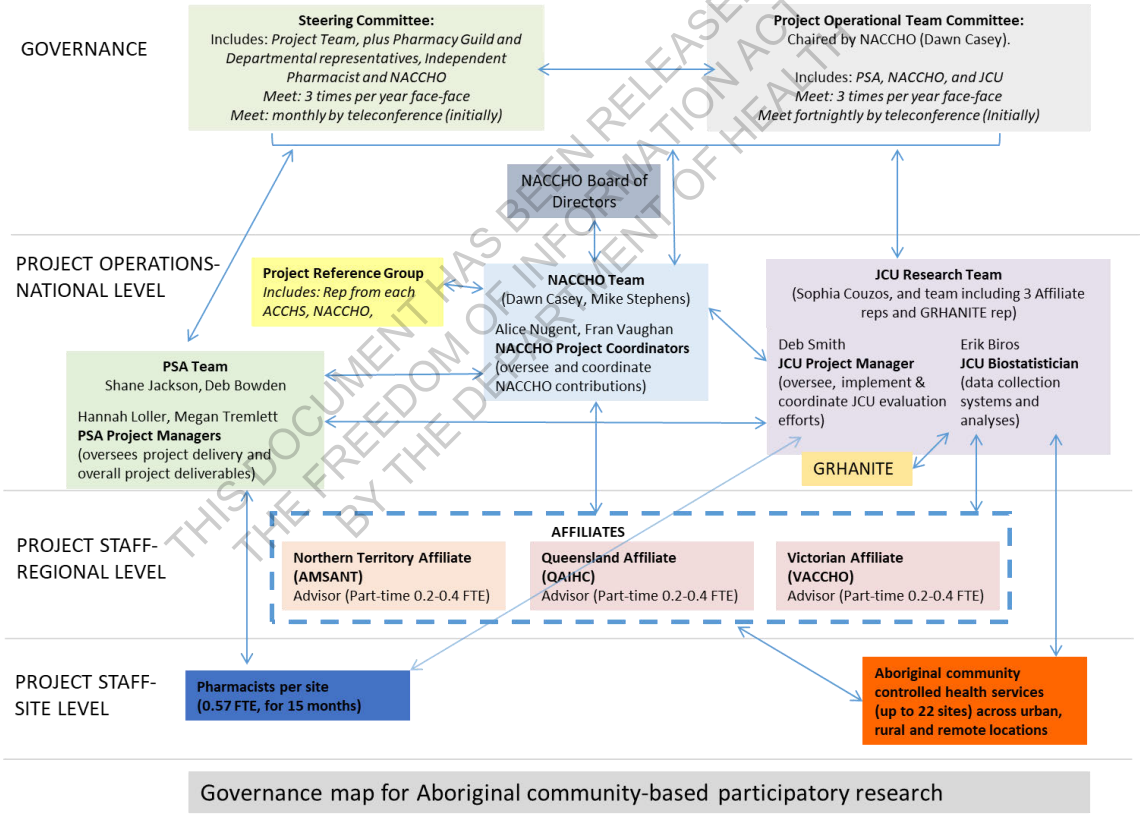
12.3 Governance map

The project teams, groups, and committees have been described in the Preamble to this Protocol and section 13.1.

The IPAC project governance process is consistent with ACCHS governance models. It respects the lines of authority for communication within the Aboriginal health service sector. The tripartite project staff will facilitate engagement between the evaluation team and sites using existing ACCHS sector networks such as through NACCHO and through Affiliates. Regular reports to Affiliates and the NACCHO Board leadership will occur through NACCHO personnel involvement in this project as co-investigators'.

The governance map for this project is shown in Figure 10.

Figure 10. Governance map for the IPAC project.



13. Communication systems

The IPAC Project Partners will respect the commitment for effective communication as agreed in the Memorandum of Understanding (*See Appendix*). Mechanisms of communication with the parties indicated in the project governance map (see 12.3) are outlined as follows:

13.1 Meetings and teleconferences

Phone and email communication will be the main mode for day-to-day communication between project partners, project staff and all committees. The committee meetings are summarised as follows:

- *Steering Committee:* face-face meetings as required, teleconference quarterly and final face-face meeting;
- *Project Operational Team:* face-face meetings as required, monthly teleconference meetings, and final face-face meeting;
- *Project Reference Group:* Meet at least quarterly by teleconference or other web-based platforms of communication;
- *Evaluation Team*: Meet as required, and face-face meetings as required during the evaluation phase of the project.

13.2 Communications with ACCHSs and Affiliates

All communications with ACCHSs will be coordinated through the NACCHO team, except if otherwise indicated (for example, if the ACCHS prefers direct contact with any other project partner).

The NACCHO Project Coordinator will be responsible for ensuring timely and effective communication between ACCHSs and other project parties including: the contractor (PSA), Evaluation Team, Affiliates, project partners and other project groups and committees referenced in 13.1. This position will involve liaising closely between ACCHSs and PSA in the development and signing of Site Agreements. The NACCHO Project Coordinator will visit each ACCHS on at least two occasions throughout the project and maintain regular communication with all sites throughout the establishment and implementation phases.

Affiliates are members of the Evaluation Team and will be contacted directly by the Project Partners.

NACCHO will provide support to practice pharmacists through the *NACCHO-PSA ACCHO Pharmacist Leadership Group* as referenced in section 4.4. This group meets via teleconference quarterly and as needed.

The PSA will communicate regularly with practice pharmacists during their placement within ACCHS by email and phone (see also 4.4, 6.6, and 6.7).

13.3 Site visits to ACCHSs

Most communication between project staff and project sites will occur using phone or email or web-based systems. In addition, ACCHSs will be visited at least three (3) times by project staff.

13.3.1 Site visit for on–site training of the practice pharmacist

The PSA Project Officer will provide a facilitated site visit to the ACCHS as required to assist with the orientation and preparation of the practice pharmacist. This visit may also need to be supported by the NACCHO Project Coordinator.

13.3.2 Baseline Health Systems Assessment visit with project initiation (0-3 month)

The NACCHO project coordinators will visit all sites to undertake a health systems assessment prior to or at the commencement of the practice pharmacist. This is to establish baseline health system characteristics of the service (see 8.8).

13.3.3 Needs Assessment site visits

The 'needs assessment' visit to the ACCHS will elicit the type of support needed by the ACCHS so that the practice pharmacist may best be integrated within the service. The visit will also assist the ACCHS to establish their preferred system to seek patient consent, and ensure the pharmacist can use the CIS, has a space to consult with patients, and the CIS is set to accept the 'job-role' for the pharmacist (this is necessary for the GRHANITE data extraction).

This visit may occur at the same time as the baseline Health Systems Assessment visit. The NACCHO Project Coordinator will visit sites (with the assistance of Affiliates) for the needs assessment and ascertain if any further supports to the ACCHS may be needed.

At the time of this visit, the NACCHO Project Coordinator will make contact with a nominated ACCHS staff member who will act as a 'go to' person. A second 'go to' person may need to be identified by the ACCHS and Coordinator as contingency for leave, resignation or movement between clinics or roles.

The NACCHO Project Coordinator will liaise directly with the nominated 'go to' person/s and relevant ACCHS staff to develop a project consent pathway and process that is consistent with the Draft Schema for Patient Consent (see 11.7 and Figure 8) and is also responsive to the local ACCHS' model of care.

A template poster aimed at clients for distribution and use within the ACCHSs' clinics and community will be provided by NACCHO (See Appendix).

The NACCHO Project Coordinator will work with each ACCHS to ensure that the service has adequate promotional material and strategies to engage both ACCHS staff and clients. (See also section 13.4 and *health service inclusion criteria- see 4.2.1*).

13.3.4 Repeat Health Systems Assessment visit (12-15 month)

The NACCHO project coordinators will undertake a repeat health systems assessment at the near conclusion of the tenure of the practice pharmacist in order to document changes in health systems.

13.3.5 An ACCHS may request an additional site visit

If there is a need to resolve any concerns or difficulties that arise from participation in the Project, and where it is not possible (or preferable) to address these concerns remotely, the most appropriate project officer may conduct this site visit.

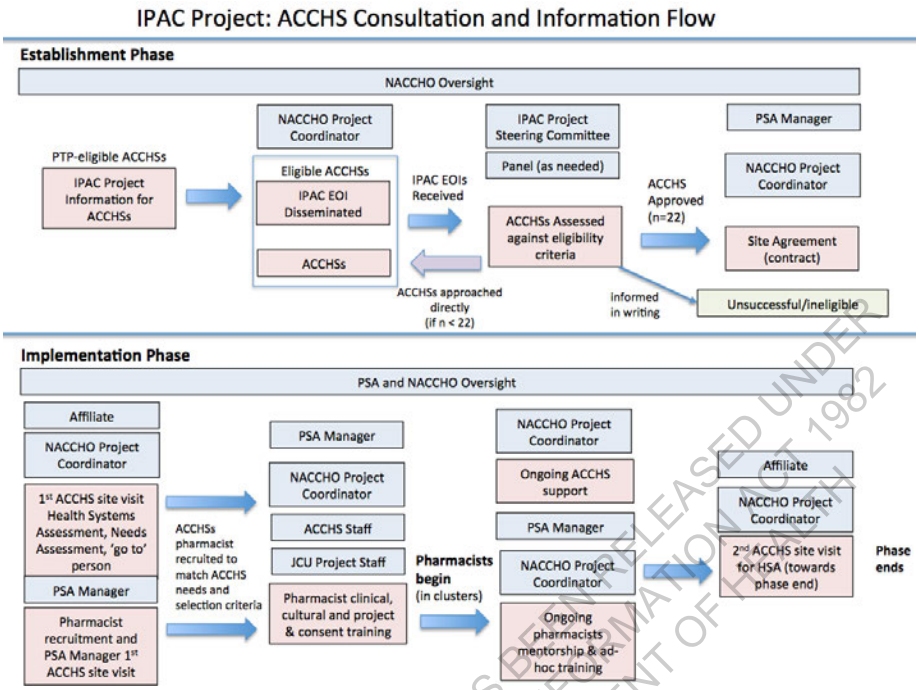
13.3.6 Site visit for qualitative data collection

Three (3) participant ACCHSs will be invited to act as case study sites for a qualitative evaluation of the integrated role of the practice pharmacist. (see section 8.10)

13.4 ACCHS site visit and information flow map by project phase

A map of the site visits to ACCHSs showing the process for site selection, support and project oversight is shown in Figure 11.

Figure 11. ACCHSs site visit and information flow map by project phase



13.4 Newsletters

A newsletter will be developed for participating ACCHSs and Affiliates for the purpose of updating progress with the Project, and communicating any results (subject to approval processes- see 10.12).

The newsletter will be distributed to participant sites using usual NACCHO lines of communication. If there is interest in more broader member communication, and subject to approval, NACCHO may communicate with members more broadly. Communication through public release of reports and other use of media have been described elsewhere (see 10.12).

14. Benefits, feasibility, acceptability and generalisability

14.1 Expected benefits from the project

This project has the potential to deliver:

- better medication management to improve medication adherence, enhance quality prescribing and deprescribing (reducing risks with polypharmacy and potentially harm from adverse drug reactions arising from inappropriate medicines);
- improved quality of care outcomes for chronic disease (which by inference can avoid or reduce unnecessary hospital admissions);
- early interventions for health promotion/disease prevention and any required social support systems;
- improved continuity of care between hospital and home and between GPs and specialists (inferred from patient interview and qualitative studies in this project);
- improvements in the patient experience; and
- address gaps in service delivery though a more integrated workforce operating within their scope of practice.

14.1.1 Expected benefits to individual participants and other patients

Aboriginal and Torres Strait Islander patients of ACCHSs attended to by the accredited practice pharmacist serve to benefit from the interaction. They will benefit because this project will facilitate their immediate access to an on-site pharmacist.

This on-site and timely access to the healthcare skills of a pharmacist is consistent with the ACCHS model of care. The staff with ACCHSs deliver opportunistic, holistic, culturally appropriate, and comprehensive primary health care services to Aboriginal peoples and Torres Strait Islanders. This model of care has been called a 'one stop shop'. It is this model of care that delivers the best health outcomes for peoples who are marginalised and have poorer access to primary health care than other Australians.[120]

Patients will receive tailored and appropriate medication reviews to optimise their use of medicines. A review of medications will lead to improved prescribing by clinicians, and improvements in access to and interactions with community pharmacy. The patient's medications can be checked in the home (called home medications reviews or HMRs) or places like the clinic (called 'non-HMRs'). The pharmacist will assess if the patient has difficulty taking their medicines (a check for medication adherence) and depending on the barriers identified, the pharmacist with provide tailored personal supports plus link with other members of the primary healthcare team.

Patients seen by the practice pharmacist will be followed up to check on progress and to provide on-going support.

14.1.2 Expected benefits to ACCHSs

This project may significantly benefit the ACCHS sector by providing the evidence-base to better support quality use of medicines through integrated care models. Having

a culturally responsive pharmacist integrated into ACCHSs will facilitate building of relationship and trust between pharmacists and patients, ACCHS staff and the community.

The project may:

1. Benefit ACCHSs in the short-term by enhancing their medicines-related workforce capacity through the employment of practice pharmacists within the primary healthcare team for 15 months. The ACCHS sector have been advocating for such a workforce for many years. Practice pharmacist appointments will be non-dispensing, and registered to work within their scope of practice. The appointments will include salary, training, and the provision of supportive resources.
2. Benefit ACCHSs in the short-term by enhancing their medications-related, preventive care and chronic disease care-related service claims through Medicare.
3. Benefit the clinic staff within the ACCHS as the practice pharmacist can support other staff with quality prescribing and medicines use, though adhoc medication advice, as well as more intensive education and training sessions.
4. Benefit the ACCHS by improving the quality use of medicines within the ACCHS by enabling a quality improvement activity called a 'drug utilisation review'.
5. Benefit the ACCHS by improving the relationship with community pharmacies in the local area. This may help pharmacies to provide more appropriate services to the local community.
6. Benefit the relationship the ACCHS has with local hospitals and other care providers by improving communication between care providers when it pertains to the medicines that patients are taking.
7. Benefit all ACCHSs in the long-term as the project aim is to develop a sustainable model of pharmacist service within ACCHSs anywhere in Australia. The project will provide the Australian Government with the evidence-base (biomedical, process, and economic evaluations) for the development of national health policies to potentially support on-going resourcing for practice pharmacists integrated within ACCHSs. This is consistent with the purpose of the Australian Government PTP Tranche 2 funding. This is also consistent with NACCHO Board of Directors recommendation for the development of this project from March 2016.

14.1.3 Expected benefits to the Australian healthcare system

Healthcare reform is a key priority for the Australian Government looking for ways to improve productivity and ensure the triple aim of: clinically effective healthcare, improved patient experience, and cost-effectiveness. The Government of Western Australia Department of Health refer to this as: 'better health, better health care, and better value'.[121]

This project provides the evidence-base for an integrated care model to improve the quality use of medicines within settings that target Aboriginal peoples and Torres Strait Islanders. This Project will provide evidence of biomedical, qualitative, and economic outcomes arising from the integration of a practice pharmacist within ACCHSs targeting Aboriginal and/or Torres Strait Islander patients with chronic disease.

The Project will provide a potential framework for workforce reform into the future. The findings will be used by the *Medical Services Advisory Committee (MSAC)* to develop submissions to the Australian Government for potential funding of practice pharmacists in primary health care settings in the future. The MSAC is an independent non-statutory committee established by the Australian Government Minister for Health to appraise proposals for public funding, and advise on whether a new service should be publicly funded.

The findings of the study may inform priorities for Health Care Home (HCH) sites. Optimising the quality of care for patients with chronic disease is a key objective of HCHs. Blended payments through the HCH model to facilitate improvements in chronic disease care may also provide a funding stream for integrated practice pharmacist roles in sites that opt-in to the HCH financing model.

The project may assist Primary Health Networks with implementation and workforce financing decisions within network boundaries. PHNs have an important role in supporting CQI within their boundaries, and in particular, focusing on enhancing health outcomes for the Aboriginal and Torres Strait Islander population in partnership with ACCHSs.[122] Workforce investments that enhance quality of care outcomes for patients with chronic disease are very important to PHNs. See also section 11.2 (generalizability).

14.2 Feasibility and acceptability

The project has been designed to be acceptable and feasible to ACCHSs, health staff within those services, the Aboriginal governing structures of those services (Chief Executive Officers and Directors of Boards), and practice pharmacists. This is evident though the community-based participatory research design, and the pre-post pragmatic approach to the evaluation (see 7.1, 7.2).

The governance structure outlines the process to ensure support to, and the participation of ACCHSs (see 12.3). The project is built around the existing professional networks with ACCHSs and with Affiliates and NACCHO. The project remunerates Affiliates for the support they provide in this project. Members of the Evaluation Team also have extensive experience in CBPR methods and experience working with ACCHSs. NACCHO and Affiliates have provided letters of support for the project (see Appendix).

The project supports ACCHSs to integrate practice pharmacists within the primary health care team, and to improve the patient journey, with education, learning resources and other products created by practice pharmacists, and stakeholder relationships with community pharmacy to benefit ACCHSs and to continue to have relevance to ACCHSs even after the project.

The collection of data using a data extraction tool from CIS is consistent with data collected by ACCHSs when undertaking core CQI activity (see 8.1).

14.3 Generalisability

The project will produce generalizable knowledge applicable to other ACCHSs, Aboriginal health services delivered by State and Territory Governments, and private general practices providing services to Aboriginal and Torres Strait Islander peoples. Beneficial outcomes of the trial may ensure that all ACCHSs can benefit into the future and not just those participating. The acceptability of the intervention to Aboriginal and

Torres Strait Islander peoples across 22 ACCHS sites suggests the intervention would be acceptable and implementable in other services across Australia.

The generalisability of trial outcomes is supported by a methodology accounting for variability in the intervention (practice pharmacist activities), integrated within health services delivering 'usual care', and data collection mechanisms adapted to minimise disruption of services (real-life and pragmatic).

15. Potential dependencies, limitations and mitigation strategies

15.1 Potential dependencies

ACCHSs may develop a dependency on the skills and contribution of the practice pharmacist that will not be able to be remunerated from this project beyond the 15-month implementation phase.

However, when the project concludes, ACCHSs will be empowered to fill these positions with identified roles, as this becomes feasible for each service. The cost-effectiveness analysis and Medicare utilization outcomes from the project may inform ACCHSs on the potential returns of financing models.

In addition, relationships with community pharmacies may be enhanced from this project, ensuring continuity of service provision in a particular or similar form.

Many of the proposed benefits of this project (see section 14) to ACCHSs will continue beyond this project. The long-term benefits to ACCHSs are dependent on the development of future financing models by the Australian Government for practice pharmacists within ACCHSs, which this project may enable.

15.2 Study limitations and mitigation strategies

A summary of potential study limitations and mitigating strategies are included in Table 13.

Table 13. **Summary of potential study limitations and mitigating strategies**

Data	**Potential limitations**	**Mitigating strategies**
Recruitment of ACCHSs into the project	Under-recruitment of ACCHSs to the project	This is unlikely. ACCHSs have been very supportive of this project, and representatives from NACCHO Affiliates are project participants. Site eligibility criteria have been devised to be consistent with the majority of ACCHSs (particularly in Qld and Victoria). If under-recruitment occurs, the project site eligibility criteria will be reviewed.
Recruitment of patients	Under-recruitment of patients to the project	There may be a risk that patients will not consent to be participants in this project in view of their right to access pharmacists services regardless of participation. Affiliates have indicated that patients are likely to consent, in view of the trust they place in the ACCHS. In order to minimise the risk of patients declining to participate in this project, promotional material will be developed by NACCHO and the ACCHS to provide supportive information to patients attending the practice. A culturally appropriate process for seeking consent has also been outlined. See Figure 8 of

		the Protocol.
Recruitment of practice pharmacists	Under-recruitment of pharmacists to the project, and delays in recruitment	This is unlikely given the lead agency in the trial is the PSA. There are a substantial number of pharmacists who have already registered their interest in appointments within ACCHSs including in remote locations. If under-recruitment occurs, sharing of roles between ACCHSs of close proximity is an option. The staggered recruitment of sites enables more time for pharmacist recruitment. Analysis of staggered data collection will take into account recruitment delays.
Quality of care measures	Patients within ACCHSs may not consent for CIS data extraction for the project	Patients already provide permission for ACCHSs to interrogate CIS data for the purposes of CQI activity within ACCHSs and to share de-identified data for analysis with Affiliates. The Participant consent forms and Information Brief provides detail on how extracted data is completely de-identified. The proposed flexible schema for seeking patient consent ensures this process can be optimised to best suit ACCHS systems. GRHANITE will extract data weekly, so the Project Operational Team can monitor this outcome. The Project Reference Group will advise on mitigation strategies if necessary. The group may recommend the development of promotional materials to encourage patient participation. Draft materials are currently under development.
	CIS data may be unreliable	Site inclusion criteria specify that ACCHSs must have been participating in CQI activity using data extraction tools for at least 24 months. The AIHW have been collecting extracted data from CIS from ACCHSs and reporting to the Australian Government since 2012-13. ACCHSs are familiar with the nKPI reporting system, having improved their systems and processes over the years. Several AIHW and independent analyses have confirmed that high performing services are identified by the duration of CQI reporting.[123] [124] [125] An independent review of ACCHSs CQI data quality commissioned by the Australian Government Department of Health found in 2015 that the data set is of high quality and fidelity, and confirmed the value of publishing and disseminating the findings in AIHW reports. It did not find any evidence of system-wide technical problems affecting

		nKPI data quality.[126] A further independent review in 2017 confirmed data validation of nKPIs from ACCHSs CIS's – Medical Director and Communicare.[127] An independent review in 2013 explored the validity of pathology data from CISs using a DET and found that it accurately extracted data.[128]
	Patient inclusion criteria refer to regular patients. This may underestimate the impact of the intervention as outcomes may be evident for non-regular patients who are seen during the project period.	The ACCHSs will target regular patients with chronic disease and polypharmacy, but any other patient who consents will be a participant in the project. The study measures extracted from the CIS will inform if the participants are regular (active) or not. This is appropriate to explore the variability in types of interventions provided to patients, as well as covariates about patients. The inclusion of secondary outcome measures such as medication adherence and MAI will also specifically refer to the impact on participants. Provided the follow-up occurs, whether a participant is regular or not won't impact on outcomes related to this assessment. Variations in the characteristics of regular patients will be compared across ACCHSs (there may be differences in remote versus urban populations).
	Unrandomised patient selection for medication review (patients will be referred from health workers and doctors)	Being unrandomised means that referrals to the practice pharmacists from doctors or other healthcare staff might lead to patient selection bias (such as patients who are more health literate). This project will assess the characteristics of the patients that benefit the most. However, because this project is conducted within ACCHSs, and ACCHSs provide support to the most needy people in the community, the degree to which certain patients above others are selected may be minimised. It is anticipated that health staff would act on the recommendations of the practice pharmacist.

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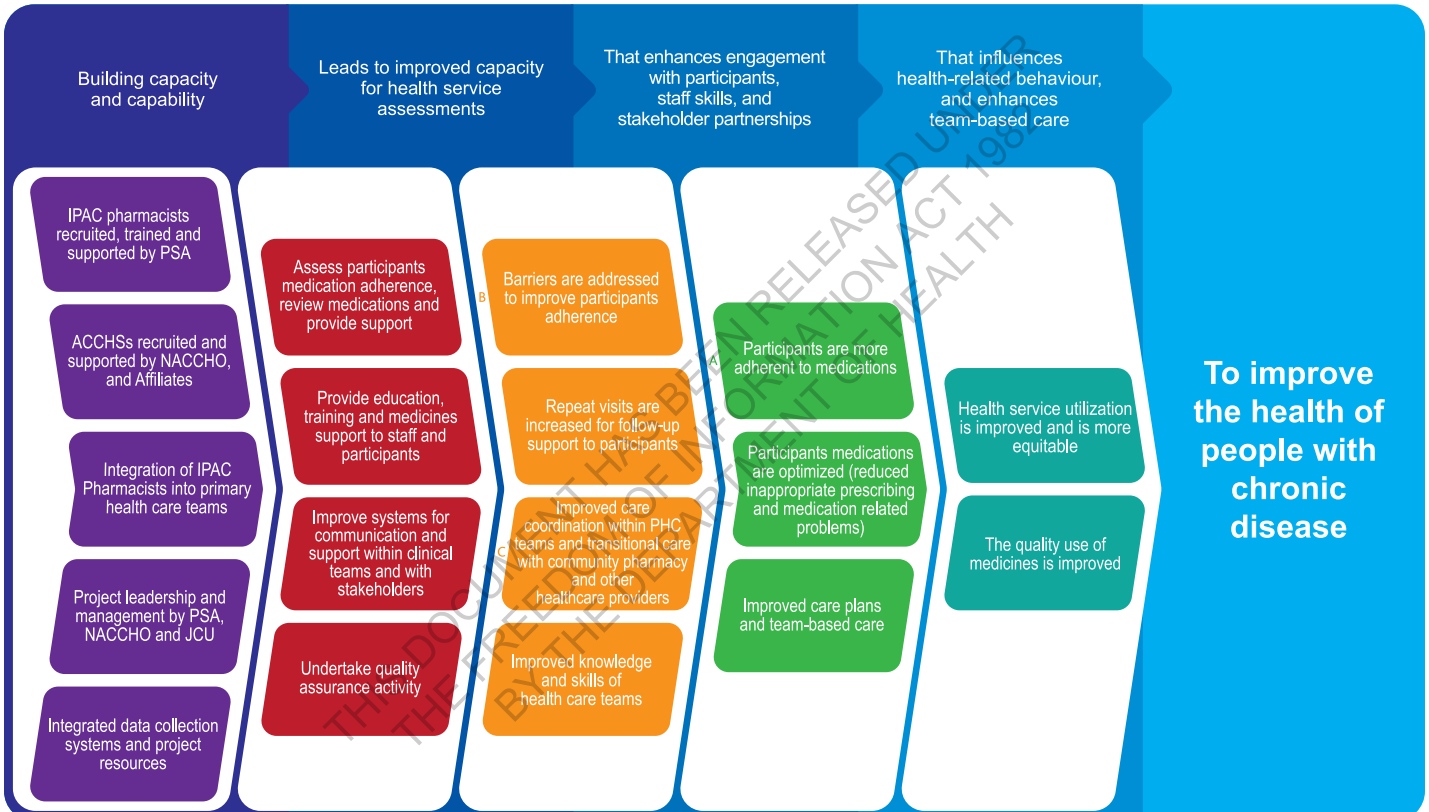
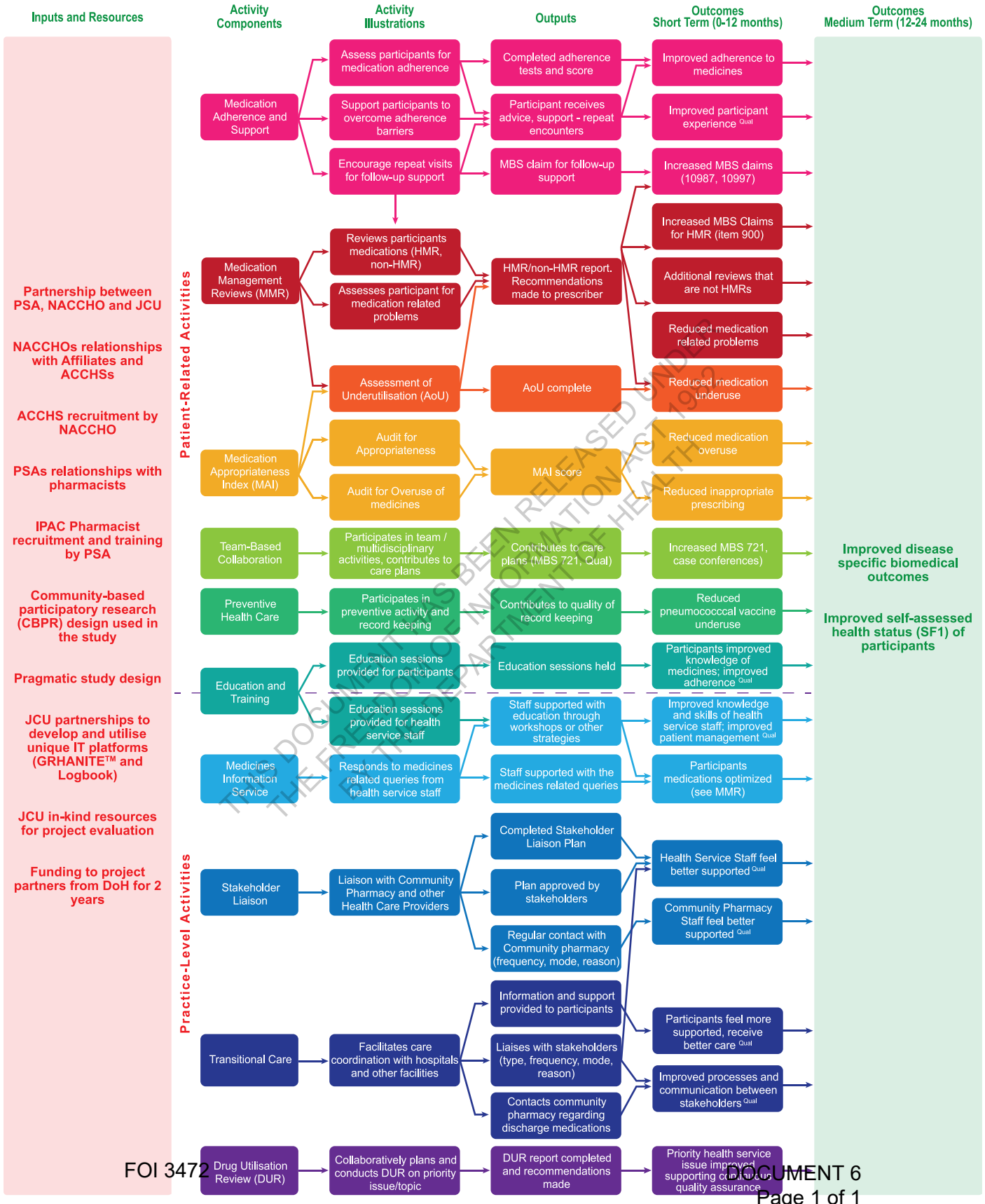
IPAC Theory of Change



Assumptions:
A: Prescribers are supportive and receptive to pharmacists recommendations.
B: Patient's and the healthcare team are able to overcome the range of barriers to adherence- many of which are outside the control of the patient and healthcare team.
C: Community Pharmacy has the capacity and is sufficiently engaged to support change.

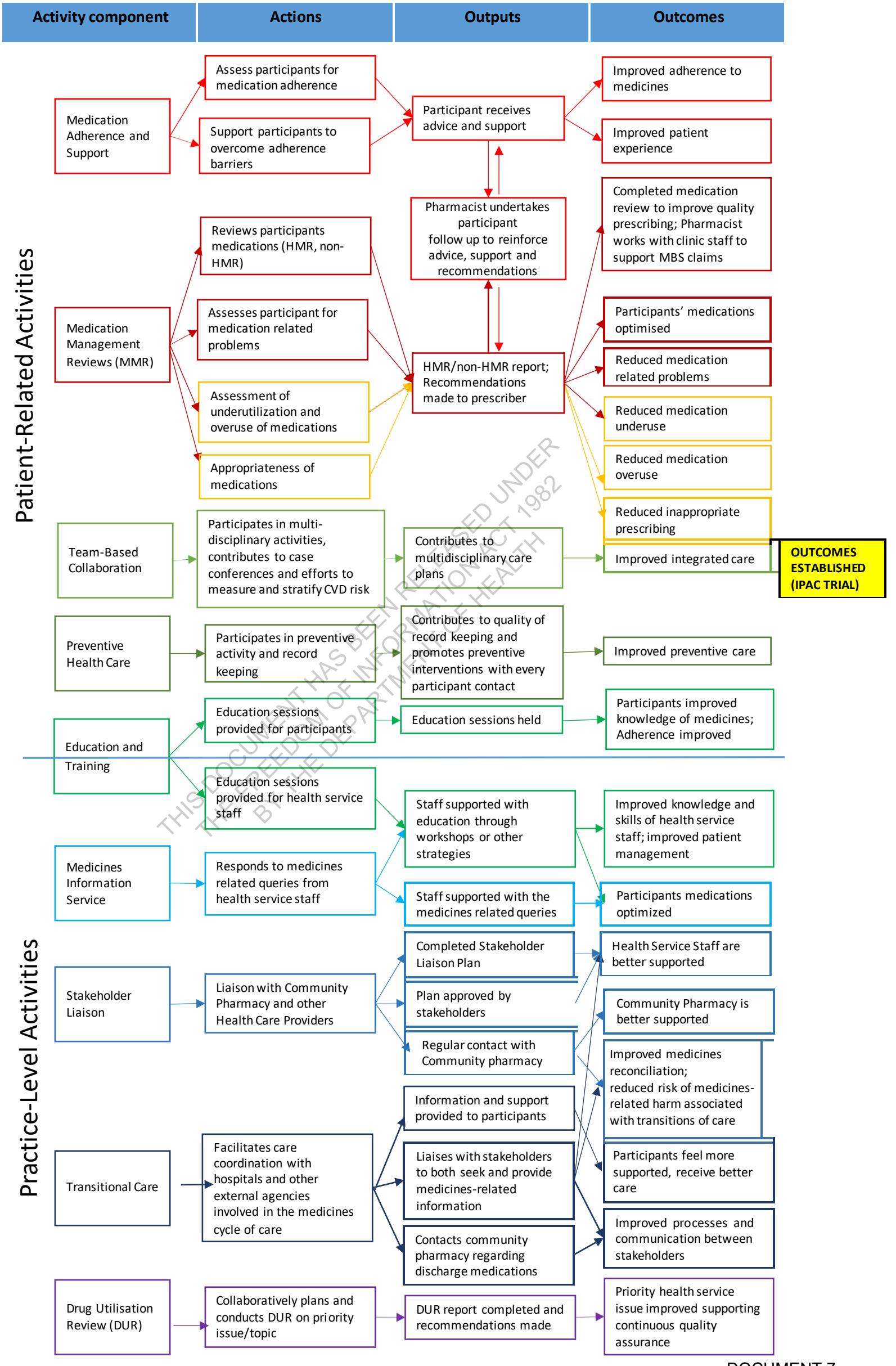
IPAC Project - Logic Model for Evaluation



(NACCHO – National Aboriginal Community Controlled Health Service; PSA – Pharmaceutical Society of Australia; JCU – James Cook University)

Version: 22/03/2019

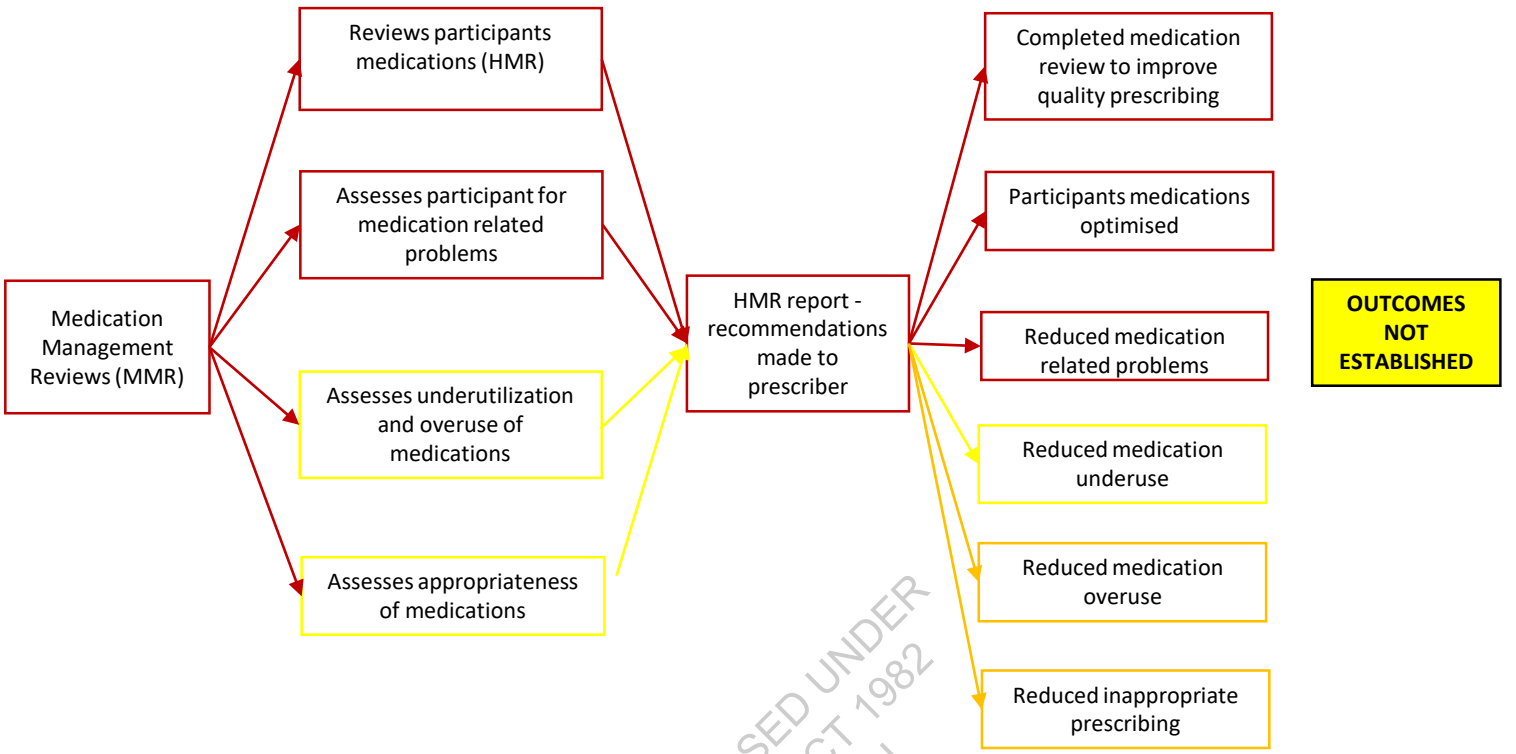
Algorithm 1 - Proposed Medical Service (Integrated pharmacist within ACCHS)



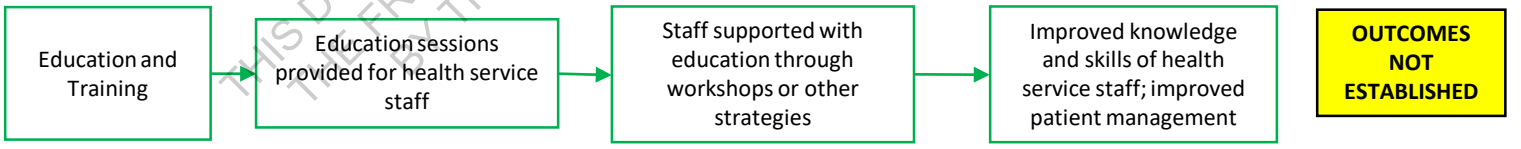
Algorithm 2 - Main comparator
(No integrated pharmacist within ACCHS)

Activity Component	Actions	Outputs	Outcomes

Patient-Related Activities



Practice-Level Activities



Acknowledgment of ongoing Community Pharmacy contribution to clinical management for both Main Comparator & Proposed Medical Service

Patient-Level Activities

- Delivered from within community pharmacy at point of dispensing: medication counselling, assistance with medicines adherence (DAA's, identification of non-collection or drug-seeking behavior), MedsChecks, assessment of medicine appropriateness within known parameters, adverse drug reaction monitoring
- Delivered by community pharmacy during Section 100 Pharmacy Support site visits to remote clinics: medication counselling, assistance with medicines adherence, assessment of medicines appropriateness . This is limited by funding constraints & program rules of Section 100 Pharmacy Support Allowance.

Practice-Level Activities

- Delivered from within ACCHS but limited by funding constraints & program rules of QUMAX & Section 100 Pharmacy Support Allowance: assistance with medicines storage & expiry, audits of DAAs vs medication charts, cold chain maintenance, compliance with controlled and restricted drug regulations, imprest management & ordering processes, access to QUM devices, procedures for medicine supply/dispensing & record keeping, staff education & training
- Delivery from within community Pharmacy: medicines information enquiries, provision of medicines-related resources for staff, medicines reconciliation at patient transitions of care, transport support

LITERATURE REVIEW OF THE COST-EFFECTIVENESS OF NON-DISPENSING PHARMACIST SERVICES INTEGRATED WITHIN PRIMARY HEALTH CARE

REPORT TO THE PHARMACEUTICAL SOCIETY OF AUSTRALIA FOR THE IPAC PROJECT

Final Report, February 2020.

Prepared by: Johnstone K, Smith D, Couzos S. College of Medicine and Dentistry, James Cook University, on behalf of the IPAC Project Team.

LITERATURE REVIEW OF THE COST-EFFECTIVENESS OF NON-DISPENSING PHARMACIST SERVICES INTEGRATED WITHIN PRIMARY HEALTH CARE

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AIM

The *Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC)* project will investigate the impact of including a non-dispensing practice pharmacist in the primary health care team within Aboriginal Community Controlled Health Services (ACCHSs). The project employed a pragmatic, non-randomized design and will evaluate impact in terms of quality of care received by Aboriginal and Torres Strait Islander peoples. An economic evaluation to determine the cost-effectiveness of the intervention relative to usual care will be conducted. This literature review aimed to identify published literature on cost-effectiveness studies for the same or similar pharmacist interventions in the primary health care setting.

METHODS

Bibliographic database search

A systematic literature review of published literature available in online bibliographic databases was conducted. A senior librarian at James Cook University guided development of the initial search strategy. Medline, CINAHL and Emcare databases were searched using variations of the core terms "primary health care", "indigenous health services", "pharmacist" and "cost-effectiveness". The search terms were applied in combination (("primary health care" OR "indigenous health services") AND "pharmacist" AND "cost-effectiveness")) and resulting relevant articles were reviewed for any other MeSH search terms or key words that could be added to the search strategy. The amended search strategy was applied again, and the cycle was repeated until no further relevant, additional search terms were identified.

The final search (Appendix 1) was conducted and all resulting articles were downloaded to the EndNote software bibliographic management program. Duplicate titles were removed. The titles and abstracts of remaining articles were screened for relevance to the aim of the literature review and removed from the EndNote library as appropriate. The reference lists of relevant literature review articles identified from the search were checked for any citations that warranted further investigation.

Articles were excluded from further review based on the following exclusion criteria: article other than a journal article or report, study protocol, study intervention that was set within a hospital or involved specialist physicians, the intervention involved community pharmacists without specified collaboration with general practitioners (GPs), the intervention involved a team-based approach where pharmacist involvement was not explicit, the study did not include a cost-effectiveness analysis, or the full text was unavailable online or written in a language other than English. The full text of the remaining articles were reviewed for relevance resulting in a final set of articles for inclusion in the literature review. The reference lists of articles included in this review were also checked for any further relevant citations and these were included in the review as appropriate. Information about the intervention, study design, outcome measures, participants and cost analysis was extracted from articles to be included in this review.

General internet search

A search of the internet was also conducted to identify reports on cost-effectiveness analyses on relevant interventions that had not been published in the academic literature. The search was restricted to interventions within Australia that involved integration of a clinical pharmacist into general practice. Search terms were a combination of the core terms "general practice" and "pharmacist". Websites of relevant key health profession bodies were also searched.

RESULTS

Bibliographic database search

A total of 2,067 articles were retrieved and downloaded to EndNote on 5th April 2019 (Figure 1). The search was not restricted to a specific start date. A further 10 articles were identified through searches of reference lists. Duplicate articles were removed (n=287) and the remaining titles and abstracts were examined for relevance to the aim of this review. Eighty-six articles were reviewed in full.

Thirteen cost-effectiveness studies, set in primary health care and with similar interventions to the IPAC intervention, were identified for inclusion in this review (Table 1 and Table 2). Only one study was conducted in Australia with the remaining studies conducted in the United States (n=5), England (n=3), Norway (n=1), Ireland (n=1), Spain (n=1) and Brazil (n=1).

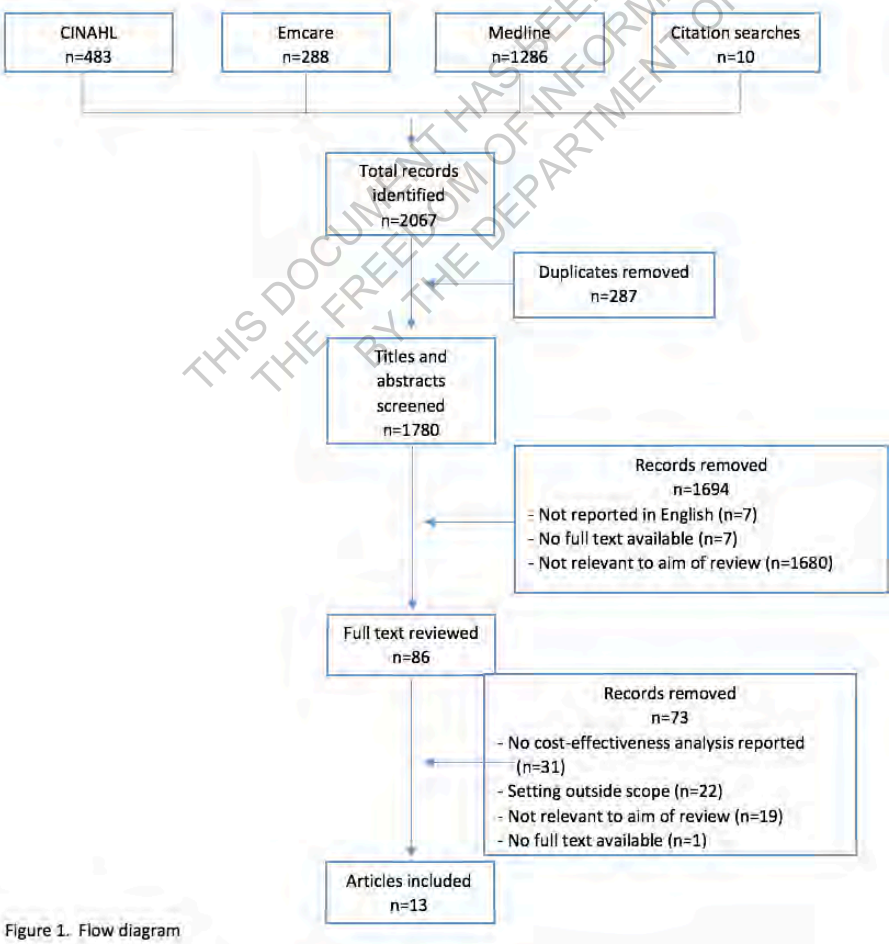

Figure 1. Flow diagram

The literature search did not reveal any cost-effectiveness studies for interventions involving a pharmacist integrated within primary health care services such as ACCHSs in Australia. Furthermore, there were no cost-effectiveness studies from any other country reporting interventions involving clinical pharmacist services to Indigenous peoples through Indigenous health services or any other type of primary health care service. Only one study, set in the United States, commented on the participation of minority populations.

Given the lack of cost-effectiveness studies that were directly relevant to the IPAC project, cost-effectiveness studies included in this review were selected to have a broader focus in general practice or other primary health care settings and involving collaborative care between a pharmacist and a general practitioner (GP).

Pharmacist integration

All studies included in this review were randomised controlled trials that aimed to influence prescribing behaviour of physicians and medication use by patients through a collaborative approach to medication management involving a pharmacist. Comprehensive collaboration between pharmacists and physicians, similar to the IPAC project, was evident in most studies however some interventions did not explicitly describe patient-pharmacist collaboration. These studies appeared to involve pharmacists providing education to, and collaborating with, physicians only (Fretheim et al, 2006; Gillespie et al, 2017; Lopez-Picazo et al, 2011). For instance, Gillespie and others' (2017) study involved a research pharmacist to identify potentially inappropriate prescriptions (PIPs) and a pharmacist to provide academic detailing to a physician, with no further involvement of a pharmacist.

Only two studies explicitly mentioned co-location of the pharmacist within the primary health care facility, but it was not clear if the pharmacists were co-located solely for the purposes of the intervention or if they were existing staff at the facility (Kulchaitanaroaj et al, 2012; 2017). The remaining studies involved community pharmacists, clinical pharmacists or research pharmacists and again it was unclear if they were co-located at the primary health care facility for the intervention period.

Patients that were targeted

The interventions targeted a range of patient characteristics broadly described as patients at risk of drug mismanagement, patients with certain health conditions and patients taking certain medications or a certain amount of medications.

Specifically, studies targeted patients at risk of medication error or inadequate blood monitoring (Avery et al, 2012; Elliot et al, 2014), drugs interaction (Lopez-Picazo et al, 2011) or medication misadventure (Sorensen et al, 2004). Patients with hypertension or diabetes were the focus of some studies (Kulchaitanaroaj et al, 2014; 2017; Polgreen et al, 2015; Obreli-Neto et al, 2015; Simpson et al, 2015). Other studies targeted patients with polypharmacy (Bojke et al, 2010; Cowper et al, 1998), patients with PIPs (Gillespie et al, 2017) and patients starting a specific medication for hypertension (Fretheim et al, 2006). Some studies were also focused on patients aged over 60 years (Bojke et al, 2010; Cowper et al, 1998; Gillespie et al, 2017; Obreli-Neto et al, 2015).

Outcomes and costs that were investigated
Across the studies, the cost-effectiveness of interventions was demonstrated through a wide variety of outcome measures. Some studies measured change in prescribing patterns due to the intervention, as follows: cost per additional medication error avoided (Avery et al, 2012); cost per unit change in Medication Appropriateness Index (MAI; Cowper et al, 1998); cost per PIP avoided (Gillespie et al, 2017); cost per additional patient started on the drug of choice (Fretheim et al, 2006); cost to reduce mean drugs interaction by 1% (Lopez-Picazo et al, 2011); and, cost to reduce adverse drug interactions (Sorenson et al, 2004).

Other studies measured change in clinical parameters due to the intervention, as follows: cost per additional patient to achieve blood pressure control (Kulchaitanaroaj et al, 2012); cost to lower blood pressure by 1mmHg (Polgreen et al, 2015); cost to reduce annualized cardiovascular risk by 1% (Simpson et al, 2015); and, cost to improve severity of illness (Sorenson et al, 2004). Cost utility studies evaluated effectiveness of interventions in relation to quantity and quality of life, and measured cost per additional Quality Adjusted Life Year gained (QALY; Bojke et al, 2010; Elliot et al, 2014; Gillespie et al, 2017; Kulchaitanaroaj et al, 2017; Obreli-Neto et al, 2015).

The types of costs captured in the studies varied with some studies capturing costs of control and intervention groups, and others using costs related to the intervention only. The sources for costs of health providers' time were captured through a combination of methods and included logbook recordings and estimation using hourly rates, annual salary or health system billing information. The cost of medications, laboratory tests and patients' health service utilisation were commonly included in analyses and these were sourced using patient records and questionnaires. Other costs included travel, administration and materials.

Cost-effectiveness
Table 2 outlines the findings of the 13 studies included in this review. Overall, the interpretation and reporting of the cost-effectiveness of interventions varied across the studies. Two interventions were considered cost-effective as the incremental cost per additional unit of health gained was within the willingness-to-pay threshold, from the perspective of the health system or society (Elliot et al., 2014; Simpson et al., 2015).

Some studies reported the probability that an intervention was cost-effective if the decision-maker's willingness-to-pay reached a certain level (Avery et al., 2012; Gillepsie et al., 2017), or reported the probability that the intervention was cost-effective at a defined threshold (Bojke et al., 2010; Gillepsie et al., 2017).

The remaining studies did not report a willingness-to-pay threshold, and instead compared the cost-effectiveness ratio with other studies or made general conclusions about the cost savings due to the intervention in relation to observed health outcomes (Cowper et al, 1998; Fretheim et al., 2006; Kulchaitanaroaj et al., 2017; Lopez-Picazo et al., 2011; Obreli-Neto et al., 2015; Polgreen et al., 2015; Sorensen et al., 2004).

The majority of studies noted that the sustained effects of the intervention may not have been captured within the analysis but would be important in future decisions about implementing the intervention.

General internet search

The general search of the internet identified some pharmacist and general practice collaborative programs associated with the Primary Health Networks (PHN) in Australia. Western Sydney PHN (WentWest), together with University of Technology Sydney, implemented the General Practice Pharmacist Project in March 2016 (Benson, Williams & Benrimoj, 2017; PHN Western Sydney, 2018). This program involved a non-dispensing pharmacist delivering clinical and education services to patients within general practice, similar to that provided by the IPAC project intervention. The program will be evaluated with a cluster-controlled trial and an economic analysis is planned, though no further details were available.

The ACT PHN/Capital Health Network Pharmacist in General Practice pilot involves a non-dispensing pharmacist within general practice and began in 2016. This pilot involved pharmacists employed part-time within a general practice for 16 hours per week. An evaluation of the pilot program found that a clinical audit conducted by one of the pharmacists resulted in a cost saving of approximately $125,700 over 3 years and $183,000 over 5 years (Capital Health Network, 2018). Further details about this analysis were not found. There was some evidence of similar programs being implemented in the Brisbane area (Kidd, 2018) however details for these programs could not be found.

DISCUSSION

This literature review used a comprehensive search strategy of online bibliographic databases to identify existing cost-effectiveness evaluations for interventions focused on the same population and setting as the IPAC project intervention. This literature search did not identify cost-effectiveness evaluations of pharmacist's interventions that were directly relevant to the IPAC project. This highlights the importance of the IPAC project to inform on the cost-effectiveness of pharmacist interventions relevant to the health of Indigenous Australians. The search did identify some studies that the IPAC project could draw on for the cost-effectiveness evaluation of certain health outcomes. The studies set in countries other than Australia have different health systems and therefore different management of health problems within the primary health care settings. However, these studies offered insights into ways that cost-effectiveness of the IPAC project intervention could be evaluated.

Several studies investigated the cost-effectiveness of interventions for patients with diabetes and hypertension (Kulchaitanaroaj et al, 2014; 2017; Polgreen et al, 2015; Obreli-Neto et al, 2015; Simpson et al, 2015). Obreli-Neto and others (2015) and Kulchaitanraoj and others (2017) conducted cost-utility studies that are out of scope for the IPAC project intervention. However, the remaining studies measured effectiveness using similar biomedical outcomes as the IPAC project such as changes in blood pressure control, changes in systolic and diastolic blood pressure and change in cardiovascular risk (Kulchaitanaroaj et

al, 2014; Polgreen et al, 2015; Simpson et al, 2015). The IPAC project also investigates measures of prescribing quality such as change in the Medication Appropriateness Index (MAI). Cowper and others (1998) evaluated cost-effectiveness by measuring the change in MAI following their intervention. The use of a threshold willingness-to-pay was limited to studies reporting health gained in terms of QALYs. As the studies included in this review measured health gains in different ways, it is difficult to report the cost-effectiveness of the interventions without considering and understanding the context of each setting.

CONCLUSION

Based on this literature review, the cost-effectiveness economic evaluation undertaken for the IPAC project is unique in the current academic literature. Published cost-effectiveness reports were not identified in Australia through the general internet search that was conducted, though there is work currently being done in this area through some Primary Health Networks. To our knowledge, the IPAC project intervention provides the first evaluation of the cost-effectiveness of a collaborative intervention involving pharmacists integrated within ACCHS in Australia, and indeed, the first evaluation of such an intervention for any Indigenous health service worldwide.

Table 1. Description of cost-effectiveness studies investigating pharmacist interventions in primary health care settings. The table includes a description of the intervention and control groups, the length of the intervention and follow-up period, the clinical measures used, and the participants involved in the cost-effectiveness analysis.

Author, Year, Setting, Country, Study design	Intervention	Control	Intervention /Follow up duration	Clinical measures	Participants for cost-effectiveness analysis
Avery et al, 2012 General Practice England Two-group pragmatic cluster randomised trial	Intervention practices were provided with simple computerised feedback for patients identified as being at risk of medication error and inadequate blood-test monitoring of medicines plus Pharmacist-led Information Technology Complex Intervention (PINCER). Then the pharmacist met with the practice team to discuss feedback and used techniques to correct medication errors including review of medical records, medication review, discussion with doctor, blood tests and improvement of local safety systems.	Simple computerised feedback for patients identified as at risk of medication error and inadequate blood-test monitoring of medicines provided to control practices plus educational materials.	Intervention: 12 weeks Follow up: 6 months 12 months	a.History of peptic ulcer and prescribed an NSAID without co-prescription of a proton pump inhibitor b. Have asthma and prescribed a β blocker/asthma c. Aged ≥75 years receiving long term ACE inhibitors or loop diuretics without urea and electrolyte monitoring in the previous 15 months d. Methotrexate for ≥3 months without full blood count in past 3 months e. Methotrexate for ≥3 months without a liver function test in past 3 months f. Lithium for ≥3 months without a lithium concentration measurement in past 3 months g. Amiodarone for ≥6 months without a thyroid function test in the past 6 months	Patients identified with potential medication error or inadequate blood-test monitoring No. of patients at baseline (IG;CG): a.87/1828 (5%); 93/1970 (5%) b.537/18906 (3%); 628/20634 (3%) c.549/4349 (13%); 483/4722 (10%) d.170/480 (35%); 202/483 (42%) e.172/480 (36%); 184/483 (38%) f.97/194 (50%); 101/224 (45%) g.111/240 (46%); 130/253 (51%) No. of patients at 6 months follow up (IG;CG): a.51/1852 (3%); 86/2014 (4%) b.499/20312 (2%);658/22224 (3%) c.255/4851 (5%); 436/5329 (8%) d.122/494 (25%); 162/518 (31%) e.121/494 (24%); 154/518 (30%) f.67/190 (35%); 84/211 (40%) g.81/242 (33%); 106/235 (45%) No. of patients at 12 months follow up (IG; CG): a.61/1852 (3%); 78/2035 (4%) b.545/21359 (3%); 692/23520 (3%) c.306/5242 (6%); 452/5813 (8%) d.130/531 (24%); 194/552 (35%) e.134/531 (25%); 186/552 (34%) f.56/176 (32%); 88/213 (41%) g.80/233 (34%); 92/247 (37%)

Author, Year, Setting, Country, Study design	Intervention	Control	Intervention /Follow up duration	Clinical measures	Participants for cost-effectiveness analysis
Bojke et al, 2010 General practice and community pharmacy England Randomised multiple interrupted time-series	RESPECT (Randomised Evaluation of Shared Prescribing for Elderly people in the Community over Time): the pharmacist moderated drug management in collaboration with doctor, patient and carer. The intervention included a medication review. Implemented at 2-month intervals at each primary care trust.	Each primary care trust, patient, general practitioner acted as their own controls.	Follow up: 12 months	-EQ-5D health status questionnaire; before pharmaceutical care, 3 months, 12 months, immediately after end of study period and 3 years post intervention. -'Utility' estimate from published preferences of 3400 members of UK population. -Patient age, gender, number of drugs on repeat prescription at time of recruitment	Patients aged 75 years and over, and taking at least five drugs on repeat prescription No. of patients: 599 (598 patients for utility analysis due to incomplete EQ-5D data)
Cowper et al, 1998 Veteran Affairs Medical Centre United States Randomised control trial	The clinical pharmacist reviewed patient laboratory findings, drug lists, hospital discharge summaries, clinic notes, procedures and test results for previous 2 years to assess appropriateness of medications prescribed using the Medication Appropriateness Index (MAI). The pharmacist made written and verbal recommendations for the physician based on principles of pharmaceutical care. The pharmacist encouraged compliance with patients following drug regimen changes.	The clinic nurse reviewed patients' prescription drugs before and after physician visits. No pharmacist involvement.	Follow up: 12 months	-Drug prescribing appropriateness with MAI. -Chronic medical conditions -Veteran Affairs prescribed drugs -Drugs for which recommendations developed	Patients aged 65 years and over, and evidence of polypharmacy (prescriptions of at least 5 regularly scheduled drugs) No. of patients at baseline (IG/CG): 105/103 Age: 70years Gender: 99% male -MAI scores at baseline: IG/CG: 17.7/17.6 -MAI scores at 3 months: IG/CG: 13.4/16.5 -MAI scores at 12 months: IG/CG: 12.8/16.7

Author, Year, Setting, Country, Study design	Intervention	Control	Intervention /Follow up duration	Clinical measures	Participants for cost-effectiveness analysis
Elliott et al, 2014 General Practice England Two-group pragmatic cluster randomised trial	see Avery et al, 2012	see Avery et al, 2012	Intervention: 12 weeks Follow up: 6 months 12 months	a.History of peptic ulcer and prescribed an NSAID without co-prescription of a proton pump inhibitor b. Have asthma and prescribed a β blocker/asthma c. Aged ≥75 years receiving long term ACE inhibitors or loop diuretics without urea and electrolyte monitoring in the previous 15 months d. Methotrexate for ≥3 months without full blood or liver function test in past 3 months e. Lithium for ≥3 months without a lithium concentration measurement in past 3 months f. Amiodarone for ≥6 months without a thyroid function test in the past 6 months	Patients identified with potential medication error or inadequate blood-test monitoring No. of patients at 6 months follow up (IG;CG): a.51/1852 (3%); 86/2014 (4%) b.499/20312 (2%);658/22224 (3%) c.255/4851 (5%); 436/5329 (8%) d.122/494 (25%); 162/518 (31%) e.67/190 (35%); 84/211 (40%) f.81/242 (33%); 106/235 (45%)
Fretheim et al, 2006 General practice Norway Randomised control trial	The pharmacist conducted educational outreach visits to practices to support implementation of general practice guidelines for the use of antihypertensive and cholesterol lowering drugs. Software was installed that gave audit and feedback on physicians' risk estimation, antihypertensive drugs and achievement of treatment goals installed. Computerised reminders were linked to the medical record system.	Passive dissemination of general practice guidelines – no pharmacist outreach visit.	Follow up: 12 months	a.Prescribed thiazides for hypertension for the first time b.Cardiovascular risk assessment completed c.Treatment goal achieved (recorded cholesterol level; blood pressure)	Patients starting thiazide medication for treatment of hypertension for the first time. No. of patients at baseline (IG; CG): a.161/2784 (5.8%); 209/2365 (8.8%) b.not reported c.4669/15914 (29.3%); 5174/15411 (33.6%) No of patients at follow up (IG/CG): a.378/2184 (17.3%); 218/1968 (11.1%) b.147/854 (17.2%); 112/768 (14.6%) c.5502/17213 (32.0%); 6056/16593 (36.5%) Statistically significant effect only on prescribing.

Gillespie et al, 2017 General practice Ireland Cluster randomised controlled trial	OPTI-SCRIPT (Optimizing Prescribing for Older People in Primary Care: academic detailing was provided by a pharmacist on how to conduct a GP-led medicine review. The medicine review was supported by Web-based pharmaceutical treatment algorithms for GPs. The algorithms provided alternative treatment options for potentially inappropriate prescription (PIP) drugs and tailored patient information leaflets.	Usual care and one-off simple patient-level PIP feedback.	Follow up: 12 months	Potentially Inappropriate Prescriptions defined as: -PPI for peptic ulcer disease at full therapeutic dosage for>8 weeks -NSAID (>3 months) for relief of mild joint pain in osteoarthritis -Long-term (i.e. >1 month), long-acting benzodiazepines and benzodiazepines with long-acting metabolites -Any regular duplicate drug class prescription. Excludes duplicate prescribing of drugs that may be required on a PRN basis -Aspirin at dose >150 mg/day -Theophylline as monotherapy for COPD/Asthma -Use of aspirin and warfarin in combination without histamine H2 receptor antagonist or PPI -Doses of short-acting benzodiazepines, doses greater than: lorazepam 3 mg; oxazepam 60 mg; alprazolam 2 mg; temazepam 15 mg; and triazolam 0.25 mg -Prolonged use (>1 week) of first-generation antihistamines -Warfarin and NSAID together -Calcium channel blockers with chronic constipation -NSAID with history of peptic ulcer disease or GI bleeding, unless with concurrent histamine H2 receptor antagonist, PPI or misoprostol -Bladder antimuscarinic drugs with dementia -TCAs with constipation -Digoxin at a long-term dose>125 µg/day (with impaired renal function) -Thiazide diuretic with a history of gout	Patients aged 70 years or over randomly selected by the practice and have specific PIPs. No. of patients (IG/CG):99/97 No. of practices (IG/CG): 11/10

Author, Year, Setting, Country, Study design	Intervention	Control	Intervention /Follow up duration	Clinical measures	Participants for cost-effectiveness analysis
				-Glibenclamide (with type 2 diabetes mellitus) -Aspirin with a past history of peptic ulcer disease without histamine H2 receptor antagonist or PPI -Prochlorperazine or metoclopramide with Parkinsonism -TCAs with dementia -TCAs with glaucoma -TCAs with cardiac conductive abnormalities -Long-term corticosteroids (>3 months) as monotherapy for rheumatoid arthritis or osteoarthritis -Bladder antimuscarinic drugs with chronic prostatism NSAID with heart failure TCAs with prostatism or prior history of urinary retention -Systemic corticosteroids instead of inhaled corticosteroids for maintenance therapy in COPD/Asthma -Bladder antimuscarinic drugs with chronic glaucoma NSAID with SSRI -Bladder antimuscarinic drugs with chronic constipation -Prednisolone (or equivalent) >3 months or longer without bisphosphonate -NSAID with ACE-inhibitor -NSAID with diuretic	

Author, Year, Setting, Country, Study design	Intervention	Control	Intervention /Follow up duration	Clinical measures	Participants for cost-effectiveness analysis
Kulchaitanaroaj et al, 2012 Community-based medical offices United States Combined data from two prospective cluster-randomised controlled clinical trials	Pharmacists were encouraged to attend clinic visits and contact patients at baseline and at specified follow-up points. Pharmacists could also make contact at their own discretion. Specialists were involved only at discretion of the physician. Physician-pharmacist collaboration included written, 'curbside' (informal, short communications within the clinic) telephone and face-to-face communication. The pharmacists were co-located with the physicians and communicated recommendations in person around time of patient visit to physician. Pharmacists made recommendations to address suboptimal drug regimens and educated physicians as needed.	Physician management only.	Follow up: 6 months	Healthcare utilisation and outcomes. a.Achieved blood pressure control b.Reduction in systolic blood pressure c.Reduction in diastolic blood pressure	Patients with hypertension aged at least 21 years. Hypertension defined as high blood pressure less than 180/100mmHg. No. of patients (IG/CG):252/244 At follow up: Proportion of patients who achieved blood pressure control (IG/CG): 66.0%/41.4% Difference in drop of mean systolic blood pressure/mean diastolic blood pressure (IG/CG): -9.08mmHg/-3.49mmHg
Kulchaitanaroaj et al, 2017 Community-based medical offices United States Two prospective, cluster randomised controlled clinical trials	Pharmacists were encouraged to attend clinic visits and contact patients at baseline and at specified follow-up points. Pharmacists could also make contact at their own discretion. Specialists were involved only at discretion of the physician. Physician-pharmacist collaboration included written, 'curbside' (informal, short communications within the clinic) telephone and face-to-face communication. The pharmacists were co-located with the physicians and communicated recommendations in person around time of patient visit to physician. Pharmacists made recommendations to address suboptimal drug regimens and educated physicians as needed.	Physician management alone.	Follow up: 6 months	Predict vascular events of acute coronary syndrome, stroke, heart failure, death or none (hypertension state).	Patients with hypertension aged 30 years to 74 years. No. of patients:399 originally from intervention and usual care groups assigned to simulated intervention group and simulated usual care group. Mean age: 56.7 years Male: 42.6%

Author, Year, Setting, Country, Study design	Intervention	Control	Intervention /Follow up duration	Clinical measures	Participants for cost-effectiveness analysis
Lopez-Picazo et al, 2011 Primary care teams Spain Single-blind, cluster randomised controlled trial	Three groups: Group 1 - Specialised software, PRISMAp reviewed active prescriptions checking for active ingredients for potential interactions and generated a report that was received by the physician through the mail. Group 2 - clinical educational sessions were presented using the interaction report. Group 3 - face to face interviews between physician and pharmacist occurred with the pharmacist presenting the report.	No intervention	Follow up: 15 months	Most important drug interactions defined as A0 using the following classification scale: Clinical relevance of drug interaction (decreasing levels A to D) and remedial action (0, interactions to be avoided; 1, interactions requiring surveillance; 3, interactions requiring a modification of the dosing interval.	Patients older than 14 years and taking more than one medication together with their treating physician No. of patients: 81,805 No. of physicians: 265 40 primary care teams stratified according to number of physicians at centres Baseline: Adjusted mean of 6.7 interactions/100 patients (n=5473) After follow-up: Adjusted mean of 5.3 interactions/100 patients (n=4353) Intragroup differences and relationship between intervention type and outcome ($p<0.001$) with no improvement in control group and Group 1, and progressive improvement in other groups.
Obreli-Neto et al, 2015 Primary health care unit (public health system) Brazil Randomised controlled trial	The pharmacist followed up individual patients for a Pharmacotherapy Workup every 6 months. Pharmacists assessed compliance, discussed medication with patients and family, suggested drug regimens to the physician, prepared special packages to provide a visual reminder that medicine was taken and developed care plans. The pharmacist also worked with other health professionals to modify diet and physical activities plans. Group education was provided by pharmacists.	Usual care: patients met for 3 monthly appointment with physicians and monthly appointments with nurses. No pharmaceutical care.	Follow up: 36 months	Mean values for intervention and control groups at baseline and follow up for: a.Systolic blood pressure b.Diastolic blood pressure c.Fasting blood glucose levels d.Haemolglobin A1c e.LDL cholesterol	Aged 60 years or over, diagnosed with diabetes or hypertension and under drug treatment No. of patients (IG/CG):97/97 Proportion of patients achieving clinical outcome goals (mean reduction in clinical measures) at baseline (IG/CG): a.26.8%/26.8% b.27.9%/29.9% c.29.9%/30.9% d.3.3%/3.3%

Author, Year, Setting, Country, Study design	Intervention	Control	Intervention /Follow up duration	Clinical measures	Participants for cost-effectiveness analysis
					e.59.8%/63.9% Proportion of patients achieving clinical outcome goals (mean reduction in clinical measures) at follow up (IG/CG): a.86.6%/30.9% b.84.8%/27.4% c.70.1%/27.8% d.63.3%/3.3% e.80.4%63.9% No significant changes in control group between baseline and intervention.
Polgreen et al, 2015 Primary care offices United States Cluster randomised controlled trial	Collaboration Among Pharmacist and Physicians to Improve Outcomes Now (CAPTION): Initially, a pharmacist conducted a patient medication history, patient medication knowledge assessment, and assessment of side effects and patient compliance. The pharmacist then called the patient at 2 weeks and had face to face visits with them at 1, 2, 4, 6 and 8 months, with additional visits if needed. The pharmacist developed a care plan and made recommendations to the physician to adjust therapy. This implementation trial did not require strict adherence to this protocol, but all pharmacist visits were tracked.	Usual care – no pharmacist involvement	Follow up: 9 months	Systolic blood pressure Diastolic blood pressure Hypertension control Adverse events	At least 18 years of age, with uncontrolled hypertension defined as BP>140mmHg systolic or >90mmhg diastolic. For patients with diabetes mellitus or chronic kidney disease, uncontrolled hypertension defined as BP>130 mmHg and >80mmHg. No. of patients (IG/CG): 401/224 Mean age:61 Male:39.7% Ethnicity: Blacks (38.4%) Hispanic or Latino (14.2%) At follow-up: Average systolic blood pressure for intervention group 6.1mmHg lower than control group Average diastolic blood pressure for intervention group 2.9mmHg lower than control group

Author, Year, Setting, Country, Study design	Intervention	Control	Intervention /Follow up duration	Clinical measures	Participants for cost-effectiveness analysis
					43% of patients with controlled hypertension in intervention group compared with 34% in control group
Simpson et al, 2015 Primary care clinic United States Randomised controlled trial	The pharmacist met with patients and conducted a medication history and physical examination including blood pressure measurement. The pharmacist made recommendations to the prescribing physician based on current clinical practice guidelines. The pharmacist followed up with patients to address any issues with medication management at discretion of the pharmacist, patient and physician.	Usual care – no pharmacist involvement	Follow up: 12 months	Prescription drug use, changes in blood glucose, blood pressure, lipid levels 10% or more decrease in systolic blood pressure Change in predicted 10 year 10-year risk of cardiovascular disease (using UKPDS Risk Engine) Initiation of guideline-concordant antiplatelet therapy Change in medication management of hypertension	Patients with Type 2 diabetes No. of patients (IG/CG):65/58 Mean age (IG/CG): 56.9/61.5 Male (IG/CG):37%/40% Predicted 10-year risk of cardiovascular disease at baseline (mean; IG/CG): 14.6%/14.2% Predicted 10-year risk of cardiovascular disease at follow up (mean; IG/CG): 12.0%/13.4% Annualised reduction in risk of cardiovascular event (IG.CG): 0.33%/0.06%
Sorensen et al, 2004 General practice and community pharmacy Australia (patients in Qld, NSW and WA) Randomised controlled trial	GPs coordinated multidisciplinary teamwork which in practice saw linking up of pharmacists and GPs. Two education sessions about managing prescribing issues attended by GPs and pharmacists. A flexible intervention with the predominant process involving a home visit by the pharmacist for medication review that was initiated by a GP referral. The pharmacist made recommendations to the GP and discussed with health care team. GP developed action plan and implemented actions and followed up at 6 weeks.	Usual care	Follow up: 6 months	Effectiveness assessed using the clinical value compass which is defined by health-related quality of life, patient satisfaction, clinical outcomes and costs. a.Functional status: Health related quality of life using SF-36 b.Adverse drug events (medication review, self-reported and physician reported through questionnaire) c.Number of GP visits d.Hospital services e.Duke's Severity of Illness Visual Analogue Scale (DUSOI-A)	Patients at risk of medication misadventure defined as: (i) on five or more regular medications; (ii) taking 12 or more doses of medication per day; (iii) suffer from three or more medical conditions; (iv) suspected by GPs to be non-adherent with their medication treatment regimen; (v) on medication(s) with a narrow therapeutic index or requiring therapeutic monitoring; (vi) had significant changes made to the medication regimen in the previous 3 months; (vii) had signs or symptoms suggestive of possible medication-induced

Author, Year, Setting, Country, Study design	Intervention	Control	Intervention /Follow up duration	Clinical measures	Participants for cost-effectiveness analysis
				f. GP plans and actions implemented, and patient satisfaction	problems; (viii) had an inadequate response to medication treatment; (ix) admitted to hospital in the preceding 4 weeks; or (x) at risk in managing their own medications due to language difficulties, dexterity problems or impaired sight. No. of patients (IG/CG):106/196 No. of GPs (IG/CG): 48/44 Statistical significance was not demonstrated in any domain of the clinical value compass. Positive trends in ADEs and severity of illness and healthcare service costs.

Table 2. Description of cost-effectiveness studies investigating pharmacist interventions in primary health care settings. The table includes the economic measures used, the methods and the findings reported for the cost-effectiveness analysis.

Author, Year, Setting, Country, Study design	Economic measures	Cost-effectiveness analysis method	Cost-effectiveness analysis results
Avery et al, 2012 General Practice England Two-group pragmatic cluster randomised trial	-Direct costs of provision of the intervention: report-generation costs, pharmacist training sessions, facilitated meetings, monthly meetings, practice feedback meetings, time spent in each practice outside meetings following up errors. -Costs for control group: report generation costs	Cost per additional medication error avoided due to the intervention at 6 months and 12 months post intervention. Health system perspective Incremental cost-effectiveness analysis Costs and outcomes adjusted for practice characteristics. Simple probabilistic decision-analytic model to generate cost-effectiveness ratios for differences in error rates between the intervention and control groups. $\frac{\text{(cost PINCER-cost simple feedback)}}{\text{(outcome PINCER-outcome simple feedback)}}$ Sensitivity analysis to establish cost-effectiveness ratios when time horizon was 12 months	PINCER had a 95% probability of being cost effective if the decision-maker's ceiling willingness to pay reached £75 per error avoided (at 6 months) or £85 per error avoided (at 12 months). This is sustained at 12 months suggesting that the intervention could be delivered yearly and still retain equivalent cost-effectiveness.
Bojke et al, 2010 General practice and community pharmacy England Randomised multiple interrupted time-series	-Costs of intervention to the NHS including community pharmacy costs such as time spent developing a care plan, health service utilisation over 4 years, drugs prescribed through acute and repeat prescriptions, laboratory tests, visits to general practice, home visits, telephone consultations, inpatient admission, length of stay, outpatient visits.	Mean incremental cost per additional QALY Health system perspective Difference-in-difference econometric model to estimate difference in mean costs and outcomes between individual experiencing usual care and same individual experiencing the intervention (comparison of costs and QALYs between pharmaceutical care and usual care) Incremental cost-effectiveness analysis Monte Carlo simulation to reflect uncertainty in estimated costs and QALYs	National Institute for Health and Clinical Excellence generally uses a threshold willingness to pay of £20000 and £30000 per QALY. Findings suggest that the pharmaceutical intervention costs £10000 per QALY gained and is therefore, on average, cost-effective. However, the uncertainty in differential costs and QALYs means that there is a 78%-81% probability that pharmaceutical care is cost-effective at a threshold between £20000 and £30000 per QALY.

Author, Year, Setting, Country, Study design	Economic measures	Cost-effectiveness analysis method	Cost-effectiveness analysis results
Cowper et al, 1998 Veteran Affairs Medical Centre United States Randomised control trial	-Costs of intervention: Fixed costs including pharmacist orientation, intervention protocol, and equipment. Variable costs related to the intervention including personnel time and supplies. Cost of health care services received by patients including clinic visits, drugs, diagnostic tests, hospitalisation and average per diem cost of inpatient care.	Cost per 1-unit change in MAI Health system perspective Median values of intervention and control patients compared with Wilcoxon rank sum test Cost-effectiveness ratio $\frac{(\text{Intervention + drug cost/patient})_{\text{intervention}} - (\text{drug cost/patient})_{\text{control}}}{\text{Change in MAI/patient}_{\text{intervention}} - \text{change in MAI/patient}_{\text{control}}}$	Cost-effectiveness ratio for the intervention (mean change in MAI 4.0) was $7.50 per 1-unit change in MAI. Excluding drug costs, the ratio was $30/1 unit change in MAI. Willingness to pay threshold not reported. The intervention was found to be relatively low cost for improving prescribing for elderly patients.
Elliott et al, 2014 General Practice England Two-group pragmatic cluster randomised trial	-Direct costs of provision of the intervention as described in Avery et al, 2012. -Direct costs from health system perspective -Drew on literature-derived error-specific projected harm to generate estimates on patient outcomes and NHS costs	Cost per additional QALY Health system perspective Economic models developed for each medication error to generate costs and QALYs for PINCER. Modelled using clinical measures at 6 months. Involved design of Markov models, informed by published models where possible and UK sources. Models populated with probability, cost and health status data to generate outcomes and costs in a cohort with and without error present. Incremental impact of PINCER costs and outcomes for each error estimated in practice population and used to determine total incremental impact of PINCER costs and outcomes for one practice. Incremental cost effectiveness ratio $\frac{(\text{Cost}_{\text{PINCER}} - \text{Cost}_{\text{Simple Feedback}})}{(\text{QALY}_{\text{PINCER}} - \text{QALY}_{\text{Simple feedback}})}$ Probabilistic analysis conducted	PINCER reached 59% probability of being cost effective at a threshold ceiling willingness-to-pay for a QALY of £20000 Without ACE inhibitor errors, probability of cost-effectiveness at £20000 increased to 65%. For the two most robust models (NSAIDs and amiodarone prescribing errors), cost-effectiveness increased to 100%. The study found that cost-effectiveness at a threshold of £20000 was achieved by targeting specific monitoring errors with evidence of effects on patient outcomes.

Author, Year, Setting, Country, Study design	Economic measures	Cost-effectiveness analysis method	Cost-effectiveness analysis results
Fretheim et al, 2006 General practice Norway Randomised control trial	-Non-recurring costs including development of software and pharmacist training. Recurring costs including printed materials, travel, salaries for pharmacist, administration, opportunity cost of physicians' time during outreach visits, number of consultations, drug costs.	Cost minimisation: if savings on drug costs were greater than intervention costs Cost-effectiveness analysis: Incremental cost effectiveness ratio of intervention versus usual care Health system perspective Adjusted for baseline differences between groups. Univariate sensitivity analyses with adjust values for variables that could impact on findings. Used model to scale intervention to national outreach program.	Cost-minimisation analysis: Net cost of implementing the intervention in study population was US$53,395 or US$763 per practice. Cost-effectiveness analysis: Cost incurred per additional patient started on a thiazide rather than another antihypertensive drug. Study population: Cost per additional patient started on a thiazide due to the intervention was US$454. Costs of the intervention outweighed savings in drug expenditures due to increased use of thiazides, except when intervention effects were assumed to be sustained for 2 years. National scale up: US$183 per additional patient started on a thiazide. The authors reported expected savings within 2 years if the intervention was implemented in a national program. Willingness to pay threshold not reported.
Gillespie et al, 2017 General practice Ireland Cluster randomised controlled trial	-Cost of intervention: pharmacist and GP time, educational materials, consumables, travel. -Cost relating to PIPs: prescribed drugs. -Cost relating to health care service use including GP and nurse consultations, outpatient visits, hospital visits. -Resource use through practice note searches and patient questionnaire, the EQ5D-3L, at baseline and 12 months.	Cost per Potentially Inappropriate Prescriptions avoided and cost per QALY gained Health provider perspective Used guidelines for health technology assessment for Ireland. Intention to treat basis Incremental cost effectiveness analysis Controlled for age, gender, baseline PIPs, number of GPs per practice and practice location.	The intervention was more costly and more effective in terms of PIPs avoided and QALYs gained compared with the control. Cost effective if willing to pay €30,535 per QALY gained Cost effective if willing to pay €1,269 per potentially inappropriate prescription avoided 84.5% probability that the intervention was cost-effective at a threshold of €2,500 per PIP avoided or higher.

Author, Year, Setting, Country, Study design	Economic measures	Cost-effectiveness analysis method	Cost-effectiveness analysis results
		Sensitivity analysis conducted. QALYs estimated from questionnaires.	60.2% probability that intervention cost-effective at threshold of €45,000 per QALY gained.
Kulchaitanaroaj et al, 2012 Community-based medical offices United States Combined data from two prospective cluster-randomised controlled clinical trials	Cost of provider time, laboratory tests and antihypertensive drugs.	Cost for one additional patient to achieve blood pressure control Cost-effectiveness ratio: $\frac{\text{Difference in intervention and control costs}}{\text{Difference in hypertension control rates for intervention and control groups}}$ Cost to achieve an additional 1mmHg reduction Cost-effectiveness ratio: $\frac{\text{Difference in cost}}{\text{Difference in blood pressure}}$ Costs adjusted for difference in patient characteristics in intervention and control groups. Sensitivity analyses conducted for key assumptions of times/provider activity and costs assumed for patients who dropped out of the study	Cost for one additional patient to achieve blood pressure control was $1338.05 $36.25 per additional 1mmHg reduction in systolic blood pressure and $94.32 per additional 1mmHg reduction in diastolic blood pressure. The intervention successfully reduced systolic and diastolic blood pressure, and increased blood pressure control at increased health care costs. The authors compared their cost-effectiveness ratio with other studies and concluded that the cost-effectiveness of the intervention required further investigation. Willingness to pay threshold not reported.
Kulchaitanaroaj et al, 2017 Community-based medical offices United States Two prospective, cluster randomised controlled clinical trials	Health professionals time providing direct patient care and collaborating, laboratory tests, antihypertensive medications and overheads. Costs of each vascular disease included cost of hospitalisation, physician fees, outpatient visits, medications, home healthcare and nursing home care.	Cost per QALY gained. Payer perspective Markov model cohort simulation to predict acute coronary syndrome, stroke and health failure throughout lifetime. 6-month Markov cycles Incremental cost-effectiveness ratios at time horizons of 5 years, 10 years and lifetime Created 6 hypothetical cohorts with modified risk profiles to explore effects of intervention on	Lifetime horizon: The intervention compared with usual care increased QALYs by 0.14 per person. The incremental cost-effectiveness ratio of the intervention was $26,807.83 per QALY gained. Horizon of 10 years: The incremental cost-effectiveness ratio of the intervention was $39,084.65 per QALY gained. Horizon of 5 years: The incremental cost-effectiveness ratio of the intervention was $78,547.07 per QALY gained.

Author, Year, Setting, Country, Study design	Economic measures	Cost-effectiveness analysis method	Cost-effectiveness analysis results
		individuals with high and low risk of vascular diseases for sensitivity analyses.	Willingness to pay threshold $50000-$100000 Intervention more cost-effective for high-risk patients
Lopez-Picazo et al, 2011 Primary care teams Spain Single-blind, cluster randomised controlled trial	Intervention costs: tangible costs only including administration, mailing, infrastructure to develop the PRISMAp system, training and time of pharmacist.	Incremental cost incurred to reduce the mean of potential drugs interaction per 100 patients by 1% more than the control group. Intention to treat analysis to assess effectiveness of each intervention Adjusted for baseline differences in patient and physician characteristics between intervention groups. Incremental cost effectiveness analysis	Session and face to face groups - 4.2€ and 4.5€, respectively, per 1% of improvement per 100 patients beyond the control group. The clinical educational session was the most cost-effective intervention. Willingness to pay threshold not reported.
Obreli-Neto et al, 2015 Primary health care unit (public health system) Brazil Randomised controlled trial	Costs for intervention and control groups including appointments with health professionals, hospital visits, drug therapy costs.	Incremental cost-effectiveness ratio per QALY Incremental cost-effectiveness ratio: $\frac{\text{Difference in total direct health care cost between intervention and control groups}}{\text{Difference in QALY between intervention and control groups}}$ Health utility estimated for each disease state – blindness, end-stage renal disease, lower extremity amputation, stroke, myocardial infarction, angina. Other health states set to 1.	Average pharmaceutical care costs for the intervention estimated at US$69.60 per 36 months more than usual care but yielded greater benefits, estimated at 1.302 QALYs. Incremental cost-effectiveness ratio per QALY was estimated at $53.50 The authors reported that the intervention had an acceptable ICER per QALY. The intervention did not significantly increase health care cost and significantly improved health outcomes. Willingness to pay threshold not reported.

Author, Year, Setting, Country, Study design	Economic measures	Cost-effectiveness analysis method	Cost-effectiveness analysis results
Polgreen et al, 2015 Primary care offices United States Cluster randomised controlled trial	Costs include pharmacist time spent performing activities of the intervention, physician appointments, anti-hypertensive drugs. Cost was difference between average intervention costs and control costs.	Cost to lower blood pressure by 1mmHg. Societal perspective Incremental cost-effectiveness ratio: $\frac{\text{Additional costs of the intervention}}{\text{Change in both systolic and diastolic BP related to the intervention}}$ And; $\frac{\text{Additional costs of the intervention}}{\text{Percentage of subjects who achieved 'BP control' as a result of the intervention}}$ Sensitivity analysis conducted	Cost to lower BP by 1mmHg was $33.27 for systolic and $69.98 for diastolic. Comparing rates in the intervention and control groups, the cost to increase BP control by 1 percentage point was $22.55. Following sensitivity analysis that included only patients who completed the 9 month intervention (n=539): -Cost to lower BP by 1mmHg was $38.82 for systolic and $81.66 for diastolic. -Comparing rates in the intervention and control groups, the cost to increase BP control by 1 percentage point was $26.31. When drug cost were deflated (n=539): -Cost to lower BP by 1mmHg was $26.54 for systolic and $55.82 for diastolic. -Comparing rates in the intervention and control groups, the cost to increase BP control by 1 percentage point was $17.99. The authors concluded that the intervention demonstrated cost-effectiveness in a broader patient population than other studies of similar interventions. Willingness to pay not reported.
Simpson et al, 2015 Primary care clinic United States Randomised controlled trial	Costs of intervention, prescription medication, health care services provided by health professionals, emergency department visits, hospitalisation; pharmacist time; drug utilisation Health measures: UKPDS Risk Engine Satisfaction measure: patient questionnaire	Cost to reduce annualised cardiovascular risk by 1% Public payer perspective Intention to treat analysis Sensitivity analysis conducted Incremental cost effectiveness ratio on a per patient basis:	95% probability that intervention is cost-effective at level of about $4000 per 1% reduction in annualised cardiovascular risk. The cost-effectiveness threshold (society's willingness to pay for a reduction of 1% in cardiovascular risk) was estimated to be $33,215.

Author, Year, Setting, Country, Study design	Economic measures	Cost-effectiveness analysis method	Cost-effectiveness analysis results
		Difference in overall average 1-year cost per patient between study arms / Change from baseline in annual risk of cardiovascular event Estimated threshold for intervention from literature	The authors reported that the intervention was cost-effective in reducing cardiovascular risk in patients with Type 2 diabetes (one year time horizon).
Sorensen et al, 2004 General practice and community pharmacy Australia (patients in Qld, NSW and WA) Randomised controlled trial	-Costs of medication and health service costs (less intervention costs) were measured pre-intervention and during the trial. GPs received payment for initial consult, discussion with pharmacist, development of action plan and consultation with patient and follow-up patient consultation, and pharmacists were paid for home visits and medication review, and discussion with GP.	Cost-saving per intervention patient. Intention to treat analysis Cost savings per patient deduced from differences in total sum of medication and healthcare costs between intervention and control groups. Marginal cost benefit per patient defined as cost savings per patient assuming no change in patient outcomes due to the intervention. Cost-effectiveness ratio to reduce adverse drug events Cost -effectiveness ratio to improve health outcomes	After adjusting for differences in cumulative costs vs. time (medication plus medical service costs) up to the time of patient enrolment, the cumulative cost/patient over the 8 months from enrolment was AUS$5730 (£2234) for the control group and AUS$5401 (£2105) for the intervention group. After subtracting the differences in costs for the trial between intervention and control groups [AUS$275 (£107) per intervention patient], the net *cost saving* per intervention patient (marginal cost benefit) was AUS$54 (~ £19) per patient relative to controls. Incremental cost–effectiveness ratio in reducing ADEs and in improving DUSOI-A for the groups were AUS$69 (~ £24) and AUS$65 (~ £23), respectively (though reduction of DUSOI-A for intervention patients was not statistically significant) The authors concluded that the cost-effectiveness ratio of the intervention based on cost savings, reduced adverse events and improved health outcomes was small. Willingness to pay not reported.

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Appendix 1. Search strategy

Emcare

((“exp pharmacy/” OR “exp pharmacist/”) OR ("pharmaceutic service" OR "pharmaceutic services" OR "pharmaceutical care" OR "pharmaceutical service" OR "pharmaceutical services" OR "pharmacist*" or "pharmacy" or "pharmacies")).mp.

AND

((“exp primary health care/” OR “patient care planning/” OR “exp general practice/” OR “exp indigenous health care/”) OR ("primary care" or "primary health care" or "primary healthcare" or "general practice" or "general practices" or "family practice" or "family practices" or "health indigenous service" or "health indigenous services" or "indigenous health service" or "indigenous health services" or ACCHS or "aboriginal community controlled health service" or "aboriginal community-controlled health service" or "aboriginal community controlled health services" or "aboriginal community-controlled health services" or "aboriginal medical service" or "aboriginal medical services" or "AMS" or "indigenous medical service" or "indigenous medical services" or "medical indigenous service" or "medical indigenous services" or "medical aboriginal service" or "medical aboriginal services")).mp.

AND

((“cost effectiveness analysis/” OR “exp cost benefit analysis/” OR “pharmacoeconomics/”) OR ("benefits and costs" OR "cost benefit" OR "cost effectiveness" OR "cost utility analysis" OR "cost-benefit" OR "cost-utility" OR "cost-effectiveness" OR "costs and benefits" OR "economic evaluation" OR "economic evaluations" OR "pharmaceutical economics" OR "pharmacoeconomics" OR "pharmacy economic" OR "pharmacy economics")).mp.

CINAHL

((MH “Pharmacy and Pharmacology” OR MH “Pharmacy service” OR MH “Pharmacists”) OR ("pharmaceutic service" OR "pharmaceutic services" OR "pharmaceutical care" OR "pharmaceutical service" OR "pharmaceutical services" OR "pharmacist*" or "pharmacy" or "pharmacies")).mp.

AND

((MH “Primary Health Care” OR MH “Patient Care Plans” OR MH “Patient Centred Care” OR MH “Multidisciplinary Care Team” OR MH “Family Practice” OR MH “Health Services, Indigenous”) OR ("primary care" or "primary health care" or "primary healthcare" or "general practice" or "general practices" or "family practice" or "family practices" or "health indigenous service" or "health indigenous services" or "indigenous health service" or "indigenous health services" or ACCHS or "aboriginal community controlled health service" or "aboriginal community-controlled health service" or "aboriginal community controlled health services" or "aboriginal community-controlled health services" or "aboriginal medical service" or "aboriginal medical services" or "AMS" or "indigenous medical service" or "indigenous medical services" or "medical indigenous service" or "medical indigenous services" or "medical aboriginal service" or "medical aboriginal services")).mp.

AND

((MH “Costs and Cost Analysis+” OR MH “Economics, Pharmaceutical”) OR ("benefits and costs" OR "cost benefit" OR "cost effectiveness" OR "cost utility analysis" OR "cost-benefit" OR "cost-utility" OR "cost-effectiveness" OR "costs and benefits" OR "economic evaluation" OR "economic evaluations" OR "pharmaceutical economics" OR "pharmacoeconomics" OR "pharmacy economic" OR "pharmacy economics")).mp.

Medline

((“exp Pharmacy/ or Pharmacy Research/” OR “exp Pharmacists/” OR “exp Pharmaceutical Services/”)"pharmaceutic service" OR "pharmaceutic services" OR "pharmaceutical care" OR "pharmaceutical service" OR "pharmaceutical services" OR "pharmacist*" or "pharmacy" or "pharmacies")).mp.

AND

((“exp General Practice/ OR “exp Primary Health Care/” OR exp “Health Services, Indigenous/” OR “Health Services for the Aged/” OR “Patient Care Team/” OR “Patient Care Planning/”) OR ("primary care" or "primary health care" or "primary healthcare" or "general practice" or "general practices" or "family practice" or "family practices" or "health indigenous service" or "health indigenous services" or "indigenous health service" or "indigenous health services" or ACCHS or "aboriginal community controlled health service" or "aboriginal community-controlled health service" or "aboriginal community controlled health services" or "aboriginal community-controlled health services" or "aboriginal medical service" or "aboriginal medical services" or "AMS" or "indigenous medical service" or "indigenous medical services" or "medical indigenous service" or "medical indigenous services" or "medical aboriginal service" or "medical aboriginal services")).mp.

AND

((“Models, Economic/” OR “exp cost-benefit analysis/ or exp health care costs/ or exp economics, pharmaceutical/”) OR ("benefits and costs" OR "cost benefit" OR "cost effectiveness" OR "cost utility analysis" OR "cost-benefit" OR "cost-utility" OR "cost-effectiveness" OR "costs and benefits" OR "economic evaluation" OR "economic evaluations" OR "pharmaceutical economics" OR "pharmacoeconomics" OR "pharmacy economic" OR "pharmacy economics")).mp.

Integration of non-dispensing pharmacists into primary healthcare services: an umbrella review and narrative synthesis of the effect on patient outcomes

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Integration of non-dispensing pharmacists into primary healthcare services: an umbrella review and narrative synthesis of the effect on patient outcomes

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31st January 2020.

Abstract

Background: Primary health care services in Australia, comprised of a range of health care providers, are faced with the challenge of addressing increasingly complex and chronic disease. When integrated into primary practice, non-dispensing pharmacists provide a range of clinical services within a team-based model of care that can improve patient outcomes and quality use of medications.

Methods: This umbrella review searched Medline, PubMed, CINAHL, the Cochrane Database of Systematic Reviews and the JBI Database of Systematic Reviews from 1990-current for systematic reviews and meta-analyses that assessed the integration of non-dispensing pharmacists into primary health care settings on patient outcomes.

Results: A total of 591 publications were identified, of which five met the pre-determined inclusion criteria. Outcomes evaluated in the included studies were broadly classified into changes in biomedical markers, changes in prescribing practices and patient-reported outcomes.

Conclusions: Overall, the results of the included systematic reviews and meta-analyses suggest that the integration of a non-dispensing pharmacist had a positive effect on patient outcomes.

1. Introduction

Primary health care (PHC) services in Australia consist of a broad range of health care providers, including general practitioners (GPs), nurses, allied health professionals and pharmacists who provide a first contact for patients within the health care system.[1] These services are usually provided through general practices (or primary health care centres) that deliver 'comprehensive, continuous and person-centred care'.[1] While primary health care services are diverse and wide-ranging, the management of complex and chronic disease represents a key responsibility and challenge for primary health care providers. As the chronic disease burden places increasing pressure on the health care system, greater collaboration between GPs and other health care professionals is required to provide high quality care that is responsive to such demands.

Non-dispensing pharmacists (NDPs), also referred to as clinical pharmacists, practice pharmacists, or general practice-based pharmacists, are pharmacists who 'deliver professional services from or within a general practice medical centre with a coordinated, collaborative and integrated approach with an overall goal to improve the quality use of medications of the practice population'.[2] While pharmacists traditionally deliver care through independent services, there is increasing recognition of the value of integrating pharmacists into primary services as part of a team-based model to provide collaborative and effective care.[3] Within this model, NDPs deliver a range of clinical services both directly to patients and to other health care professionals to optimise medical therapy, provide medical management services, promote medication safety initiatives, improve health literacy and educate and empower patients to employ effective medication self-management.[3, 4] Statements released by the Australian Medical Association and the Royal Australian College of General Practitioners promote the integration of NDPs into primary care to improve the quality use of medications, reduce adverse drug events (ADEs), as well as to provide a financial benefit to the health care system.[3, 5]

This team-based model of care is already in place in health care systems overseas, including in the US and the UK, and a body of evidence exists to support its benefit to patients and other health care providers. However, this model has not been readily adopted in the Australian context, and there is a lack of robust evidence examining its effectiveness in Australia. Several international systematic reviews[6, 7, 8] and an umbrella review[9] have explored the effectiveness of pharmacist involvement in the management of patients with chronic disease in a range of healthcare settings by investigating changes in biomedical markers, in prescribing quality, medication adherence and in patient-reported outcomes. These reviews explored a range of pharmacist interventions delivered in diverse healthcare settings, including in community pharmacies. In order to better understand the effect of integration of NDPs into primary health care settings, an umbrella review of existing systematic reviews and meta-analyses was conducted.

2. Methods

2.1 Umbrella review methods and objective

Umbrella reviews systematically review and summarise the evidence from multiple existing systematic reviews and meta-analyses to allow for rapid review of the evidence base for a particular issue to inform policymakers and clinical decision-makers.[10]

This umbrella review aimed to determine the effectiveness of the integration of NDPs into primary health care settings on patient outcomes such as biomedical markers, prescribing quality, and patient-reported outcomes. Integration was defined broadly as any intervention that involved co-location of pharmacists within PHC settings, and/or pharmacists who worked as part of multidisciplinary healthcare teams using a range of integrative processes. These processes include informational methods (shared electronic healthcare records), care coordination for shared assessments, and governance frameworks (such as formal partnerships)[11], in order to deliver a range of clinical services both directly to patients and to other health care professionals.

2.2 Literature search

A search of the literature was undertaken between August and December 2019 using Medline, PubMed, CINAHL, the Cochrane Database of Systematic Reviews, and the JBI Database of Systematic Reviews to identify all relevant systematic reviews and meta-analyses regarding the integration of non-dispensing pharmacists in primary health care. In addition, a manual review of the reference lists of systematic reviews was performed.

The search strategy, developed in conjunction with a trained librarian, was conducted using the following MeSH and natural language terms and was adapted for each database: (pharmacists OR pharmaceutical services OR non-dispensing pharmacist OR clinical pharmacist OR pharmaceutical care) AND (primary health care OR general practice OR family practice OR patient care team OR community health service OR community health centre OR primary care OR outpatient care OR family medicine OR multidisciplinary health care team OR team based care) AND (systematic review OR review). The search terms used were purposefully broad to allow identification of all possible relevant publications. After deliberation, it was decided not to include search terms relating to 'patient outcomes' as this narrowed the search and eliminated relevant publications. Rather, all publications were manually screened to determine whether patient outcomes were the outcomes of interest. Two independent reviewers (CS and SC) screened the titles and abstracts of all publications for eligibility (based on inclusion criteria outlined below) and examined the full text of those considered eligible. Searches were limited to English language articles, those with human subjects, and a set date range of 1990-current was used.

2.3 Inclusion criteria

Inclusion criteria used for this review were determined in accordance with the PICO scheme (population, intervention, comparison, outcome)[10] as outlined in Table 1. Inclusion criteria consisted of (a) systematic reviews or meta-analyses; (b) studies that examined pharmacists as a member of a PHC team and/or were integrated or co-located within a PHC setting; (c) studies that primarily examined adults with chronic disease; and (d) studies that included patient outcomes. Patient outcomes were inclusive of changes in biomedical measures, prescribing quality, or medication adherence. Articles were excluded if they were unpublished or not clearly a systemic review or a meta-analysis, if they concerned health professionals other than pharmacists, or if they investigated pharmacists in a community pharmacy or inpatient setting.

Table 1. Population, intervention, comparison, outcome (PICO) scheme of inclusion criteria

Parameter	Description
Population	Inclusion: adults (over 18 years), chronic disease, any sex, any country, any ethnicity
Intervention	Inclusion: pharmacist integrated or co-located in PHC setting, provision of direct patient services or participation in the PHC team Exclusion: pharmacist based in community pharmacy or inpatient setting
Comparison	Usual care, lack of intervention
Outcome	Inclusion: patient outcomes (biomedical measures, prescribing quality or appropriateness, medication adherence) Exclusion: financial outcomes, analysis of interprofessional relationships

2.4 Study selection

In total, 589 publications were identified from searching the electronic databases and an additional two publications from manual searching (134 in Medline, 366 in PubMed, nine in the Cochrane Database of Systematic Reviews, 28 in CINAHL, 52 in the JBI Database of Systematic Reviews and two from manual searching). Of the 591 publications initially identified, five reviews were selected to include in the umbrella review after removal of duplicates and exclusion of publications which did not meet the inclusion criteria. A PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)[12] flow diagram outlining the included and excluded studies is presented in Figure 1.

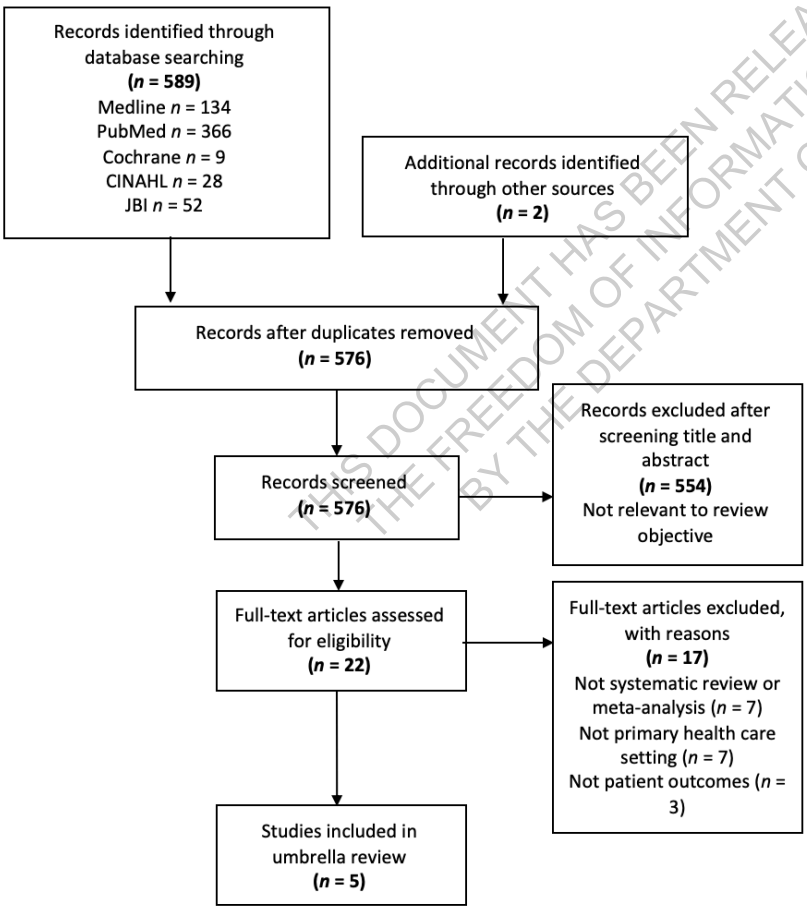

Figure 1. PRIMSA flow diagram of included and excluded studies

3. Results

3.1 Assessment of methodological quality of included studies and quality of evidence

Eligible publications were assessed for methodological quality using the critical appraisal tool for systematic reviews and research syntheses developed by The Joanna Briggs Institute[10], presented in Table 2. Each element of the checklist was designated as being 'met', 'not met', 'unclear', or 'not applicable'. This tool allows for an assessment of the quality of the included publications and was not used as part of the inclusion criteria.

Table 2. Joanna Briggs Institute critical appraisal checklist for systematic reviews and research syntheses

Checklist	Fish et al. 2002	Tan et al. 2014	Riordan et al. 2016	Fazel et al. 2017	Hazen et al. 2018
Review question clearly and explicitly stated	Met	Met	Met	Met	Met
Inclusion criteria appropriate for the review question	Met	Met	Met	Met	Met
Appropriate search strategy	Met	Met	Met	Met	Met
Adequate sources and resources used to search for studies	Met	Met	Met	Met	Met
Critical appraisal conducted by two or more reviewers independently	Met	Met	Met	Met	Met
Appropriate methods used to combine studies	Not applicable	Met	Not applicable	Met	Met
Likelihood of publication bias assessed	Unmet	Met	Met	Met	Unclear
Recommendations for policy and/or practice supported by reported data	Unclear	Met	Met	Met	Met
Appropriate specific directives for new research	Met	Met	Met	Unmet	Unclear

3.2 Data extraction and characteristics of included studies

For each eligible publication, the following data was extracted: author, year and journal of publication, objective(s) and outcome(s) of interest, type of review, participants, setting, number of databases searched, date range of database searching, publication date range, number of studies, types of studies, country of origin and conclusions provided by the authors. This information is presented in Table 3.

Of the five included publications[13, 14, 15, 16, 17], all presented a systematic review of the evidence, and two[14, 16] also presented a meta-analysis. A total of 161 studies were assessed across the five reviews, and included randomised controlled trials (RCTs), non-randomised controlled trials (non-RCTs), quasi RCTs, cohort studies, controlled before and after studies and pretest-posttest studies. Approximately 60% (97 of 161) of the studies were conducted in the US.

The studies were heterogenous in regard to 'integration' of NDPs into primary health care teams. Involvement of the NDP in the health care team ranged from short educational visits from pharmacists to primary health care providers, to pharmacists who had a regular relationship with a clinic or health centre, to fully integrated NDPs who were permanently employed by a primary care organisation, had a significant clinical role within the practice and had shared access to information systems and administrative support. One study[16] assessed pharmacists who provided direct patient care within a health care team, however involved a number of settings such as hospital outpatient clinics, community pharmacies, community clinics and primary care physician offices. Only 10 of the 35 included studies in this publication specified that the nature of the pharmacist intervention was a 'collaborative practice agreement'.[16] All other publications[13 14, 15, 17] specified 'primary health care' or a related term as a search or inclusion criterion. Only one review[13] assessed the impact of the degree of integration of NDPs into health care teams on patient health outcomes in PHC settings.

All studies primarily examined interprofessional collaboration between pharmacists and GPs. In terms of characteristics of the patient populations assessed, only two specified particular age ranges (over 18 years[16], and over 65 years[15]). Across the included studies patients were either categorised according to a particular chronic

disease; or were considered more broadly as patients prescribed multiple medications, those at risk of an adverse health issue or those at risk of a medication-related adverse event. Chronic diseases or medication-related issues considered in the studies included hypertension[13, 14, 15, 17], dyslipidaemia[13, 14, 15, 17], diabetes mellitus[13, 14, 15, 16], metabolic syndrome[13, 14], heart failure[13], depression[13, 14], osteoporosis[13], cardiovascular disease[13, 14], pain[14], chronic obstructive pulmonary disease (COPD)[14], menopause[14], and polypharmacy.[17] One study[16] only investigated diabetes mellitus. None of the included studies identified if participants were from marginalised groups such as Indigenous peoples or peoples residing in remote geographical locations.

In terms of interventions, all studies considered pharmacist interventions that were educational, clinical, or both, and included direct patient services (for example medication reviews) and involvement in team-based care (for example providing recommendations to other health care providers or participating in team-based decision making). All reviews except one[17] stipulated that the comparison group was usual care or no intervention.

Outcomes examined across the included studies were also heterogenous, consisting of biomedical markers, changes in prescribing practices and medication adherence, as well as patient reported factors such as quality of care, quality of life and satisfaction. Four studies[12, 14, 16, 17] examined biomedical or clinical markers including HbA1c[13, 14, 16], lipids[13, 14, 16, 17], blood pressure[13, 14, 16, 17] and the Framingham risk score.[14] Improvement in prescribing practices, medication adherence and detection of medication-related problems were also outcomes assessed in four studies.[13, 14, 15, 17] One review[15] focused on changes in prescribing quality by examining the reduction in inappropriate prescribing using one of the following tools: Beers criteria, STOPP/START (Screening Tool for Older Persons Prescriptions/Screening Tool to Alert doctors to Right Treatment) and MAI (Medication Appropriateness Index). Studies also considered secondary outcomes such as improvement in quality of care[13, 17], improvement in health-related quality of life[13, 15, 17], and patient satisfaction.[15, 17] One study[13] examined 89 health outcomes inclusive of clinical health outcomes (biomedical markers such as HbA1c or blood pressure), patient-reported health outcomes (such as quality of life) and proxies of health outcomes (such as medication errors). One review[17] also contained a cost analysis of the included studies, however this was disregarded for the purposes of the umbrella review as cost was not an outcome of interest.

4. Discussion

4.1 Findings

Outcomes assessed in this review can be classified broadly as changes in biomedical markers (blood pressure, HbA1c, cholesterol, lipids, Framingham risk score), changes in prescribing practices or appropriateness (prescribing quality, reduction of inappropriate prescribing), and patient-reported outcomes (quality of life, patient satisfaction). Studies examined a range of interventions which were either pharmacist-led or involved a pharmacist for a range of diseases or medication-related problems. While most studies were conducted in PHC settings (general practice, family medicine clinic, community health centre), some included hospital outpatient clinics and community pharmacies in their analysis.[16] Due to the specific inclusion criteria used, only five publications were considered eligible for inclusion. Because of this significant heterogenicity and small number of included publications, a narrative synthesis of the evidence was considered the most appropriate method to discuss the findings.

In four reviews, pharmacist intervention had a positive effect on blood pressure, producing reductions in both systolic and diastolic blood pressure.[13, 14, 16, 17] However, only two reviews[16, 17] stated that these reductions were statistically significant. Pharmacist intervention was also found to reduce HbA1c in three publications[13, 14, 16], and cholesterol in four publications.[13, 14, 16, 17] One study[16] assessed all three of these biomedical markers in patients with diabetes, and found that pharmacist intervention reduced HbA1c, SBP and LDL-C, with significantly improved outcomes compared to the comparison group ($P < 0.01$). One review[14] assessed the impact of pharmacist intervention on the 10-year Framingham risk score and found a statistically significant reduction in cardiovascular risk (-1.83%). However only two studies were included in this assessment. One study[13] assessed 51 surrogate clinical health outcomes (such as blood pressure, cardiovascular risk, HbA1c), and found a positive effect of pharmacist intervention in 67% (a statistically significantly difference following the intervention compared with controls).

Three of the publications assessed prescribing quality. Pharmacist interventions were found to reduce inappropriate prescribing and improve prescribing quality.[14, 15] Positive effects on medication-related problems and medication adherence was reported.[14] One study[15] found that pharmacist intervention showed an improved MAI score and reduced inappropriate prescribing compared to the control group. One trial included in the review found that 'pharmaceutical care' provided by community pharmacists had no effect on appropriate prescribing.[15] Another publication[17] found that while medication reviews and patient prescribing advice achieved one or more of the outcomes of interest in seven of the eight included studies, some studies showed no statistically significant improvements and were of poor design.

Other outcomes assessed included secondary or patient-reported outcomes such as quality of life and patient satisfaction. These were the not the focus of any of the included studies and their discussion of these is limited. Pharmacist interventions were found to have little or no effect on quality of life.[13, 14, 16]

Authors commented on factors considered important to promote the success of NDP integration into primary care teams. In particular, multifaceted interventions (medication reviews, adherence assessments, advice, monitoring) were more likely to improve outcomes, as were those that encouraged verbal and written communication with GPs and patients.[14, 15] Access to medical notes was also deemed important for success.[15] One study[13] assessed the impact of the degree of integration of an NDP into the primary health care team on health outcomes. Integration was categorised as either none, partial or full based on organisational, informational, clinical, functional and normative integration. The review found that the degree of integration did not impact health outcomes overall. However, full integration of an NDP (one who is permanently employed as part of a multidisciplinary team with shared access to information and administrative support) had a positive effect on patient-centred pharmacy services (for patients with multimorbidity) such as resolving medication errors (70% of patient-centred services with fully integrated NDPs showed improved health outcomes).[13]

4.2 Limitations of the included publications

A majority of the studies included in the systematic reviews discussed were conducted in the US (97 of 161). Only five of the total 161 studies were conducted in Australia.[13, 16, 17] This limits the applicability of the results to the Australian health care context. Also, a number of the authors commented that the methodological quality of many of the included studies was poor[14, 15, 17], and all reviews stated that significant heterogenicity across interventions and outcomes made aggregation and generalisability of results difficult.[13, 14, 15, 16, 17]

4.3 Limitations of this umbrella review

There was significant heterogenicity of the populations, interventions and outcomes of interest in the included studies. This limits the degree to which this review can draw conclusions regarding the impact of integration of NDPs into PHC settings and patient outcomes. Due to the nature of an umbrella review, only systematic reviews and meta-analyses were included. As such, other publications that may offer useful insights were not included.

4.3 Implications

The aggregated results from the included reviews suggest that the integration of an NDP in PHC settings can improve patient outcomes and quality of care. Biomedical markers, such as HbA1c, blood pressure and cholesterol improved with pharmacist intervention across a number of trials. Pharmacist intervention also improved quality use of medications and reduced inappropriate prescribing. There was no effect on quality of life. Greater integration of pharmacists into the health care team with access to medical records and administrative services, as well as shared goals and responsibilities, may improve patient outcomes.

Research in this area is heterogenous, and therefore it is difficult to draw strong conclusions. Standardisation of populations, interventions and/or outcomes could improve the quality of research and allow for better applicability and generalisability. In particular, strategies that encourage better pharmacist integration into primary health care teams to deliver multifaceted interventions need further investigation.[18] The potential for pharmacists and community pharmacy to influence patient chronic disease outcomes can be constrained by a lack of pharmacist time (in lieu of dispensing medications), limited integration and interprofessional collaboration with clinicians to increase patient continuity of care (eg lack of access to medical records and respectful partnerships), and suboptimal timing to influence patient outcomes.[19] A clearer understanding of ways

to reduce barriers to pharmacist integration might better harness their pharmaceutical skills in primary health care settings.

5. Conclusion

Primary health care services in Australia, comprised of a range of health care providers, are faced with the challenge of addressing increasingly complex and chronic disease. When integrated into primary practice, non-dispensing pharmacists provide a range of clinical services within a team-based model of care that can improve patient outcomes and quality use of medications. Overall, the results of the included systematic reviews and meta-analyses suggest that the integration of a non-dispensing pharmacist has a positive effect on patient outcomes.

Table 3. Characteristics of included studies

Author, year, journal	Objectives	Outcomes	Type of review	Participants	Patient characteristics	Setting	No. of data-bases searched	Date range of database searching	Publication date range	No. and types of studies, country of origin	Conclusions
Fish et al. 2002 **The International Journal of Pharmacy Practice**	Effect and cost of practice-based pharmaceutical services	Changes in prescribing practices Prescribing quality Cholesterol BP Medication compliance QoL	Systematic review	Physicians/GPs Pharmacists/ Pharmaceutical prescribing advisors	Adults with chronic disease (hypercholesterolaemia, hypertension, polypharmacy, COPD) Patients at risk of medication-related errors	GP practice Community health centre	5	Jan 1980-March 2001	1983-2000	16 studies RCTs UK Australia Sweden Canada US	Educational outreach visits, medication reviews and patient specific prescribing advice were effective in achieving desired outcomes There is insufficient evidence to generalise about cost-effectiveness of the interventions
Tan et al. 2014 **Research in Social and Administrative Pharmacy**	Effectiveness of clinical pharmacist services delivered in primary care general practice clinics	HbA1c BP Cholesterol Framingham risk score	Systematic review and meta-analysis	GPs Pharmacists	Adults with chronic disease (CVD, diabetes, depression, metabolic syndrome, pain, COPD, menopause) or polypharmacy Patients at risk of medication-related errors Patients at risk of adverse health problem	GP practice	4	1966-2013	1996-2013	38 studies RCTs US UK Canada Brazil Chile Japan Thailand Jordan	Pharmacist co-location in GP clinics delivered a range of interventions with favourable results in chronic disease management and quality use of medications
Riordan et al. 2016 **SAGE Open Medicine**	Effect of pharmacist-led interventions in optimising prescribing	Change in prescribing appropriateness: Beers criteria STOPP/START MAI Clinical or patient-reported outcomes eg QoL or patient satisfaction	Systematic review	Pharmacists Physicians Nurses	Community-dwelling older adults (>65 years) with polypharmacy, drug-related problems	GP practice Family medicine clinic Veterans Affairs medical centre	11	Inception-Dec 2015	1996-2010	5 studies RCTs Quasi-RCTs Controlled before and after studies Interrupted time series US UK New Zealand	Pharmacist-led interventions involving access to medical notes and medication reviews conducted in physician practices with feedback to physicians may improve prescribing appropriateness

Fazel et al. 2017 **Annals of Pharmacotherapy**	Impact of pharmacist interventions as part of the health care team on diabetes therapeutic outcomes in ambulatory care settings	HbA1c Systolic BP LDL-C	Systematic review and meta-analysis	Pharmacists	Adults with Type 1 or Type 2 diabetes mellitus	Hospital-based outpatient clinics Community pharmacies Primary care physician offices Community clinics	9	1995-Feb 2017	1996-2016	42 studies (Systematic review = 42 studies Meta-analysis = 35 studies) RCTs Non-RCTs Pretest-posttest studies US Australia Iran Jordan Thailand	Pharmacists' interventions as part of the patient's health care team improved diabetic therapeutic outcomes by significantly reducing HbA1c, SBP, LDL-C
Hazen et al. 2018 **Research in Social and Administrative Pharmacy**	Impact of degree of integration of a non-dispensing pharmacist on medication related health outcomes in primary care	Real clinical health outcomes eg mortality Surrogate clinical health outcomes eg HbA1c, lipids, BP Patient reported outcomes eg QoL Proxies of health outcomes eg quality of care performance indicators	Systematic review	Pharmacists GPs	Adults with chronic disease (diabetes, hypertension, dyslipidaemia, metabolic syndrome, heart failure, depression, cardiovascular disease, osteoporosis)	Primary care practice	2	1966-June 2016	1996-2015	60 studies RCTs Two group cohort studies One group cohort study US UK Brazil Canada Hong Kong Jordan Australia Sweden	Full integration of a non-dispensing pharmacist into a primary health care setting adds value to patient-centred (heterogeneous patients such as those with multimorbidity and polypharmacy), but not disease-specific (patients with specific chronic conditions), clinical pharmacy services

BP = blood pressure, SBP = systolic blood pressure, LDL-C = low-density lipoprotein C, HbA1c = haemoglobin A1c, CVD = cardiovascular disease, COPD = chronic obstructive pulmonary disease, QoL = quality of life, GPs= general practitioners, RCT = randomised controlled trial, STOPP/START = Screening Tool for Older Persons Prescriptions/Screening Tool to Alert doctors to Right Treatment, MAI = Medication Appropriateness Index

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Integrated pharmacists in ACCHSs- Analysis of the assessment of clinical endpoints in Aboriginal and Torres Strait Islander patients with chronic disease (IPAC Project)

REPORT TO THE PHARMACEUTICAL SOCIETY OF AUSTRALIA FOR THE IPAC PROJECT

Final Report, May 2020.

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Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project.

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ABSTRACT

Objective

To assess the effect of integrated pharmacist interventions on intermediate clinical endpoints in Aboriginal and Torres Strait Islander adults with chronic disease attending Aboriginal Community Controlled Health Services (ACCHSs) compared with usual care (pre-intervention).

Design and participants

The study was a non-randomised, prospective, pre and post quasi-experimental community-based, participatory, and pragmatic trial that integrated a registered pharmacist within an ACCHS located in Queensland, the Northern Territory or Victoria. The intervention comprised non-dispensing medicines-related services, collaborative and coordinated care, including the provision of medication management reviews. Participants were usual patients of the ACCHSs aged 18 years or older with a chronic disease. Participants consented to receive the intervention and were followed for up to 15 months.

Outcome measures

De-identified participant data was electronically extracted from health records. Biomedical outcome measures comprised HbA1c in participants with Type 2 diabetes mellitus (T2DM), and systolic and diastolic blood pressure (SBP and DBP), total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (LDL-C), triglycerides (TG), estimated glomerular filtration rate (e-GFR), albumin-creatinine ratio (ACR), and absolute primary cardiovascular disease risk (CVD risk) for all participants.

Statistical analysis

The following differences were calculated for paired measurements: (1) for HbA1c and ACR: the differences between the most recent observation in the 12 months prior to enrolment and the final observation during follow-up; (2) for SBP, DBP, TC, LDL-C, HDL-C, TG, ACR: the differences in the mean baseline values (12-month pre-intervention period representing usual care) from the mean follow-up value; (3) for e-GFR: mean annualised e-GFR difference as the most recent e-GFR value 12 months pre-enrolment and at end of study divided by follow-up time between assessments; (4) and for the absolute CVD 5-year risk according to the Framingham risk equation for those not at high risk according to clinical criteria: the difference between assessment at enrolment and at the end of the study.

Differences for all outcome measures except for e-GFR were statistically compared against zero using cluster-adjusted (ACCHS) regression analyses techniques. For e-GFR, annualised differences were statistically compared against -3 (ml/min/1.73 m^2) a theoretically assumed value, using cluster-adjusted (ACCHS) regression analyses techniques. The effects of participant, health service, and intervention characteristics on differences of outcome measures were examined, including the influence of Home Medicines Review and other comprehensive reviews, using cluster (ACCHS) and length of follow-up time adjusted regression analyses.

Results

Participants (n=1,456) from 18 ACCHSs involving 26 integrated pharmacists were followed-up for a median of 285 (IQR: 219-352) days. At baseline, the mean age of participants within clinical endpoint groups defined by the availability of outcome measures stated above, ranged from 57- 58 years, and most (91-94%) were Aboriginal and/or Torres Strait Islander, 65 to 76% attended health services located in inner and outer regional locations, 59% to 75.4% had T2DM, and 87.5% to 90.2% had co-morbidity. Of the participants with data available for analysis, mean baseline HbA1c was 8.3% (n=539), mean SBP was 133 (n=1,103) with mean DBP of 80 mmHg (n=1,045), dyslipidaemia only pertained to elevated mean triglycerides (2.39 mmol/L, n=730), mean eGFR was consistent with Stage 3A of CKD (49.1 ml/min/1.73m^2, n=895), mean ACR levels were consistent with overt albuminuria (57.9 mg/mmol, n=475), mean BMI was 32.4 (n=991), with moderate CVD risk (10% to <15%, n=38).

There was a significant improvement in HbA1c in participants with T2DM, with a 2.8 mmol/mol or 0.3% (unit) reduction (p=0.001, 95% CI -0.4% to -0.1%). Significant reductions in diastolic BP (-0.8mmHg, p=0.008), total cholesterol (-0.15 mmol/L, p<0.001), LDL-C (-0.08 mmol/L, p=0.001), and triglyceride levels (-0.11 mmol/L, p=0.006) were observed for the entire participant collective. The mean calculated absolute 5-year CVD risk was significantly reduced by 1% (95% CI: -1.8% to -0.12%, p=0.027). The mean annual eGFR significantly improved with an increase of 1.9mL/min/1.73m^2 (95% CI: 0.1 to 3.7) from baseline (p<0.001). When participants with less than 6-months of follow-up were excluded, the mean annual eGFR decline was -0.2 ml/min/1.73m^2 (95% CI:-2.99 to 2.7), significantly less than the predicted decline of -3 (p=0.034, n=720). SBP significantly improved only for younger participants (<57 years, -1.8 mmHg, SD: 12.5, p=0.004).There were no net improvements in HDL-C. ACR stabilised with a mean difference of 3.8 mg/mmol (95%CI: -6.3 to 13.8,

p=0.42).No differential impact on clinical endpoints was identified by the type of medication management review (p>0.05).

Conclusion

Integrated pharmacists embedded into usual care in a range of geographical settings, can significantly improve the control of CVD risk factors, glycaemic control in patients with T2DM, and reduce absolute CVD risk in Aboriginal and Torres Strait islander adults with chronic disease. This evaluation supports the integration of non-dispensing pharmacists within ACCHS settings more broadly.

INTRODUCTION

In Australia, Aboriginal peoples and Torres Strait Islanders are five times more likely to die from chronic disease before the age of 75 years (premature mortality) than other Australians (2011-15).[1] This profound health disparity has generated many policies and programs to encourage better chronic disease prevention and management within primary healthcare services. Yet, despite their higher burden of disease, medication underutilisation, and inappropriate use of medications by Aboriginal peoples and Torres Strait Islanders persists when assessed within primary health care settings.[2 3] There are many reasons for this including health system factors such as poorer access to primary health care services,[4] culturally unsafe pharmaceutical support,[5] lack of health service integration,[6] disease profiles inconsistent with medicines listed on the PBS,[7] and suboptimal prescribing quality.[8] Patient factors include insufficient health literacy for optimal self-management of disease,[9] distrust of health services,[10] family and community obligations,[11] and belief in traditional medicines,[12] whilst condition-related factors include disproportionately high multimorbidity.[13] Socioeconomic factors may also affect the personal management of medicines such as adherence and storage.[14]

A whole of health system response is needed to tackle these factors. One strategy has been to integrate pharmacists within primary health care multidisciplinary teams so that patients and teams can receive better medication management support, direct care from a pharmacist, and a more joined-up experience of care. This strategy is intended to compliment and extend the services provided as usual care by community pharmacists'. Increasingly, studies are reporting that the addition of pharmacists to healthcare teams enhances quality prescribing,[15] biomedical outcomes,[16 17] and reduces hospitalisation.[18 19] Co-location of pharmacists within general practice appears to enable greater communication, collaboration and relationship building among health professionals.[20] However, the impact of integrated pharmacists on health outcomes for patients with chronic disease has never been evaluated in Aboriginal health settings.

The Australian Government Department of Health, under the Pharmacy Trials Program (PTP, Tranche 2) funding as part of the Sixth Community Pharmacy Agreement (6CPA) sought to improve clinical outcomes for patients utilizing the full scope of pharmacist's role in

delivering primary health care services. This Program supported a project to investigate the potential gains in health outcomes arising from integrated models of care within Aboriginal health settings- the *Integrating Pharmacists within Aboriginal Community Controlled Health Services* (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project. The project explored if integrating a registered pharmacist as part of the primary health care (PHC) team within ACCHSs (the intervention) led to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples with chronic diseases, when compared with prior (usual) care. Integration within ACCHSs meant that pharmacists had identified positions and core roles, shared access to clinical information systems, provided continuous clinical care to patients, received administrative and other supports from primary health care staff, and adhered to the governance, cultural, and clinical protocols within ACCHSs as part of their shared vision.

If pharmacists can influence prescribing quality within these settings, improvements in participant biomedical outcomes such as a reduction in HbA1c (in patients with diabetes), blood pressure, lipids, albumin- creatinine ratio, and absolute primary cardiovascular risk, may be evident over time. Reductions in these clinical endpoints are proxy or intermediate outcome measures in lieu of distal outcomes such as CVD events. For example, pharmacological reductions in BP can significantly reduce the risk of major CVD events, coronary heart disease, stroke, heart failure and all-cause mortality including in patients with comorbidities.[21] Reduction in HbA1c in patients with T2DM can significantly reduce diabetes-related complications such as deaths related to diabetes, myocardial infarction, and microvascular complications.[22] Lipid lowering (as measured with serum cholesterol) using statin therapy over 5 years reduces the risk of major CVD events such as coronary deaths, non-fatal myocardial infarction, coronary revascularisation, or stroke by 20%.[23] The development of end stage kidney disease (ESKD) can also be slowed if albuminuria is reduced by 30% such as from anti-hypertensive therapy.[24]

Improvements in intermediate clinical endpoints may result from improved patient access to medication management reviews as pharmacists providing this service can detect and resolve errors in prescribing, medication omissions, inappropriate medication choices, and adverse drug reactions and interactions.[25] If pharmacists support patients to better address

all the World Health Organisation (WHO) dimensions of medication adherence,[26] this may play a significant role in improving patient outcomes as 'drugs don't work in patients who don't take them'.[27] Consistent with the chronic disease care model,[28] these influences may be more efficiently mobilised if pharmacists participate in chronic disease management plan development other team-care arrangements initiated by general practitioners and undertake active patient follow-up. Improved communication between integrated pharmacists and community pharmacy, as well as with tertiary care providers (such as hospitals when patients are discharged), may also facilitate improvements in biomedical outcomes as medication-related errors in the transition points of care are reduced.[29] [*See Supplementary file- IPAC Theory of change*]

The IPAC project commenced in 2018 and involved ACCHS as they deliver comprehensive primary health care to predominantly Aboriginal peoples and Torres Strait Islanders, and consequently do much more than just cure illness.[30 31] Primary clinical endpoints for the study were changes in HbA1c levels in those with T2DM, and changes in systolic and diastolic blood pressure (SBP and DBP), total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (LDL-C), triglycerides (TG), albumin-creatine ratio (ACR), and absolute primary cardiovascular disease risk (CVD risk). Secondary clinical endpoints with regard to biomedical measures were changes in annualized estimated glomerular filtration rate (e-GFR).

This report describes the clinical endpoint outcomes for participants enrolled in the IPAC trial. Other secondary endpoints included prescribing indices (appropriateness, overuse and underuse), medication adherence, patient self-assessed health status, and health service utilisation indices, but these outcomes are reported elsewhere.[32 33 34 35]

METHOD

Study Design

The IPAC project was a pragmatic, community-based, participatory, non-randomised, prospective, pre and post quasi-experimental study (Trial Registration Number and Register: ACTRN12618002002268) that integrated a registered pharmacist within the ACCHS primary healthcare team for up to a 15-month period. A total of 26 registered pharmacists were

recruited and appointed within ACCHSs to deliver 12.5 full-time equivalent pharmacist services for the duration of the study within ACCHS services (n=18). These ACCHSs were recruited for the project across three jurisdictions: Victoria, Queensland and the Northern Territory (NT), and comprised 34% (18/53) of all ACCHSs in these jurisdictions.

The IPAC project methodology has been described in detail elsewhere,[36] with health services characteristics also summarized in a separate report.[37] Briefly, IPAC pharmacists delivered non-dispensing clinical medication-related services within ACCHSs through a coordinated, collaborative and integrated approach to improve the quality of care of patients (the intervention). The intervention phase of the IPAC study comprised the period from participant enrolment to the end of the study (31st October 2019).

Study participants

Patients were eligible to participate in the study if they were aged 18 years and over with a diagnosis of cardiovascular disease (CVD), Type 2 diabetes mellitus (T2DM), chronic kidney disease (CKD), or other chronic conditions and at high risk of developing medication-related problems (e.g. polypharmacy). Patients attending ACCHSs for their usual care who met the study inclusion criteria were recruited as participants by health service staff and pharmacists. A non-probabilistic sampling method was adopted to reflect the pragmatic study design where all patients who had relevant chronic disease conditions were invited to participate without setting criteria for study compliance or other restrictions.[38] Patients were consented into the study by pharmacists or other health service staff according to the cultural protocols of the ACCHS,[39] after which pharmacists provided supportive clinical care as part of the primary healthcare team to meet the individual needs of the participant. All participating health service sites included participant access to a GP. The decision to provide a medication review to a participant was based on usual clinical criteria consistent with MBS rules, and was a decision made by the GP, with or without consultation with the integrated pharmacist.

Study sites

The majority of services (n=13 of 18) were located in outer regional and remote locations of Australia, and in regions of relative greater disadvantage for Indigenous Australians than other locations based on the Indigenous Relative Socioeconomic Outcomes (IRSEO) index.[40] Participating ACCHS sites were similar to other ACCHSs in their jurisdiction according to geographic location, and proportionate patient distribution by sex and Aboriginality [data not shown]. However, to minimize the risk of unreliable or missing data, only ACCHSs that had participated in continuing quality improvement activity for at least 24 months prior to enrolment were eligible for study inclusion.

In order to identify if incidental changes to health service systems during the intervention confounded the interpretation of study outcomes, additional health service information was sourced directly from each site through a 'health systems assessment' survey completed by two NACCHO project officers each visiting individual sites. Information was collected on service and client population size, number of episodes of care (annualised number of client contacts with the service, where all contacts with the same client on the same day are counted as one episode), number and types of staff, access to on-site specialist and allied health services, engagement with and the support received from community pharmacy, and systems for clinical management and chronic disease care.

By the end of the study, the vast majority of the broad health service level factors explored had not changed, as reported elsewhere.[41] Six ACCHSs were eligible for remote area support from community pharmacy through the Section 100 Pharmacy Support program that supports the quality assurance of medications dispensed from remote area Aboriginal health services.[42] This program did not usually require pharmacists to provide individual patient medication management services. Remote area support continued in these services during the intervention phase of the study. Five ACCHS sites also participated in the Health Care Homes (HCH) program funded by the Australian Government and designed to better coordinate the health care of patients with chronic disease,[43] with all located in the NT and predominantly in remote locations.

Integrated pharmacist interventions

As a pragmatic trial, pharmacists functioned within existing and usual primary health care service delivery systems and were trained to deliver ten core roles during the intervention

phase. Pharmacists provided medication management reviews (to resolve identified medication -related problems and optimise prescribing quality), assessed adherence and medication appropriateness, provided medicines information and education and training, collaborated with healthcare teams, delivered preventive care, liaised with stakeholders such as community pharmacy, provided transitional care, and undertook a drug utilisation review to support quality improvement within the ACCHS. Their intervention targeted both consented patients (participants) and practices, with practice-specific activities directed to health professionals and systems within the service. Two types of medication management reviews were offered to participants– a Home Medicines Review (HMR, also known as Medicare item 900), and a non-HMR defined as a comprehensive medication management review comprising some or all the elements of a HMR, but not fulfilling all relevant MBS HMR criteria. Pharmacists also scheduled patient follow-up assessments 3-6 months after the completion of a medication management review to reinforce advice, monitor the impact of any changes made, and determine if additional supports were needed. As there was no MBS rebate for these follow-up pharmacist services, pharmacists may have also supported practice nurses and Aboriginal and Torres Strait Islander Health Practitioners to undertake an MBS rebated follow-up of participants for a health assessment or a chronic disease care plan that included a medication adherence check (rebated as items 10987 and 10997).[44] This follow-up service was consistent with usual practice within each ACCHS, but could be enhanced by integrated pharmacists.

Pharmacists had the flexibility to apply their core roles to meet participant and ACCHS needs, matching their activity with the existing service and staff infrastructure in a full range of clinical settings. Participants were not charged a fee for any of the services they received from the integrated pharmacist.[45]

As reported elsewhere, pharmacists completed a total of 639 HMRs and 757 non-HMRs during the period participants were enrolled, as well as 1,548 other follow-up assessments to either a HMR or non-HMR. Medicines information to health staff was provided on 1,715 occasions, with 358 occasions of formal education and training services such as workshops and the provision of written resources to both patients and health professionals.[46] There were 47 completed stakeholder liaison plans and 3,233 separate contacts with community

pharmacy. Transitional care support was provided on 1,901 occasions and predominantly involved community pharmacy, hospitals, and renal units in order to support medicines reconciliation (such as with patient discharge from hospital), dose administration aid supply, and dispensing of medicines. The number of team-based collaboration activities that were logged was 3,165 (predominantly involving general practitioners (GP), nurses and Aboriginal Health Practitioners), and 26 drug utilization reviews were completed.[47]

Pharmacists

The Pharmaceutical Society of Australia (PSA) recruited pharmacists to be integrated within ACCHSs, in partnership with the National Aboriginal Community Controlled Health Organization (NACCHO). IPAC pharmacists fulfilled the following eligibility criteria: registration with the Australian Health Practitioners Regulation Agency (AHPRA); more than 2 years' post-registration experience; and post-graduate clinical qualifications or demonstrated clinical experience. Accreditation to conduct an HMR was preferred, however it was not mandatory. These criteria enabled the selection of pharmacists with skills aligned to the expected scope of practice for this project.

All pharmacists had access to participants electronic medical records held at the ACCHS to function as a member of the health care team. Medications were accepted by pharmacists as 'prescribed' if they were included in the patient's current medication list within the records. Pharmacists were also able to check other sources of information to validate the current medication list such as correspondence from specialist clinicians, discussion with the individual patient or other clinical staff, and by liaising with community pharmacy.

Data collection

De-identified participant data was collected from two existing clinical information systems (CIS) used by ACCHSs (Best Practice and Communicare) to manage patients' electronic health records and a bespoke online database (pharmacist logbook) to record information about pharmacist activity. Demographic, biomedical, and health service utilization indices were extracted from CISs in de-identified form using an electronic tool called GRHANITE. This tool required remote installation and regular extraction from IPAC sites for the term of the project.[48] Participant consent was recorded in the CIS by pharmacists. GRHANITE

extracted data only from consented patients and copied it to a JCU databank employing internationally recognised point-to-point encryption (P2PE) mechanisms to protect data in transit.

The scope of the data extractions was agreed based on IPAC-specific data requirements and extract definitions for GRHANITE XML's (site interfaces). Definitions ensured the fit-for-purpose collection of clinical endpoint measures and MBS-related measures such as participant MBS 900 claims pre-enrolment. All ACCHSs consented to the installation of GRHANITE and de-identified data extractions. Each ACCHS successfully completed 'site acceptance testing' to confirm the extraction of fit-for purpose data. The integrity of the data extraction process was monitored with weekly data uploads. XML interface maintenance ensured that any vendor software upgrades to the CIS were aligned with data extract definitions.

Deidentified CIS participant identification numbers in the GRHANITE extractions were linked with participant data recorded by pharmacists in the logbook. The pharmacist logbook was a secure password protected online database, accessible from any device connected to the internet, with dual recording and reporting functionality. The electronic interface was developed to be intuitive and user-friendly to minimise the burden of data entry and reporting. Pharmacists were trained to record activity details into the logbook including participant medication management reviews that were a HMR and/or a non-HMR, and the participant clinical diagnoses pertinent to patient eligibility criteria for the project. Information on the duration of participant chronic diseases was not collected.

The participants primary place of residence was not collected for privacy reasons, and so the location of the health service providing the intervention was used as a proxy. The geographical location of IPAC sites was defined to the Australian Statistical Geography Standard-Remoteness Area (ASGS-RA, 2016) which is a classification based on the physical distance of a location from the nearest urban centre.[49] The Indigenous Relative Socioeconomic Outcomes (IRSEO) index was used to define the relative advantage or disadvantage of geographical areas based on nine socioeconomic measures such as education, employment, housing and income for the Aboriginal and Torres Strait Islander

population. The measure is Indigenous-specific and assigns a score of one (1) for the most advantaged area and a score of 100 for the most disadvantaged area.[50] IRSEO data was sourced from publicly available datasets.[51]

The participants self-assessed health status was determined using the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?'.* An extra response option – 'very poor' – was added (as in the SF-8 survey) to reduce the potential for respondents to overstate their health status.[52] Responses to this single-item (SF-1) question have been shown to correlate well with multi-item tools measuring the same construct,[53] and are used in the National Aboriginal and Torres Strait Islander Social Survey.[54]

The extent of medication adherence for each participant was assessed using a self-reported indirect method of assessment with a single-item question: '*How many days in the last week have you taken this medication?*' This was asked for each medication the participant was taking. Pharmacists were trained to express the score as a proportion of the number of days the participant took the correct doses of the medication as prescribed in the preceding week. For example, if the patient took half the doses prescribed for the preceding week, this would be expressed as 50% of the days in the previous 7 days. An 'adherent day' was defined as not missing any doses of prescribed medicines on that day.[55] The mean number of adherent days in the preceding week ranged from 0-7 days, based on the mean score for all medications. This informed the proportion of days with the correct number of doses taken, which is a frequent summary statistic used for reporting medication adherence.[56] If the mean number of adherent days for participants was least 6 of 7 days, this approximated medication adherence for at least 80% of the days indicated.

Albuminuria was defined as a urinary albumin:creatinine ratio (ACR) >2.5 mg/mmol for males and >3.5mg/mmol for females.[57] [58] Estimated glomerular filtration rate (eGFR) as reported in CISs was used without derivation from serum creatinine measures. Patients already at a clinically high risk for a CVD event were those with any of the following: diabetes mellitus and age >60 years, diabetes mellitus and microalbuminuria (urinary ACR

>2.5 mg/mmol for males and >3.5 mg/mmol for females), eGFR <45 mL/min per 1.73 m^2, systolic blood pressure (BP) ≥180 mm Hg, diastolic BP ≥110 mm Hg, and serum total cholesterol >7.5 mmol/L.[59] Patients with existing CVD were defined as participants with a clinical diagnosis for any of the following: coronary heart disease, cerebrovascular disease, and peripheral vascular disease.[60]

Clinical endpoints such as blood pressure were measured by existing healthcare staff within ACCHSs as per usual care. Private laboratories conducted all pathology testing for ACCHSs using standardised enzymic methods through usual systems and were all accredited for testing by the National Association of Testing Authorities.[61] Additional point of care testing undertaken in some sites as part of usual care, complied with *Quality Assurance for Aboriginal and Torres Strait Islander Medical Services* (QAAMS) program requirements. The QAAMS program supported participating ACCHSs to ensure that such testing was conducted under a quality management framework delivering analytically sound performance.[62]

GRHANITE extracted relevant clinical endpoint data for each consented IPAC participant for the 12-month interval prior to participant enrolment into the study (representing pre-intervention usual care that was defined as baseline) and for the duration of the intervention until the end of the study date, set at 31st October 2019.

Clinical endpoints

Haemoglobin A1C (HbA1C):

The most recent HbA1c value in the 12 months prior to enrolment for participants with T2DM was compared with the follow-up result closest to the end of the study. The most recent value for this measure was considered clinically meaningful given that HbA1c is a measure of glycaemic control in the preceding 2 to 3 months of participant involvement in the study and free of daily fluctuations.[63]

Systolic and diastolic blood pressure, lipid profile (HDL-C, LD-CL, TG, and TC) and ACR

The mean of values in the 12 months (365 days) prior to participant study enrolment was considered baseline, whilst the mean of values in the period after enrolment until the end of the study, was considered the follow-up result. Given that the recommended frequency for

repeat ACR testing according to clinical practice guidelines is 2-yearly or annually,[64] for ACR, the most recent paired observations pre and post participant enrolment were compared due to the absence of repeat measures during the study period.

e-GFR

The outcome of eGFR change (ml/min per 1.73 m^2) was defined as 'eGFR at end of study – eGFR at baseline'/follow-up time. The follow-up time was defined as the time between the most recent baseline eGFR value and the follow-up eGFR value closest to the end-of study date, as per the eGFR Follow-Up Study involving adult Indigenous Australians.[65] According to this study, one baseline and one follow-up estimate for eGFR (based on serum creatinine) is considered sufficient to estimate short-term kidney function decline (up to four years) and the decline is linear.[66] In the eGFR Follow-Up Study, the mean annual unstratified (by albuminuria) eGFR change was estimated at -3.0 (-3.6 to -2.5) ml/min/1.73^2 from participants (irrespective of baseline eGFR) with at least 6-months of follow-up between eGFR measures.[67] [68] This magnitude of expected decline was used as a standard with which to compare the observed annualised eGFR change for IPAC participants. The use of paired single eGFR measures for the duration of the study provided sufficient data points given that eGFR screening recommendations for those older than 30 years and/or with T2DM, were 2-yearly or annually (respectively).[69]

Absolute cardiovascular (CV) risk score:

The absolute CVD risk was calculated for each participant at baseline and the end of the study (derived from mean values for continuous variables) by using the National Vascular Disease Prevention Alliance (NVDPA) absolute cardiovascular disease risk tool (http://www.cvdcheck.org.au/).[70] This tool was based on the 1991 Framingham Risk Equation (FRE)[71] to estimate the 5-year risk of a primary cardiovascular event in those not already at clinically high-risk for CVD or were free of existing CVD at baseline. The tool uses a composite of sex, age, systolic blood pressure, total cholesterol to HDL-C ratio, and T2DM, plus smoking status measures (excluding left ventricular hypertrophy). This equation is recommended for people without existing CVD (primary risk) who are aged 30-74 years as outlined in clinical practice guidelines for the Aboriginal and Torres Strait Islander population.[72] [73] It was not applied to those with existing CVD nor to those already at a clinically high risk for a CV event

(>15%) at baseline.[74] Absolute risk estimates were not adjusted upwards given the FRE is known to underestimate absolute CVD risk in the Aboriginal and Torres Strait Islander population as this is subject to clinical discretion.[75]

Covariates to clinical endpoints

Changes in clinical endpoint's that could be attributable to a range of baseline participant, health service, and intervention-related characteristics (defined as covariates) were also examined. The participant-related covariates included: mean age at baseline; median length of time in the study (and/or length of time between endpoint measures); sex; baseline measures for medication adherence and the median number of medications, and baseline self-assessed health status. Health service-related characteristics included the IRSEO score of the health service location. Intervention-related characteristics investigated the influence of a HMR and non-HMR type of medication management reviews, as well as MBS rebates for item 10987 and 10997.

Sample size

A sample size of 732 patients with chronic disease was estimated to achieve power in excess of 80% to detect (1) an absolute CVD risk reduction of 1% (1-point difference) from baseline if a standard deviation (SD) of 2.7% was assumed;[76 77] (2) a clinically relevant reduction of 10mmHg (SD 20 mmHg) in systolic blood pressure and (3) 5mmHg (SD 10 mmHg) in diastolic blood pressure;[78 79] (4) a reduction in total cholesterol (-0.3mmol/L; SD 1 mmol/l),[80 81] (5) an increase in high-density lipoproteins (0.1 mmol/L; SD 0.4 mmol/l),[82 83] and (6) a reduction in low-density lipoproteins (-0.3 mmol/L; SD 0.9 mmol/l);[84] (7) a reduction in triglycerides (-0.9mmol/L; SD 1.5 mmol/l);[85 86] and (8) a 30% decrease in ACR (SD: 23 mg/mmol);[87 88] with an overall level of significance of 0.05 (adjusted for multiple testing k=8) using two-sided one-sample paired t-tests.

A total sample size of 119 T2DM patients was estimated to achieve power in excess of 80% to detect a decrease in HbA1c (in % units) from baseline of at least 0.5% with an assumed SD for change of 1% [89] with an overall level of significance of 0.05 using two-sided one-sample paired t-tests. The sample size calculations allowed for an attrition rate (including missing values) of 50% and assumed a design effect of 1.75[90 91] to adjust for the cluster sampling

approach. Calculations were based on a comparison of mean values in a paired analysis, and were conducted with PASS 2008 (NCSS, Kaysville, Utah, USA).

Data analysis

All participants with less than 90 days of follow-up were removed from the analysis due to their short length of stay in the study (n=90). Health Care Homes (HCH) participants who were also concomitantly enrolled in another program known as the 'Community Pharmacy in Health Care Homes Trial'[92] were also removed from the analysis (n=47) due to the potential for confounding from the additional support given by community pharmacy to individuals in this program. The remaining HCH participants were retained in the analysis. For each clinical endpoint measure, there were participants with insufficient pathology data to enable paired data analyses (baseline compared with follow-up), who were consequently excluded from the analysis.

Participant characteristics and biomedical outcomes data was extracted from the JCU SQL Server database using the Navicat 15 for SQL Server (PremiumSoft) database management tool or from the pharmacist logbook as Microsoft Excel files. All data was subsequently analysed using a number of statistical programs including the SPSS Statistics Premium version 24 (IBM) statistical package, Stata/MP 13.0 (StataCorp LP), and Microsoft Excel 2016 (Microsoft). Categorical variables are presented as absolute and relative frequencies. Depending on their distribution, numerical variables are presented as mean and standard deviation (SD) or median and interquartile range (IQR) as indicated accordingly. Statistical analyses were cluster-adjusted as the study design involved cluster sampling using ACCHSs as the primary sampling units.

Differences were calculated for paired measurements of clinical outcome measures as described above. Differences for all clinical outcome measures except for e-GFR were statistically compared against zero using cluster-adjusted (ACCHS) regression analyses by applying the svy : regress Stata command. The observed mean eGFR decline per annum (annualised) was calculated as the number of days between eGFR measurements was not the same for all participants. For e-GFR, annualised differences were statistically compared against -3 (ml/min/1.73 m^2) using a cluster-adjusted (ACCHS) regression analysis technique.

The value of -3 was the theoretically expected mean annual e-GFR (ml/min/1.73m^2) linear decline expected without the intervention.[93] A sensitivity analysis was done for e-GFR change by excluding participants with a follow-up (days between paired assessments) of ≤180 days (6 months).

The effects of participant, health service, and intervention characteristics on all differences of clinical outcome measures (except for e-GFR) were examined using cluster (ACCHS) and length of follow-up time adjusted regression analyses (svy: regress command of Stata). For annualised e-GFR change such analyses were cluster (ACCHS) adjusted only. Statistical significance was assumed at the conventional 5% level.

Ethics approval

Ethics approval for the project was received from four ethics committees in the three jurisdictions including St Vincent's Hospital Melbourne (SVHM) Human Research Ethics Committee (HREC), Victoria (HREC/17/SVHM/280), James Cook University HREC (mutual recognition of SVHM HREC, approval HREC/H7348), Menzies School of Health Research (HREC/2018-3072) and the Central Australian HREC (HREC/CA-18-3085).

RESULTS

Of 1,733 patients who consented to participate in the study, the IPAC cohort included in the analysis after initial exclusions comprised 1,456 enrolled participants who remained in the study until the end (Figures 1-11) and were followed-up for a median of 285 (IQR: 219-352) days following enrolment.

A number of participants were excluded from the analysis if there was insufficient data for analysis (n=138), or if study enrolment was less than 90 days (n=40). Participants were also withdrawn from the study (n=99) if evidence of consent was missing (n=38), if there was concomitant enrolment in the Community Pharmacy in HCH program (n=47), or for other reasons (n=14). Of the 1,456 participants who remained in the study until the end, analyses were conducted if paired biomedical outcomes data at baseline and follow-up was available (Figures 1-10, and Table 1). Of participants with T2DM, HbA1c paired data was available from 54% (539/997). The proportion of participants with paired data for other clinical

endpoints were: systolic BP for 76% (1103/1456); diastolic BP for 72% (1045/1456); total cholesterol for 45% (660/1456); LDL-C for 39.5% (575/1456); HDL-C for 43% (622/1456); triglycerides for 50% (730/1456), ACR for 33% (475/1456); and eGFR for 61.5% (895/1456). The proportion of participants with paired data to estimate the primary CVD risk score was 27% (390/1456). After exclusion of those already at high clinical risk for a primary CVD event (n=288) and the remainder with only established CVD (n=27), plus those missing data necessary to assess these exclusions (n=37), this left 9.7% (38/390) of participants whose primary CVD risk was estimated (Figure 10). The median length of stay in the study for participants in all clinical endpoint groups ranged from 255 to 301 days, with the shortest stay being for the calculated CVD risk group (Table 1).

Demographic and other baseline participant characteristics were consistently similar across all clinical endpoint groups (Table 1). The mean age of participants at baseline ranged from 57- 58 years with the exception of the smaller cohort assessed for calculated CVD risk (mean 60 years; n=38). There were almost twice as many females as males, most participants (91-94%) were Aboriginal and/or Torres Strait Islander, and >80% were eligible for social support (pensioner or other concession card holders). Participants were similar across the groups with respect to the geographical location of the ACCHS they attended. Most participants (65 to 76%) attended health services located in inner and outer regional locations, and most of the remainder (22 to 30%) attended remote or very remotely located health services. Very few participants attended health services located in urban centres (0 to 3%).

The clinical endpoint groups with paired data were similar with regard to the mean number of prescribed medications (7.1 to 8.0) per person, the number of doctors encounters in the 12 months prior to enrolment (mean of 7.5 to 8.4), self-reported medication adherence (mean of 6.1 to 6.2 adherent days in the preceding week), and self-assessed health status (17.4% to 21.1% had 'excellent' to 'very good' health status). Similarly, the presence of co- or multimorbidity minimally varied between groups (87.5% to 90.2%, and 76.8% to 79.1% respectively). The proportion of participants with a clinical diagnosis of type 2 diabetes mellitus (T2DM) ranged from 59% to 75.4%, with the highest proportion being in the group tested for ACR. The range in the proportion of participants with a clinical diagnosis of

hypertension was 62.7% to 66.8%. The proportion of participants with dyslipidaemia (49.8% to 55.7%), chronic kidney disease (CKD, 37.4% to 46.8%), rheumatic heart disease or acute rheumatic fever (1.9% to 3.6%), chronic obstructive pulmonary disease (COPD, 5.8% to 9.2%) or depressive disorders (3.2% to 5.8%), also appeared similar between the clinical endpoint groups. Few participants across the groups (7.0% to 11.4%) had evidence of at least one medication management review in the 12 months prior to study enrolment (HMR based on MBS item 900 claims). Similarly, few participants were concomitantly engaged in the Health Care Homes (HCH) program (between 9.8% and 13.8% across the clinical endpoint groups), which is consistent with the remote geographical location of ACCHSs participating in this program. The smaller cohort who had their CVD risk calculated differed from the other groups by being proportionately more female (76.3%), from locations that were very remote (36.8%) and consequently also enrolled in the HCH program (18.4%), having fewer medications (mean of 5.3), and less multimorbidity (65.8%, Table 1).

At baseline, participants with T2DM had levels of glycaemia warranting further control measures (mean HbA1c of 8.3%, n=539). Participants as a whole were on average normotensive with a mean SBP of 133 (n=1,103) and mean DBP of 80 mmHg (n=1,045), whilst the only evidence for dyslipidaemia were elevated mean triglycerides (2.39 mmol/L, n=730). The calculated absolute 5-year CVD risk was classed as moderate (10% to <15%, n=38), the overall mean participant eGFR was consistent with Stage 3A of CKD (49.1 ml/min/1.73m^2, n=895), and mean ACR levels were consistent with overt albuminuria (57.9 mg/mmol, n=475, Table 2). Participants were on average obese at baseline with a mean BMI of 32.4 (n=991, data not shown).

Changes in primary and secondary clinical endpoints from baseline are shown in Table 2. By the end of the study, there was a significant improvement in HbA1c in participants with T2DM, with a 2.8 mmol/mol or 0.3% (unit) reduction (p=0.001, 95% CI: -0.4% to -0.1%). Reductions in diastolic BP (-0.8mmHg, 95% CI: -1.4 to -0.2, p=0.008), total cholesterol (-0.15 mmol/L, 95% CI: -0.22 to -0.09, p<0.001), LDL-C (-0.08 mmol/L, 95% CI: -0.13 to -0.03, p=0.001), and triglyceride levels (-0.11 mmol/L, 95% CI: -0.20 to -0.01, p=0.006) were statistically significant for all participants. The mean calculated absolute 5-year CVD risk was significantly reduced by 1% (95% CI: -1.8% to -0.12%, p=0.027) but the risk remained at

a ‘moderate’ level for participants. The mean annual eGFR for all participants significantly improved with an increase of 1.9mL/min/1.73m^2 (95% CI: 0.08 to 3.74) from the mean eGFR at baseline and was significantly higher than the predicted rate of annual eGFR decline of -3.0 ml/min/1.73m^2 (p<0.001). When participants with less than 6-months of follow-up were excluded, there was a decline in the mean annual eGFR by -0.2 ml/min/1.73m^2 (95% CI: -2.99 to 2.68), that remained significantly lower than the predicted annual rate of eGFR decline (p=0.034, n=720).

Although there was a slight increase in HDL-C (0.01 mmol/L), this change was not significant (p=0.32). There were no net improvements in SBP or HDL-C, and the mean ACR stabilised from baseline to the end of the study with a mean difference of 3.8 mg/mmol (95%CI: -6.3 to 13.8, p=0.42).

Across all clinical endpoints, more participants tended to be recipients of a non-HMR than a HMR by the end of the study (Table 3) as was described elsewhere.[94] With the exception of the calculated CVD risk participant group, the proportion of non-HMR recipients in the clinical endpoint groups ranged from 40.4% to 50.4%, versus 30.9% to 38.3% who were HMR recipients. By the end of the study, the proportion of participants who had received an MBS follow-up service for medication adherence ranged from 43.3% to 63.5% across all clinical endpoint groups (Table 3).

The effect of participant, health service, and intervention covariates on each clinical endpoint is shown in Tables 4-11, and 13-15. Although SBP was not significantly reduced for the cohort as a whole, younger participants (<57 years) had a significantly greater mean reduction in SBP of -1.8 mmHg (SD: 12.5) from baseline to the end of the study when compared to those who were older (p=0.004, Table 5). A significantly greater mean DBP reduction of -1.4 mmHg (SD 7.5) was also seen for younger participants (<57 years) compared with those who were older (p=0.012, Table 6).

A significantly greater reduction in SBP of -1.6 mmHg (SD: 14.9) was evident for participants who stayed in the study for a median of 266 days or longer compared with shorter stays (n= 588, p=0.03, Table 5). Participants with longer stays in the study (≥296 days) also had

significantly greater reductions in mean triglyceride levels of -0.20 mmol/L (SD: 1.34) compared to those with shorter than median stays (n=515, p=0.024, Table 10).

An increased length of stay in the study was associated with worsening of the eGFR. In participants who stayed in the study for a median of 296 days or longer (IQR: 234-359, n=450), the mean annual eGFR decline was -2.7 ml/min/1.73m^2 (SD 17.0), which was a significantly greater decline than for participants with a shorter than median stay (n=445, p<0.001, Table 13). Annual eGFR decline was even greater for participants with a minimum of 6 months between eGFR measures (as undertaken for sensitivity analysis). For these participants, a longer than median stay (≥317 days, IQR:252-366, n=372) in the study revealed an annual eGFR decline of -3.5ml/min/1.73m^2 (SD: 22.8), which was significantly greater than for participants with a shorter than median stay (n=348, p=0.003, Table 14).

The selected health service-related covariate (IRSEO score <median of 60) was identified as exerting an influence on clinical endpoints only for total cholesterol. The total cholesterol level of participants attending health services in more advantaged locations was reduced by -0.20mmol/L (SD 0.51) which was significantly greater than for participants attending services in disadvantaged locations (p=0.014, Table 7).

The intervention-related covariate MBS follow-up service that included assessments for medication adherence from items 10987/10997 was an influence only for participant triglyceride levels. A reduction in mean triglycerides of -1.8 mmol/L (SD 1.01) was significantly more likely in those who received this service (p=0.027, Table 10), compared to those who had not.

The influence of medication management reviews on clinical endpoints did not differ by the type of review (p>0.05), with two exceptions. The first was a significantly greater reduction in absolute CVD risk score observed for HMR recipients by -2.4% units (SD 1.1, for n=8) compared with non-HMR recipients of -0.5% units (SD 1.9, for n=22, p=0.039, Table 15), but the participant sample size was very small. The second was for participants with a minimum of 6 months between eGFR measures. HMR recipients in this subset had a significantly greater mean annual eGFR decline (-2.9 ml/min/1.73m^2, SD 19.3, n=258) than non-HMR

recipients whose eGFR improved rather than declined (+2.2 ml/min/1.73m^2, SD 30.1, n=314, p=0.035, Table 14).

There was a suggestion that participants with a poorer self-assessed health status had more favourable changes to both their HDL-C and ACR levels over time compared to the other participants, but these improvements were of borderline significance (p=0.048, Table 9 and p=0.047, Table 11, respectively). No effect on clinical endpoints was evident for any of the other covariates examined.

DISCUSSION

The IPAC study was set in ACCHS primary health care settings and is the first to explore the impact of integrated pharmacists on a range of intermediate clinical endpoints regarding Aboriginal and Torres Strait Islander adult patients with chronic disease. Compared with usual care (in the 12 months preceding the intervention), this study found that participants had significant improvements post- intervention in most primary and secondary clinical endpoints after a median of 285 days, compared with usual care pre-intervention. The intervention significantly improved glycaemic control in participants with T2DM and also brought about improvements in diastolic BP, total cholesterol, LDL-C, triglycerides, mean annual eGFR, and mean calculated absolute 5-year CVD risk in all study participants. Systolic BP significantly improved in those younger than 57 years of age. No change was observed in participant HDL-C levels, whilst ACR levels did not change during the study. The type of medication management review (HMR or non-HMR) received by participants did not influence the majority of clinical endpoints.

These clinical improvements were evident in a population with a substantial chronic disease burden that occurred at a relatively younger age than other Australians.[95] Almost all participants were Aboriginal and/or Torres Strait Islander, and most had polypharmacy (≥5 medications) and clinical diagnoses of T2DM, and/or hypertension. Approximately half had a clinical diagnosis of dyslipidaemia, and more than one-third had CKD. The mean participant baseline clinical endpoints were outside the target range for HbA1c, eGFR, ACR, and triglycerides, whilst mean BP and other lipids were within the normal range for the cohort as a whole.

Glycaemic control in participants with T2DM significantly improved with a mean -0.3% (2.8 mmol/mol) decrease in HbA1c after a median of 284 days (9.3 months). This change was consistent with the -0.18% to -2.1% HbA1c decrease (difference between intervention and control groups) observed over a mean of 9.4 months in 24 of 26 other studies that investigated pharmacist interventions in patients with T2DM.[96] HbA1c reductions of -0.6% to -1.1% for those with T2DM were also reported in another systematic review of the effect of pharmacist interventions.[97] This review also found no association between the duration of pharmacist intervention and change in HbA1c, which concurs with IPAC study findings.[98]

Even a modest HbA1c drop may translate to a reduction in micro and macrovascular complications in people with T2DM if sustained population wide. According to the UK Prospective Diabetes Study (UKPDS) *any improvement* in HbA1c in those with T2DM reduced the risk of diabetes complications, with little evidence of a threshold of effect. The quantum of impact was such that for each 1% reduction in HbA1c, the risk of microvascular complications was reduced by 37%, the risk of myocardial infarction by 14%, and the risk of death related to diabetes was reduced by 21%.[99] These benefits were realised over a 10-year observation period in a treated population *without* pre-existing CVD.

However, IPAC participants at baseline differed from the UKPDS population by having a higher BMI, a lack of baseline glycaemic control, a higher prevalence of macroalbuminuria, and 31% already had pre-existing CVD.[100] Therefore, these predispositions better aligned with the ACCORD study cohort with T2DM who were at high risk for CVD events.[101] This study found that patients benefited from a modest lowering of HbA1c, but not from intensive lowering, as those with HbA1c lowered to a median of 6.4% had a 35% higher risk of death from CVD causes.[102] [103] This suggests that the safest range for HbA1c in those with T2DM at greatest risk of CVD events appears to be between 7.0-8.0%.[104] However, Clinical Practice Guidelines (CPGs) tend to recommend a uniform HbA1c target for all patients with T2DM, adjusting glycaemic therapy so that HbA1c is maintained to ≤7%.[105] The modest, but significant HbA1c reduction observed in the IPAC trial may reflect the more appropriate clinical efforts that target individual needs, rather than meeting generic CPG targets. For

example, at the individual level, a 0.5% HbA1c reduction is considered a clinically significant change to aim for, whilst also taking into account the imprecision of the test.[106]

Optimising glycaemic control for Aboriginal peoples and Torres Strait Islanders with diabetes is complex as little empirical evidence exists to guide target-setting. The Aboriginal and/or Torres Strait Islander population is known to have an earlier age of onset and a higher risk of complications from diabetes, complicated by a reduced access to primary health care than other Australians.[107] This means there is a greater propensity to disease progression over time, and a need for earlier and sustained glycaemic control measures to minimise longer-term complications.[108] Clinicians need to make judicious treatment decisions when individualising glycaemic targets, to balance the risks and benefits associated with treatment, and manage social and other factors affecting this population.

The net drop in HbA1c observed in this study may be attributed to more efficient and enhanced collaborations between clinicians and integrated pharmacists to optimise prescribing decisions. Other studies, also conducted within Aboriginal primary health care settings but not involving a pharmacist, reported significant and similar drops in HbA1c (-0.4%) in Aboriginal and Torres Strait Islander patients with diabetes after one year. Patients attended health services where staff were better supported to adhere to clinical guidelines through systems changes and regular systems improvement cycles.[109] However, it is unlikely that these health system influences within IPAC sites acted to confound the impact of integrated pharmacists. [110] Health system assessment measures were explored pre and post intervention at IPAC sites, and the few changes identified were most likely explained by improvements generated by integrated pharmacist activity.[111]

The net mean reduction in diastolic BP for participants was significant but modest at 0.8mmHg, whilst systolic BP was significantly reduced by a mean -1.8mmHg for participants aged under 57 years of age, with a mean -1.6mmHg for those with a longer duration in the study (≥ 266 days). These net reductions occurred for the cohort as a whole from a baseline where two-thirds had a clinical diagnosis of hypertension but the mean systolic and diastolic BP was within the normal range. This BP change was smaller than reported in other studies following pharmacist interventions. Pooled analysis from 33 randomised controlled studies

that examined pharmacist medication management reviews conducted within ambulatory clinics (defined as settings with care mostly provided by general practitioners), showed a mean SBP and DBP reduction of -8.3 (range -1.5 to -22.6 mmHg) and -4.5 (range -0.2 to -12.9) mmHg respectively, between intervention and control groups over a mean follow-up period of 8.5 months.[112] Another analysis of 17 randomised controlled studies investigated collaborative and integrated pharmacist interventions for patients with T2DM over a mean follow-up of 9.4 months, and reported SBP and DBP reductions from -3.3mmHg to -23.0 mmHg and -0.2 to -9.1 mmHg respectively.[113] An analysis of 13 randomised and non-randomised controlled studies of pharmacist interventions targeted to patients diagnosed with hypertension reported a net mean SBP reduction of -7.5mmHg, and DBP reduction of -3.4mmHg over a mean follow-up of 7.6 months.[114]

Even the small but significant average DBP and SBP reductions shown for IPAC participants may attenuate the incidence of CVD events for Aboriginal and Torres Strait islander peoples if such reductions were population-wide, particularly for those with chronic disease. The benefits that accrue from BP reduction are not just limited to those with hypertension, which is why population-wide BP reduction strategies are recommended for the primary prevention of CVD events.[115] A population-wide reduction in DBP of a mere 2mmHg is estimated to reduce the prevalence of hypertension and CHD risk by 17% and 6% respectively, and combined with BP reductions in those needing medical treatment, could double or triple the impact of medical treatment alone.[116] A mere 1 mmHg reduction in SBP may substantially reduce heart failure (with 20 fewer cases for every 100,000 African-Americans per year), as well as CHD, and stroke incidence.[117]

The net effect of BP reduction in the IPAC study most likely emanated from the observed targeted improvements to prescribing quality and participant medication adherence, as reported elsewhere. Prescribing quality significantly improved following the IPAC intervention with reductions in inappropriate prescribing for BP lowering and diabetes medications,[118] a significant reduction in underprescribing of BP-lowering medications for those with T2DM and albuminuria,[119] and significant improvements in patient self-reported medication adherence.[120] Integrated pharmacists also delivered team-based care to optimise chronic disease management (such as case conferences) and preventive health

assessments, and attended patient group meetings to deliver preventive health messages such as advice on dietary and lifestyle improvements. [121]

The mean total cholesterol and LDL-C was normal or already well controlled at baseline for participants as a whole, but also reduced significantly following intervention. Total cholesterol reduced by 3.3% (to -0.15mmol/L) compared with baseline over a mean 314 days of follow-up. LDL-C reduced by 3.4% (to -0.08 mmol/L), whilst mean triglycerides that were elevated at baseline, reduced by 4.6% (to -0.11 mmol/L) over a mean 295 days of follow-up. HDL-C levels did not increase following the intervention.

This reduction in LDL-C levels was slightly less than reported by other studies that assessed the impact of pharmacist interventions in the general or dyslipidaemic population. The mean LDL-C reduction identified in a metanalysis of 9 randomised and non-randomised studies of pharmacist interventions for dyslipidaemic patients ranged from -1.4 to - 0.08 mmol/L in intervention groups over a mean of nearly 10 months follow-up. Like the present study, no impact on HDL-C levels was found.[122] Another meta-analysis of the impact of medication management reviews in the general population also showed a small (mean effect size of -0.23 to -0.39 mmol/l) reduction in LDL-C from 11 pooled studies in both ambulatory and community pharmacy settings when differences between intervention and control groups were compared over a mean of 9-months follow-up. In this analysis, the increase in lipid control was attributed to the positive effects of medication management reviews. [123]

The improvements in IPAC participant TC, LDL-C and TG levels were most likely mediated by significant improvements in prescribing quality and reduced medication omissions like lipid lowering drugs for those clinically at high risk for CVD, as was shown in other IPAC study reports.[124] [125] The small magnitude of the change in LDL-C post-intervention may have been a function of the already low baseline LDL-C of participants. Statins are particularly effective at lowering LDL-C levels, but for patients already on statins, only a 6% further reduction in LDL-C is achievable for every doubling of the statin dose such as a change from 20mg to 40mg of atorvastatin.[126] Based on subset analysis for the IPAC project, 72% of participants were already prescribed lipid-lowering medication at baseline,[127] meaning that further LDL-

C reductions beyond what was observed may have been difficult to achieve or clinically unnecessary.

Nevertheless, for those already on statins, reducing LDL-C levels by a further 0.51 mmol/l from the LDL-C at baseline over a year, can significantly reduce the residual risk for major CVD events by an additional 15% (on top of the existing 20% relative risk reduction per 1 mmol/L LDL-C reduction from statin therapy).[128] [129] This suggests that any population-wide reduction in LDL-C, even if small in magnitude such as demonstrated in the IPAC study, may have broader benefits in reducing major CVD events for Aboriginal and Torres Strait Islander peoples. Lipid lowering therapy should also be targeting those at highest CVD risk and not just those with elevated LDL-C levels.[130]

The reductions in LDL-C were not influenced by the selected patient, service, or intervention characteristics that were examined. This indicates that certain subsets of participants did not benefit more than others, nor was the change influenced by the type of medication review received. A similar LDL-C reduction was evident in participants who had a HMR compared to those who received a non-HMR.

The mean annual eGFR decline in IPAC participants was slowed significantly compared with the pre-intervention period. Participant eGFR change was compared to the standard established by the eGFR Follow-Up Study with an estimated rate of mean annual change in the progression of eGFR decline of -3.0ml/min (irrespective of baseline eGFR).[131] This study longitudinally followed 550 Aboriginal and/or Torres Strait Islander peoples recruited from ambulatory health care settings across remote and non-remote locations. At baseline, the cohort had a mean age of 46.3 years overall, but a subset of those with an eGFR <60 ml/min/1.73m^2 (n=85) had a mean age of 60.1 years, BMI of 27.8 kg/m^2, mean eGFR of 46.2 ml/min/1.73m^2, and a mean ACR of 73.5 mg/mmol, indicating that this subset had similar characteristics to the IPAC participant cohort. The annual rate of eGFR decline for the subset with baseline eGFR <60 ml/min/1.73m^2 was -5.0 ml/min/1.73m^2, and for those with ACR > 30 mg/mmol it was -6.0 ml/min/1.73m^2 (irrespective of baseline eGFR strata).[132] Thus, without intervention, IPAC participants were at risk of a much higher rate of eGFR decline per year than the selected expected rate. This further affirms that the progression of kidney

disease significantly slowed as a result of the intervention for IPAC participants. This benefit persisted after removing from the analysis those participants with less than 6-months of follow-up,[133] as eGFR was significantly less likely to decline in IPAC participants with shorter follow-up times.

A decline in eGFR of -5 ml/min/1.73m^2 over 2 years predicts a 1.5 and 1.2 times higher risk of ESKD and CVD events respectively, as shown in an analysis from the USA involving participants from mixed ethnic groups.[134] The eGFR Follow-Up study showed that those with a slower rate of kidney disease progression (a 5 ml/min/1.73m^2 higher eGFR) had an 18% risk reduction (hazard ratio 95% confidence interval 0.75-0.91) in combined renal endpoints over a median of 3 years (adjusted for aged, sex, and ACR) that included death from renal causes, and initiation of renal replacement therapy.[135] This suggests that the magnitude of the slowing in annual eGFR decline observed in IPAC study participants was clinically significant, and could delay the onset of these events if the impact of the intervention was sustained.

Slowing of the eGFR decline in IPAC participants was achieved in the absence of a significant reduction in mean ACR level upon follow-up. An increase in the ACR is usually an early indicator of CKD progression. An increasing ACR is also linearly associated with increasing risk for ESKD and both CVD and non-CVD related deaths when compared to those with a stable ACR, according to a large 2-year observational study that adjusted for baseline ACR, age, and a range of CVD risk factors.[136] So, whilst a higher ACR is also predictive of eGFR decline as shown for the Aboriginal and Torres Strait Islander population,[137] a reduction in ACR can prevent kidney disease progression.[138] Indeed, a 30% drop in ACR over 2 years was shown to be associated with a 22% relative risk reduction in ESKD in a large meta-analysis of prospective cohort studies.[139] In spite of this association, a third to half of ESKD outcomes in this meta-analysis developed *without any increase* in albuminuria, especially for those with high baseline albuminuria,[140] because even stable albuminuria remains a CVD and ESKD risk factor.[141] However, the management of CVD risk factors in those with CKD (eGFR 15-59 ml/min/1.73m^2) and T2DM can still reduce all-cause and CVD mortality, even without a change in ACR.[142] This was shown in a study including Aboriginal peoples with diabetes and micro or macroalbuminuria who were treated with an angiotensin converting enzyme

inhibitor (ACEI) plus other agents to reach blood pressure targets (including attempts to control glucose and lipid levels). Deaths were reduced from renal and non-renal causes, even though ACR and eGFR did not decline. Survival benefits persisted in those with overt albuminuria, even with stabilization of their ACR.[143] Only 11.6 people needed to be treated over a mean 3.39 years to avoid one death.[144]

Strategies to slow the rate of CKD progression (by slowing eGFR decline) are vital for Aboriginal peoples and Torres Strait Islanders as they have 10 times higher rates of end-stage kidney disease (ESKD) than other Australians and at much younger ages.[145] An improved use of ACEI, angiotensin-2 receptor blockers (ARB), and statins may have slowed eGFR decline and stabilised the ACR in IPAC participants. This is because ACEI or ARB treatments are known to reduce progression of albuminuria, the risk of ESKD, and CVD events in those with CKD.[146] Statins can significantly slow the rate of annual eGFR decline by -0.09 ml/min/1.73m^2 [147] to -0.19 ml/min/1.73m^2 [148] in those with baseline eGFR <60 ml/min/1.73m^2 as well as to reduce proteinuria. The improvements in lipids, the rate of eGFR decline, and ACR stabilization in the IPAC study likely followed improvements in prescribing quality, medication adherence, and participant access to medication management reviews.

Very few other studies have reported the impact of pharmacist interventions (in any setting) on eGFR and ACR clinical endpoints for patients with or without CKD. Of 36 studies included in a systemic review of pharmacist interventions in ambulatory care settings, only four reported ACR clinical endpoints and all showed no change.[149] A short study duration, small sample size, patients at low risk for CKD progression, and an inability to provide sufficient patient follow-up, may explain most of these research findings.

The mean 5-year CVD risk of IPAC participants was significantly reduced by an absolute 1% (or 8.4% relative risk reduction) over 255 days suggesting a clinically significant potential for primary CVD prevention. This composite risk measure could only be calculated from a small number of participants because most were already classified as 'high' risk for CVD (>15% in the next 5 years) for clinical reasons or due to existing CVD. A 1% absolute risk reduction in CVD events translates to a substantial population-wide impact over 5 years, as only 100

people need to receive the integrated pharmacist intervention to prevent one from developing a CVD event in that time. Integrated pharmacist influences on risk factors such as BP and lipids most likely explains this outcome as all participants in this small cohort were smokers (data not shown).

CVD risk was predicted by six other pharmacist intervention studies involving patients with T2DM, with only two demonstrating a significant decline.[150] Another systematic review of pharmacist interventions in general practice settings demonstrated a significant decline in predicted CVD risk in one of two studies.[151] In Aboriginal health settings, other types of interventions, such as electronic decision support tools for clinicians, have been used to enhance the primary prevention of CVD and reduce predicted CVD risk. One study increased the proportion of patients tested for certain CVD risk factors but had no statistically significant impact on clinical endpoints such as reductions in mean SBP, LDL-C, or a lowering of the calculated 5-year CVD risk.[152]

A major strength of the IPAC study was the large number of enrolled Aboriginal and/or Torres Strait Islander participants who remained till the study end (n=1,456), with initial exclusions undertaken for ethical reasons and to minimise confounding. Only one participant opted to withdraw from the study (reasons not given). After this, the vast majority of participant exclusions were due to missing data for paired clinical endpoint analysis, with numbers closely following the 50% attrition rate estimated apriori to determine the sample size. The study was therefore sufficiently powered to show the expected changes in clinical endpoints within pragmatic, real-life, ACCHS settings to inform on external validity. It is unusual for a clinical interventional study to enrol so many adult Aboriginal and Torres Strait Islander participants with chronic disease, suggesting that the community-based participatory research and pragmatic study design was a success factor,[153] as was shown in other large-scale (but non-interventional) studies.[154]

Medication management reviews were the most likely mechanism through which pharmacists influenced clinical endpoints. Such reviews have elsewhere been shown to improve prescribing quality,[155] improve CVD risk factors,[156] reduce underuse and overuse of medications,[157] and support patients with medication adherence and chronic disease self-

management.[158] IPAC Integrated pharmacists significantly increased participant access to these reviews. Elsewhere, we reported that the proportion of participants who received an HMR increased 3.9 times after a median of 284 days enrolment in the IPAC study compared with usual care pre-intervention. Integrated pharmacists needed to assess only 5 participants for one to receive a HMR.[159] Non-HMR services were also provided by integrated pharmacists as patients most in need of a HMR were known to be missing out on this service.[160] In the present analysis, we showed that clinical endpoints improved irrespective of the type of medication management review received by participants. This is an important observation given that non-HMRs served to enhance participants' access to a comprehensive medication management review (most were conducted within the health service setting) where participants were 'at risk of forgoing a HMR'.[161]

Other likely factors that served to enhance pharmacist integration and participant access to medication management reviews include a pharmacist workforce trained to target high-value pharmacotherapies specifically for the Aboriginal and Torres Strait Islander population, a receptive clinical environment that fostered their integration within the primary health care team, trusting and responsive relationships with prescribers, and access to patients' medical records.[162] [163] [164] [165] When prescribers are unsupported in challenging health service environments, quality improvement in intermediate clinical endpoint measures can be impeded.[166]

Limitations

Whilst this study had many strengths, there are several limitations that require consideration. Participants were not randomly assigned to receive the intervention but were sampled according to their eligibility as if the intervention was part of usual care. Internal validity may have been compromised if it was likely that participants enrolled in the study were more responsive to the advice of pharmacists and had less progressive chronic disease than those not enrolled but who also attended the same ACCHS. The characteristics of adult patients with chronic disease who were not enrolled in the study were not assessed, nor was it possible to assess the proportion of those who declined to participate. However, participant characteristics suggest they were at very high risk of disease progression over time. Of the enrolled participants, most had a substantial degree of

comorbidity, only a minority self-rated their health as very good to excellent (fewer than reported by Aboriginal and Torres Strait Islander adults with poorly controlled T2DM in a separate study[167] and the national average for adults[168]), no more than 11% had a prior medication management review, and there was suboptimal control of glycaemia with a mean eGFR indicating progressive CKD. Participants were from a population known to be at high risk for CKD progression to ESKD and at a rapid rate, within 2 years of follow-up.[169] Due to participants' severe chronic disease, the average number of doctors' visits for them 12 months prior to the intervention (7.5 to 8.4 visits) was above the average number of attendances per annum for all Australians at general practices (6.1 visits).[170] Selection bias may also have been minimised because of the large sample sizes (participants and sites) and representativeness of ACCHSs (they comprised one-third of all services in the jurisdictions involved in the study). The potential bias from sampling clusters from within ACCHSs was also minimised by statistical adjustment in the analysis of all clinical endpoint measures.

Without an external and randomised control group, it is possible that participant clinical endpoints improved independently of the IPAC intervention. This temporal trend might be mediated directly if participants had less progressive disease or from the effect of regression to the mean, or indirectly by other factors influencing medication management reviews. The possibility that participants had less progressive disease was clinically unlikely as already mentioned. However, the effect of regression to the mean may explain the observed improvements in BP and other endpoints, being a particular limitation of pre-post intervention studies without a control group. Regression to the mean occurs from the influence of chance on highly variable measurements, where long-term (average values) are less extreme than baseline values.[171] Most regression to the mean occurs from measurements taken within 3-6 months after baseline measurements.[172] The clinical endpoints analysed in this study used mean measures over a 12-month baseline time-period which is likely to have mitigated the influence of regression to the mean. In addition, participant baseline mean BP was not elevated which suggests that regression to the mean could have caused a 'headwind effect' if the effects of the intervention (to reduce average BP) were minimised from the opposing influence of upward regression to the mean.[173 174] This was demonstrated in a systematic review of 86 trials reporting change in BP where upward regression to the mean observed in those with low baseline BP levels acted to

counteract the BP reduction treatment effects.[175] Therefore, this effect may have biased mean differences towards the null value, thereby underestimating the observed impact of the IPAC intervention on BP change. Regression to the mean can also occur irrespective of how clinical endpoint values are measured.[176] Any information bias arising from the imprecision in BP measurements which could not be standardised for pragmatic reasons, or from laboratory measures, would have been non-differential, which in general implies a bias towards the null value.

EGFR changes over time from baseline were measured against an independently validated rate of annual eGFR decline that was applicable to the type of population included in the IPAC study. The significantly slowed eGFR decline that was observed relative to this expected decline offers empirical support in favour of the intervention effect, even in the absence of a control group. We also found that the quantum of clinical endpoint changes reported in the present study are similar to the findings of other trials that investigated pharmacist interventions in ambulatory care settings, even though these studies were randomised and externally controlled.

Indirect influences may have independently increased participant access to HMRs. As reported elsewhere, ACCHS characteristics and service activity did not change in ways that were independent of integrated pharmacists to otherwise explain the increase in HMR access.[177] Moreover, in qualitative analysis, clinicians and participants reported that the intervention had increased their access to medication reviews.[178] Substantial and significant increases in HMR access also occurred over a short time during this study, which also make it unlikely that this was mediated by external factors. [179]

The influence of potentially confounding programs on participants was removed from the analysis. This included participants concurrently enrolled in the *Community Pharmacy in Health Care Homes* Trial program that was undertaken around the same time as the IPAC project.[180] The few IPAC participants concurrently enrolled in the broader HCH program were not in receipt of additional community pharmacy support beyond usual care and were therefore not excluded. Moreover, the IPAC pharmacist was integrated within those services also operating as a HCH trial site, meaning that the HCH program could not have

acted as a confounder independently of the pharmacist. Non-HMRs were also a unique outcome of the IPAC project and cannot be attributed to external and independent influences.

A 50% attrition rate due to missing follow-up data was anticipated when deriving estimates of the sample size required to power the study. Follow-up of patients with chronic disease is a known challenge within primary health care settings and particularly with regard to underserved populations.[181] To minimise this data loss, only ACCHSs with experience in continuing quality improvement activity were eligible for study inclusion. Indeed, the proportion of participants who had a recorded result for clinical endpoints in the previous 12 months was higher in IPAC sites than reported by ACCHSs nationally based on key performance indicator data quality assurance reporting. A higher proportion of T2DM IPAC participants had a recorded eGFR test result over the previous 12 months (81.5%, 722/886, data not reported) than reported by all ACCHSs nationally (58% in 2017).[182] This was also observed for ACR testing and for HbA1c testing (62.5%, 554/886 of IPAC participants compared with 50% nationally, and 74.2%,657/886 of IPAC participants, compared with 64% nationally, respectively).[183] National quality assurance reporting includes reports from all ACCHS including those services that would not have met the site inclusion criteria for the IPAC study, that are generally smaller sites. It is important to note that this site inclusion criterion was set only to maximise data collection for trial purposes. It is possible that the intervention may have had an even greater effect within services requiring more support to improve the quality of care for their patients with chronic disease.

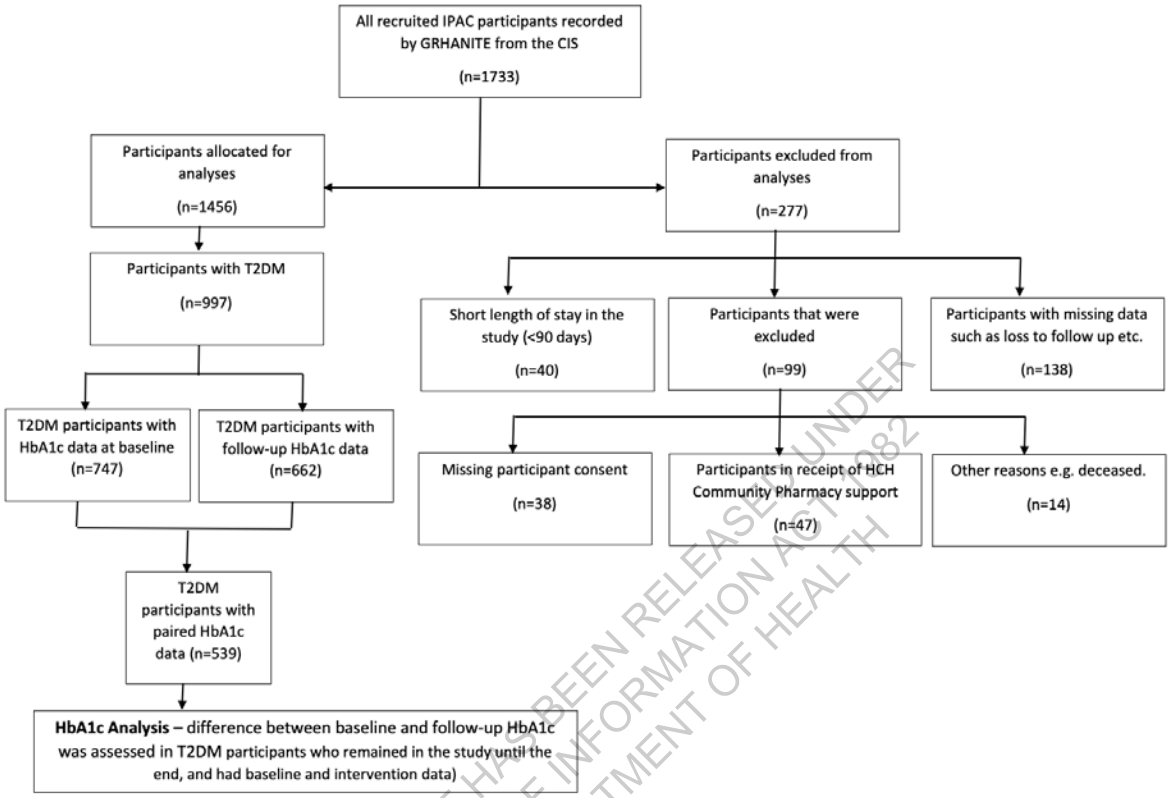
The outcomes attributed to the support provided by integrated pharmacists are generalisable to the broader ACCHS adult patient population with chronic disease who are at risk of developing medication related problems. This is because all study participants were usual patients accessing ACCHSs, were general patients rather than disease subgroups (with the exception of T2DM), a large number of ACCHSs participated in the study, and the study design was pragmatic being consistent with usual care. The lack of randomisation facilitated the recruitment of a large number of participants which also acted to optimise the external validity of the effects of the intervention.

Despite these limitations, no previous studies, to our knowledge, have evaluated the impact of integrated pharmacist services within Aboriginal health settings. This evaluation linked the observed clinical endpoint improvements to measured activities arising from the intervention such as medication management reviews, impacts on participant adherence, and practice-based activity that enhanced team care. According to the perspectives of stakeholders involved in the project, integrated pharmacists could have also influenced the quality of care in other intangible ways that are difficult to measure. These include the development of trust between the pharmacist, patients, healthcare providers, and external stakeholders such as community pharmacy that could have acted to improve the quality of care.[184] As a whole, the collection of multiple clinical endpoint improvements that were observed, support the effectiveness of integrated pharmacists within ACCHSs.

CONCLUSION

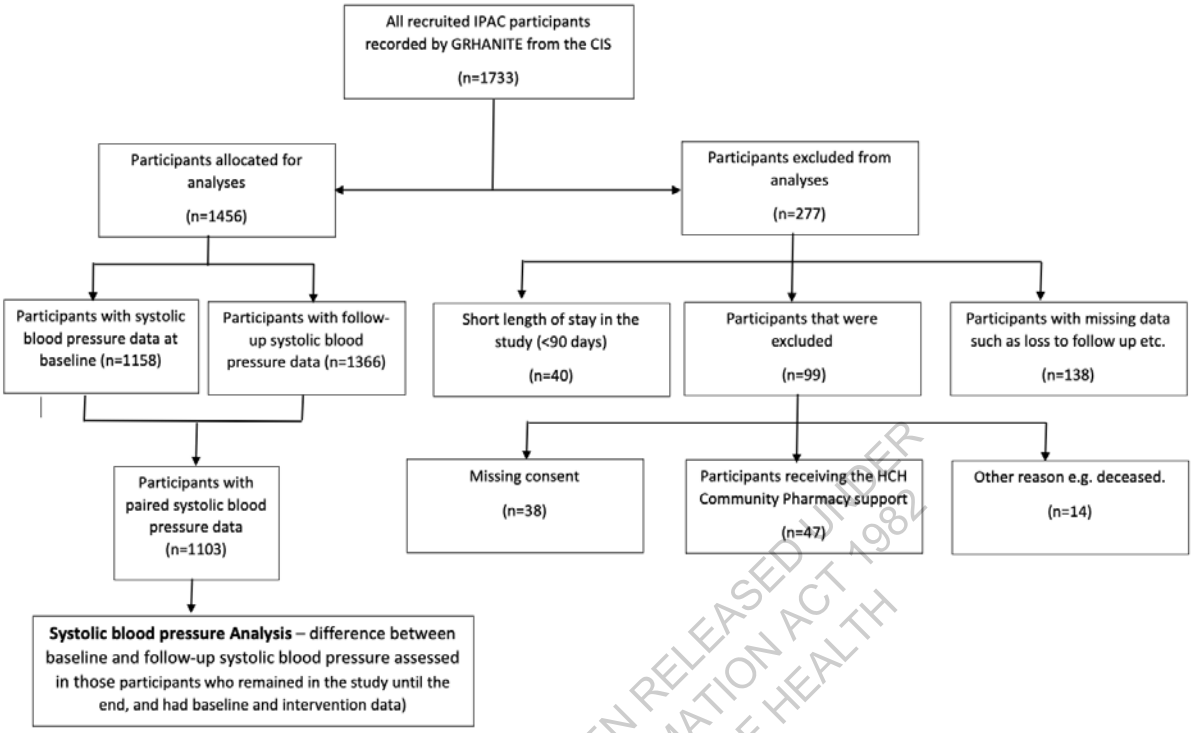
The IPAC study is the first work to investigate the impact of integrated pharmacist interventions with regard to Indigenous peoples by enrolling adult Aboriginal and Torres Strait Islander participants with chronic disease. It may be the largest prospective study that investigated the impact of integrated pharmacists using intermediate clinical endpoints in primary health care settings. The intervention comprised non-dispensing medicines-related services, collaborative and coordinated care, including the provision of medication management reviews by pharmacists integrated within Aboriginal community-controlled health services. The IPAC study findings show that integrated pharmacists embedded into usual care in a range of geographical settings, can significantly improve the control of CVD risk factors, improve glycaemic control in patients with T2DM, and reduce absolute CVD risk in Aboriginal and Torres Strait islander adults with chronic disease. This evaluation supports the integration of non-dispensing pharmacists within ACCHS settings more broadly. This will increase Aboriginal peoples and Torres Strait Islanders access to comprehensive medication management support to significantly reduce CVD risk factors in this already high-risk population.

Figure 1. Flow diagram for *HbA1c* outcome analysis in participants with Type 2 diabetes mellitus enrolled in the IPAC study



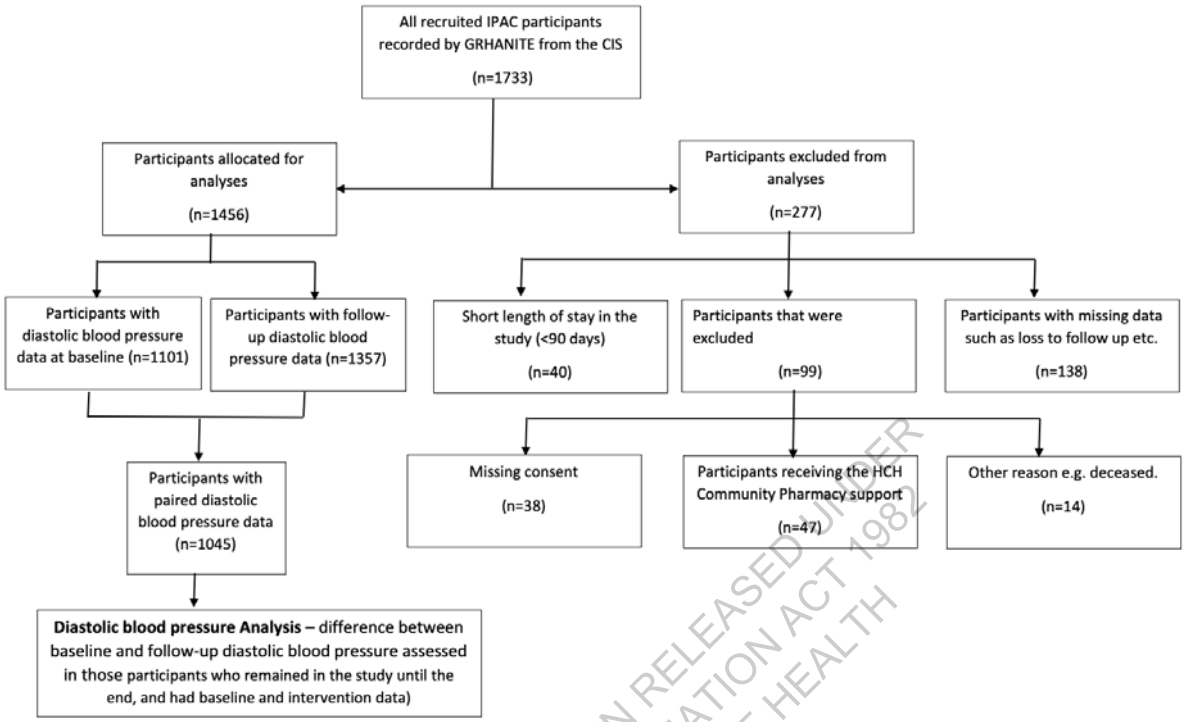
CIS= Clinical information systems
GRHANITE= Data extraction tool
HbA1c= Haemoglobin A1c
HCH= Health Care Homes
HCH Community Pharmacy support= Community Pharmacy in Health Care Homes Trial Program
T2DM= Type 2 diabetes mellitus

Figure 2. Participant flow diagram for *systolic blood pressure (SBP)* outcome analysis in the IPAC study cohort



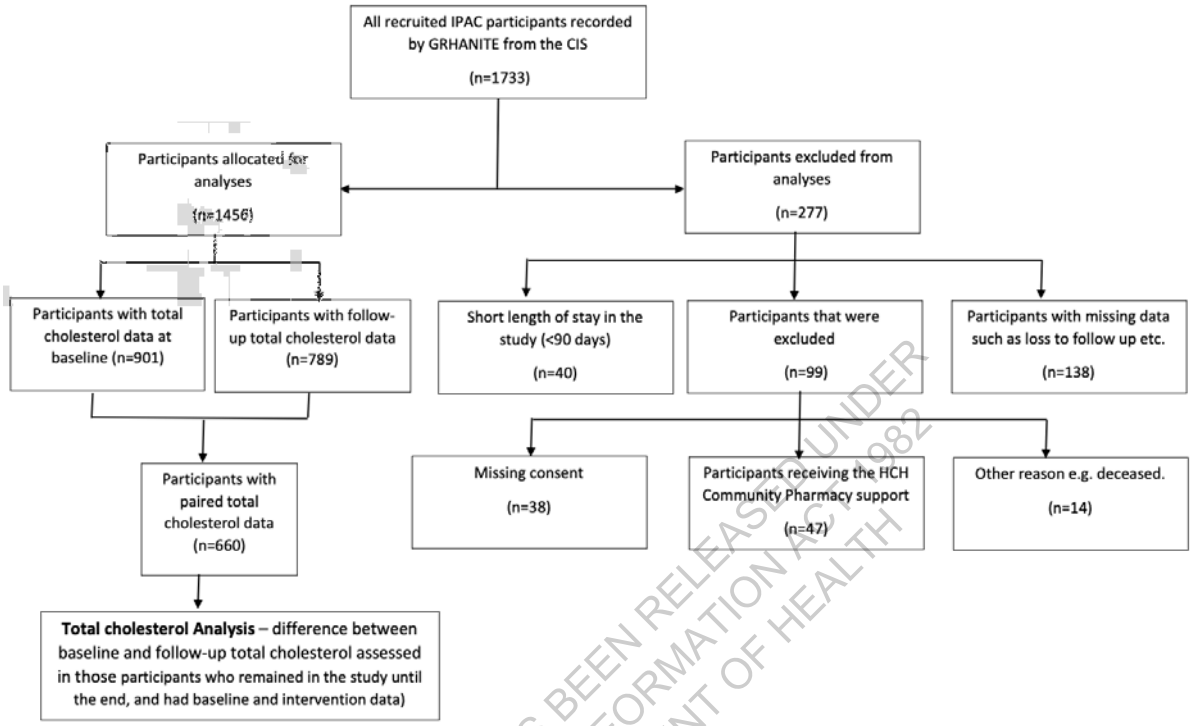
CIS= Clinical information systems
GRHANITE= Data extraction tool
HCH= Health Care Homes
HCH Community Pharmacy support= Community Pharmacy in Health Care Homes Trial Program

Figure 3. Participant flow diagram for *diastolic blood pressure (DBP)* outcome analysis in the IPAC study cohort



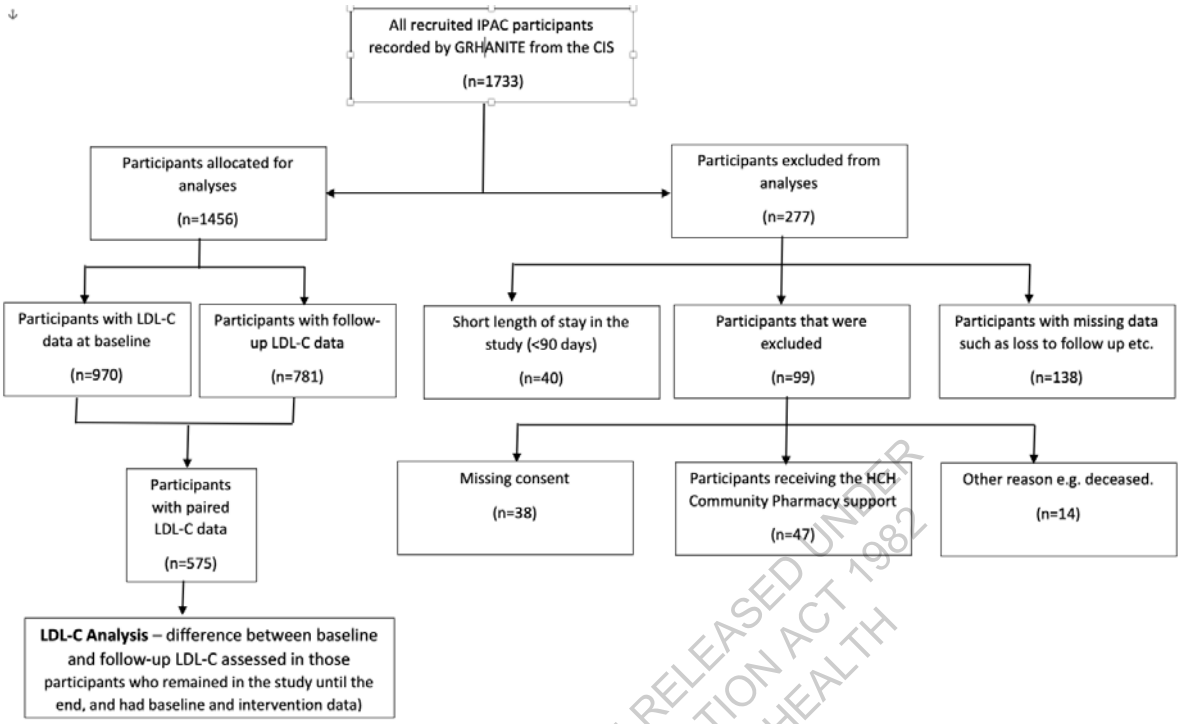
CIS= Clinical information systems
GRHANITE= Data extraction tool
HCH= Health Care Homes
HCH Community Pharmacy support= Community Pharmacy in Health Care Homes Trial Program

Figure 4. Participant flow diagram for *total cholesterol (TC)* outcome analysis in the IPAC study cohort



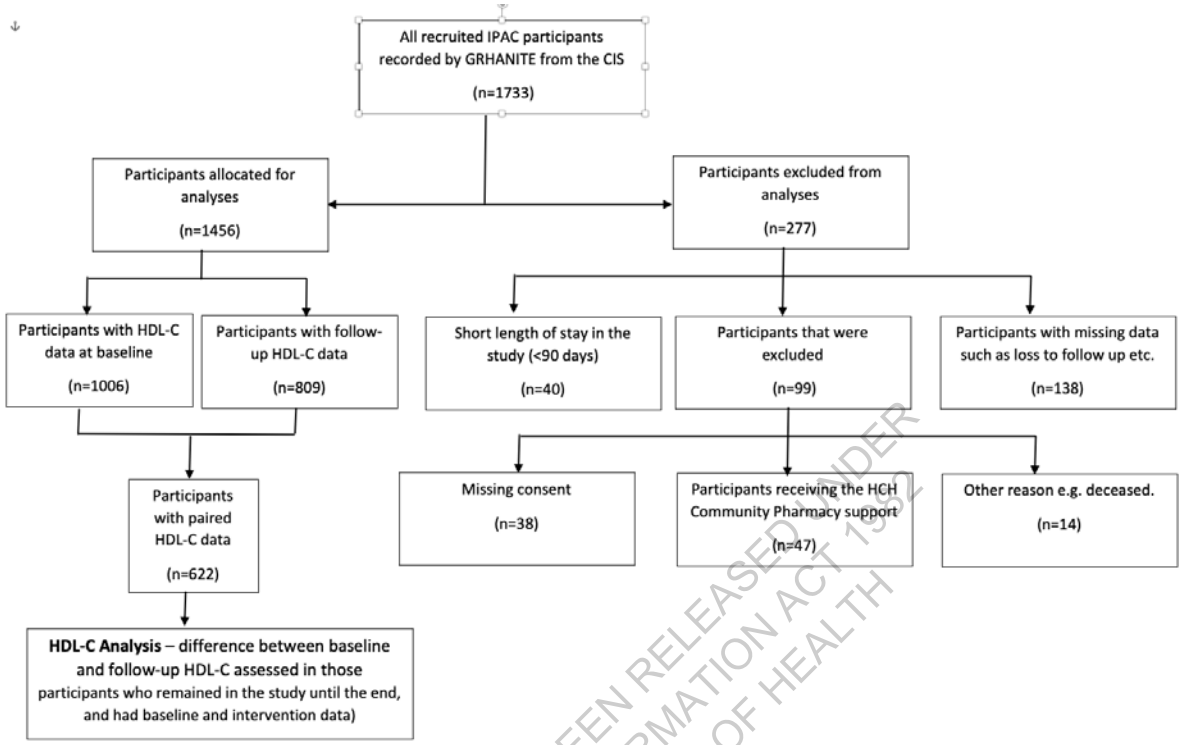
CIS= Clinical information systems
GRHANITE= Data extraction tool
HCH= Health Care Homes
HCH Community Pharmacy support= Community Pharmacy in Health Care Homes Trial Program

Figure 5. Participant flow diagram for *low density lipoprotein cholesterol (LDL-C)* outcome analysis in the IPAC study cohort



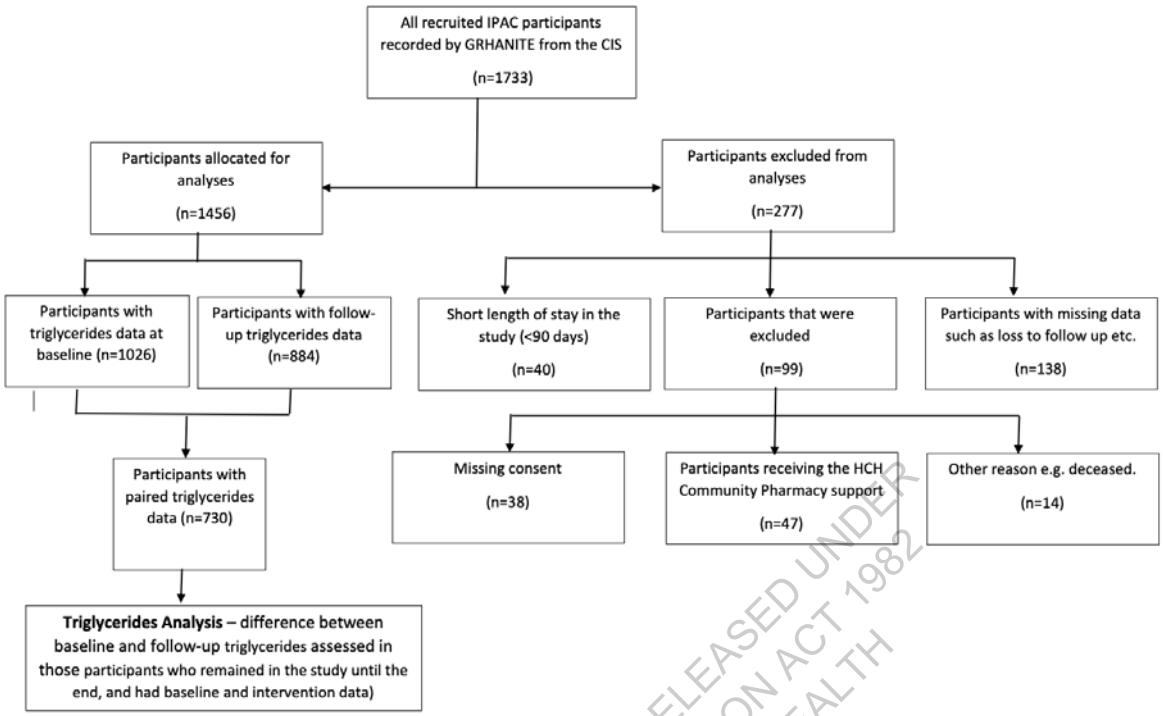
CIS= Clinical information systems
GRHANITE= Data extraction tool
HCH= Health Care Homes
HCH Community Pharmacy support= Community Pharmacy in Health Care Homes Trial Program

Figure 6. Participant flow diagram for *high density lipoprotein cholesterol (HDL-C)* outcome analysis in the IPAC study cohort



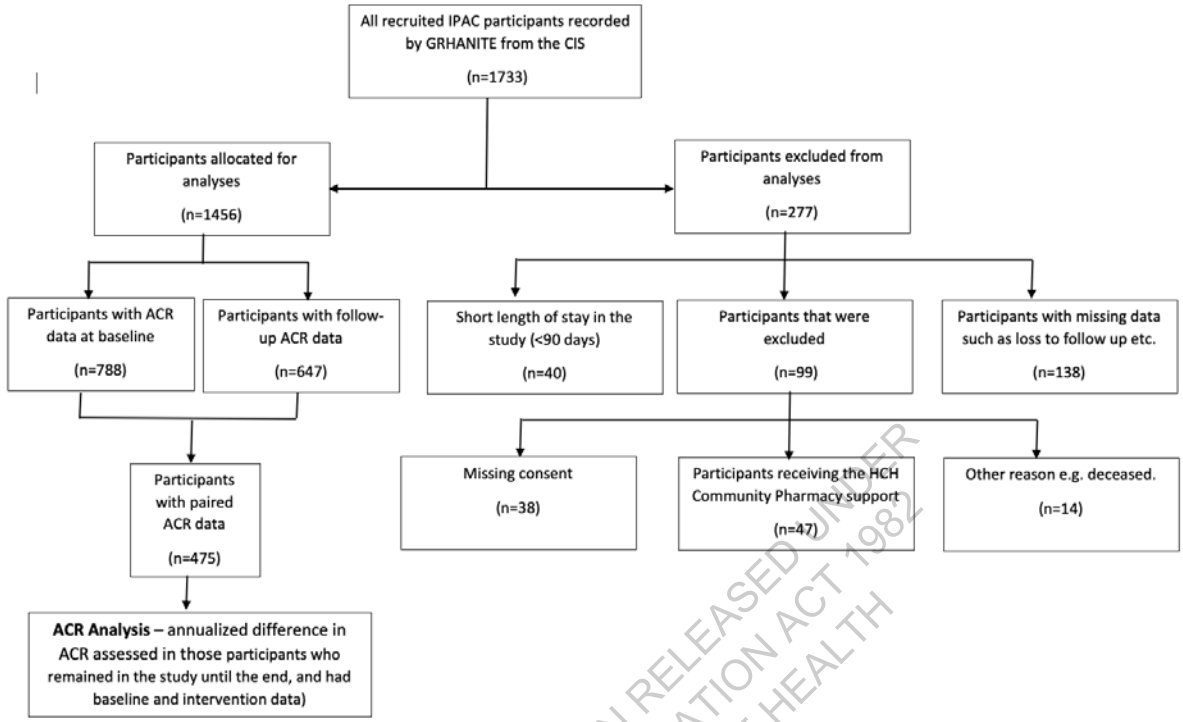
CIS= Clinical information systems
GRHANITE= Data extraction tool
HCH= Health Care Homes
HCH Community Pharmacy support= Community Pharmacy in Health Care Homes Trial Program

Figure 7. Participant flow diagram for *triglycerides (TG)* outcome analysis in the IPAC study cohort



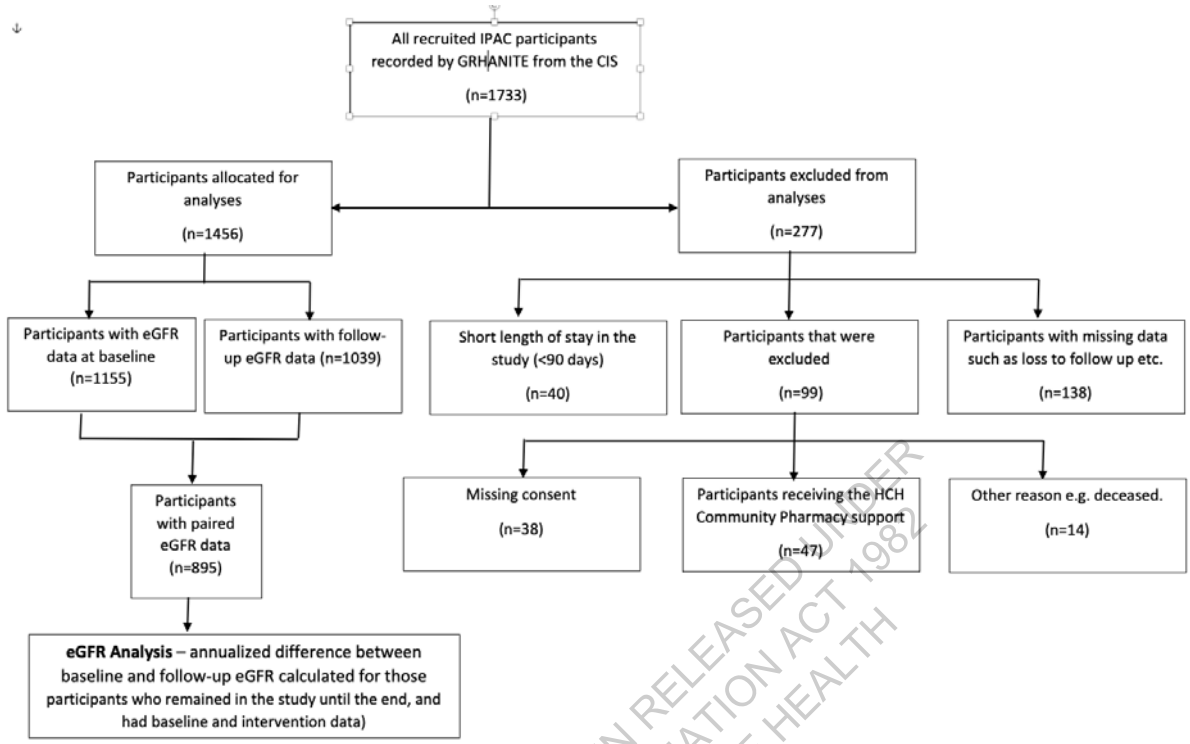
CIS= Clinical information systems
GRHANITE= Data extraction tool
HCH= Health Care Homes
HCH Community Pharmacy support= Community Pharmacy in Health Care Homes Trial Program

Figure 8. Participant flow diagram for *albumin-creatinine ratio (ACR)* outcome analysis in the IPAC study cohort



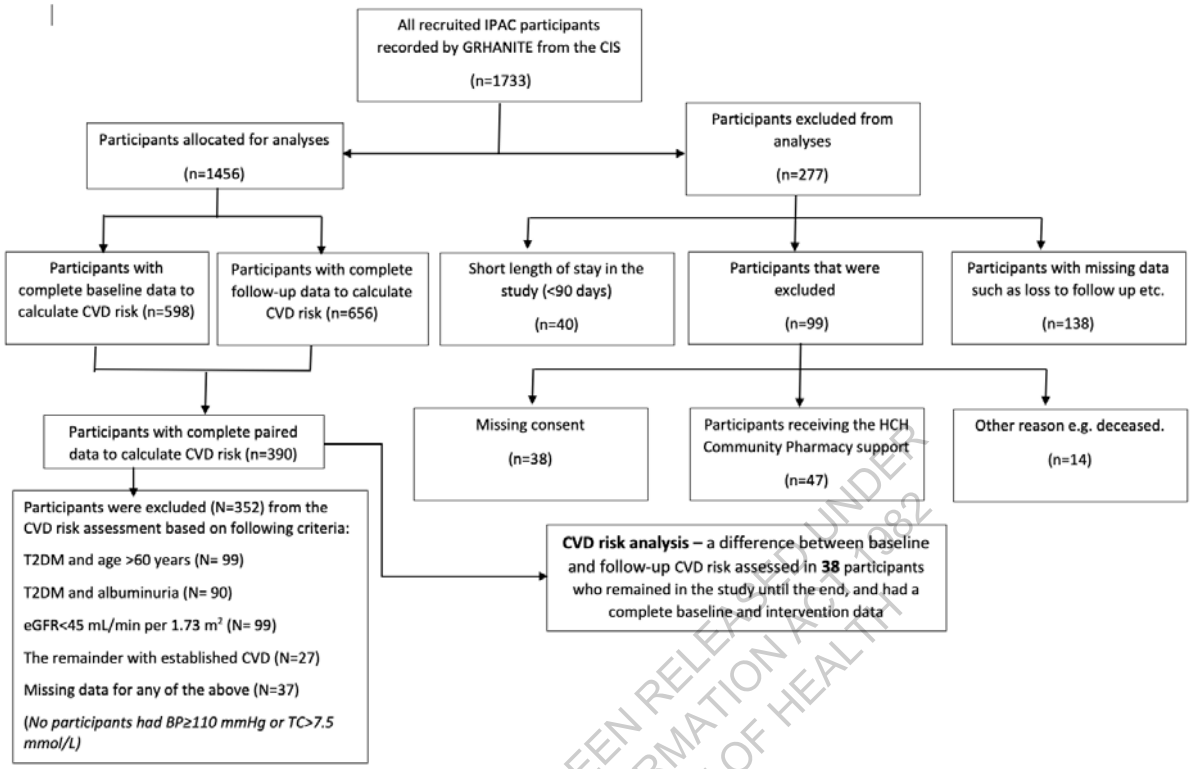
CIS= Clinical information systems
GRHANITE= Data extraction tool
HCH= Health Care Homes
HCH Community Pharmacy support= Community Pharmacy in Health Care Homes Trial Program

Figure 9. Participant flow diagram for *estimated Glomerular Filtration Rate (eGFR)* outcome analysis in the IPAC study cohort



CIS= Clinical information systems
GRHANITE= Data extraction tool
HCH= Health Care Homes
HCH Community Pharmacy support= Community Pharmacy in Health Care Homes Trial Program

Figure 10. Participant flow diagram for *calculated absolute cardiovascular disease risk (CVD risk)* outcome analysis in the IPAC study cohort



BP= blood pressure
CIS= Clinical Information Systems
CVD= cardiovascular disease
e-GFR= estimated glomerular filtration rate
GRHANITE= Data extraction tool
HCH= Health Care Homes
HCH Community Pharmacy support= Community Pharmacy in Health Care Homes Trial Program
T2DM= Type 2 diabetes mellitus
TC= total cholesterol

Table 1: Baseline characteristics of participants with Type 2 diabetes mellitus (T2DM, n=997) and the whole IPAC participant cohort (n=1,456) disaggregated into subsets with complete and paired pre and post-intervention biomedical outcome measures.

Patient characteristics	HbA1c in participants with T2DM (n=539)	SBP (n=1,103)	DBP (n=1,045)	TC (n=660)	LDL-C (n=575)	HDL-C (n=622)	TG (n=730)	ACR (n=475)	eGFR (n=895)	Estimated primary CVD risk* (n=38)
Location classification by ASGS-RA (2016)										
Major city (RA1)	5/539 (0.9%)	34/1103 (3.1%)	34/1045 (3.3%)	0/660 (0%)	1/575 (0.2%)	2/622 (0.3%)	0/730 (0%)	2/475 (0.4%)	26/895 (2.9%)	0/38 (0%)
Inner regional (RA2)	147/539 (27.3%)	381/1103 (34.5%)	377/1045 (36.1%)	113/660 (17.1%)	138/575 (24.0%)	144/622 (23.2%)	176/730 (24.1%)	89/475 (18.7%)	276/895 (30.8%)	7/38 (18.2%)
Outer regional (RA3)	240/539 (44.5%)	344/1103 (31.2%)	325/1045 (31.1%)	367/660 (55.6%)	271/575 (47.1%)	285/622 (45.8%)	344/730 (47.1%)	247/475 (52.0%)	367/895 (41.0%)	16/38 (42.1%)
Remote (RA4)	60/539 (11.1%)	155/1103 (14.1%)	124/1045 (11.9%)	55/660 (8.3%)	51/575 (8.9%)	66/622 (10.6%)	85/730 (11.6%)	41/475 (8.6%)	90/895 (10.1%)	1/38 (2.6%)
Very remote (RA5)	87/539 (16.1%)	189/1103 (17.1%)	185/1045 (17.7%)	125/660 (18.9%)	114/575 (19.8%)	125/622 (20.1%)	125/730 (17.1%)	96/475 (20.2%)	136/895 (15.2%)	14/38 (36.8%)
Mean age at baseline (SD) [years]	*n=539* 58.2 (20.9)	*n= 1103* 56.9 (36.5)	*n=1045* 56.9 (34.3)	*n= 660* 58.5 (25.7)	*n= 575* 58.3 (19.2)	*n= 622* 57.9 (22.4)	*n=730* 58.6 (24.3)	*n=475* 57.7 (21.1)	*n=895* 58.2 (26.9)	*n=38* 59.8 (7)
Sex (n,%)										
Male	188/539 (34.9%)	428/1103 (38.8%)	406/1045 (38.9%)	241/660 (36.5%)	216/575 (37.6%)	237/622 (38.1%)	280/730 (38.4%)	180/475 (37.9%)	346/895 (38.7%)	9/38 (23.7%)
Female	351/539 (65.1%)	675/1103 (61.2%)	639/1045 (61.1%)	419/660 (63.5%)	359/575 (62.4%)	385/622 (61.9%)	450/730 (61.6%)	295/475 (62.1%)	549/895 (61.3%)	29/38 (76.3%)
Ethnicity (n,%)	*n=539*	*n=1101*	*n=1044*	*n=658*	*n=574*	*n=621*	*n=729*	*n=474*	*n=892*	
Aboriginal and/or Torres Strait Islander	508/539 (94.3%)	1005/1101(91.3%)	953/1044 (91.3%)	617/658 (93.8%)	528/574 (92.0%)	571/621 (91.9%)	676/729 (92.7%)	453/474 (95.6%)	819/892 (91.8%)	37/38 (97.4%)
Non-Indigenous	31/539 (5.7%)	96/1101 (8.7%)	91/1044 (8.7%)	41/658 (6.2%)	46/574 (8.0%)	50/621 (8.1%)	53/729 (7.3%)	21/474 (4.4%)	73/892 (8.2%)	1/38 (2.6%)
Pensioner/concessional (n, %)	439/539 (81.5%)	891/1103 (80.8%)	839/1045 (80.3%)	573/660 (86.8%)	472/575 (82.1%)	513/622 (82.5%)	611/730 (83.7%)	403/475 (84.8%)	747/895 (83.5%)	28/38 (73.7%)
CTG scripts eligible (n,%)	418/539 (77.6%)	778/1103 (70.5%)	759/1045 (72.6%)	493/660 (74.7%)	425/575 (73.9%)	450/622 (72.4%)	553/730 (75.8%)	362/475 (76.2%)	682/895 (76.2%)	27/38 (71.1%)
Patient engaged in Health Care Home program (n, %) [a]	72/539 (13.4%)	134/1103 (12.2%)	119/1045 (11.4%)	86/660 (13.0%)	71/575 (12.4%)	86/622 (13.8%)	86/730 (11.8%)	64/475 (13.5%)	96/895 (10.7%)	7/38 (18.4%)
Number of medications# [b]	*n=441*	*n= 835*	*n=792*	*n= 558*	*n= 470*	*n= 508*	*n=606*	*n=399*	*n=722*	*n=32*
Mean (SD)	8.0 (10.5)	7.1 (11.6)	7.2 (11.0)	7.3 (7.1)	7.4 (8.7)	7.3 (9)	7.6 (9.8)	7.4 (7.8)	7.6 (10.7)	5.3 (4.8)

Patient characteristics	HbA1c in participants with T2DM (n=539)	SBP (n=1,103)	DBP (n=1,045)	TC (n=660)	LDL-C (n=575)	HDL-C (n=622)	TG (n=730)	ACR (n=475)	eGFR (n=895)	Estimated primary CVD risk* (n=38)
Median (IQR)	8 (6-10)	7 (5-9)	7 (5-9)	7 (5-9)	7 (5-10)	7 (5-9)	7 (5-10)	7 (5-9)	7 (5-10)	5 (3-7)
Prior medication review (MBS item 900) [c] (n,%)	57/539 (10.6%)	114/1103 (10.3%)	113/1045 (10.8%)	46/660 (7.0%)	53/575 (9.2%)	54/622 (8.7%)	71/730 (9.7%)	38/475 (8.0%)	100/895 (11.2%)	4/38 (10.5%)
Doctors' encounters prior to enrolment (per 12 months)[d]	*n=516*	*n= 1016*	*n=961*	*n= 629*	*n= 547*	*n= 591*	*n=701*	*n=445*	*n=839*	*n=36*
Mean (SD)	7.8 (14.1)	7.5 (22.3)	7.5 (22.6)	8 (17.6)	7.8 (14)	7.8 (13.9)	8.4 (15.9)	7.8 (16.0)	8.2 (18.8)	6.9 (5.4)
Median (IQR)	6 (3-10)	6 (3-10)	6 (3-10)	6 (3-10)	6 (3-10)	6 (3-10)	6 (4-11)	6 (3-10)	6 (3-11)	5 (4-9)
Mean number of medication 'adherent days' (SD)[e]	*n=441*	*n= 835*	*n=792*	*n= 558*	*n= 470*	*n= 508*	*n= 606*	*n=399*	*n=722*	*n=32*
	6.1 (4.2)	6.1 (5.8)	6.1 (4.2)	6.1 (3.5)	6.2 (2.2)	6.1 (3.8)	6.2 (3.4)	6.2 (3.4)	6.2 (3.5)	6.3 (1.7)
Self-assessed health status score (SF1): [# f] (n,%)	*n=388*	*n=787*	*n=746*	*n=484*	*n=414*	*n=448*	*n=533*	*n=336*	*n=636*	*n=31*
Excellent	20/388 (5.2%)	33/787 (4.2%)	34/746 (4.6%)	26/484 (5.4%)	15/414 (3.6%)	18/448 (4.0%)	27/533 (5.1%)	19/336 (5.6%)	27/636 (4.2%)	1/31 (3.2%)
Very good	54/388 (13.9%)	104/787 (13.2%)	104/746 (13.9%)	76/484 (15.7%)	60/414 (14.5%)	65/448 (14.5%)	85/533 (15.9%)	50/336 (14.9%)	98/636 (15.4%)	4/31 (12.9%)
Good	162/388 (41.8%)	327/787 (41.6%)	305/746 (40.9%)	200/484 (41.3%)	177/414 (42.8%)	185/448 (41.3%)	222/533 (41.7%)	129/336 (38.4%)	260/636 (40.9%)	12/31 (38.7%)
Fair	106/388 (27.3%)	229/787 (29.1%)	214/746 (28.7%)	135/484 (27.9%)	121/414 (29.2%)	132/448 (29.5%)	146/533 (27.4%)	101/336 (30.1%)	183/636 (28.8%)	11/31 (35.5%)
Poor	42/388 (10.8%)	77/787 (9.8%)	72/746 (9.7%)	40/484 (8.3%)	37/414 (8.9%)	44/448 (9.8%)	46/533 (8.6%)	34/336 (10.1%)	54/636 (8.5%)	3/31 (9.7%)
Very poor	4/388 (1.0%)	17/787 (2.2%)	17/746 (2.3%)	7/484 (1.5%)	4/414 (1.0%)	4/448 (0.9%)	7/533 (1.3%)	3/336 (0.9%)	14/636 (2.2%)	0/31 (0%)
Recorded clinical diagnoses: [#] (n,%)										
Type 2 diabetes mellitus	539/539(100%)	651/1103 (59.0%)	616/1045 (59.0%)	430/660 (65.2%)	380/575 (66.1%)	418/622 (67.2%)	482/730 (66.0%)	358/475 (75.4%)	562/895 (62.8%)	10/38 (26.3%)
Hypertension	360/539 (66.8%)	703/1103 (63.7%)	657/1045 (62.9%)	415/660 (62.9%)	365/575 (63.5%)	401/622 (64.5%)	458/730 (62.7%)	310/475 (65.3%)	574/895 (64.1%)	22/38 (57.9%)
Dyslipidaemia	300/539 (55.7%)	550/1103 (49.9%)	520/1045 (49.8%)	335/660 (50.8%)	290/575 (50.4%)	324/622 (52.1%)	367/730 (50.3%)	245/475 (51.6%)	446/895 (49.8%)	16/38 (42.1%)
Patients with established or existing CVD[g]	168/539 (31.2%)	363/1103 (32.9%)	344/1045 (32.9%)	221/660 (33.5%)	191/575 (33.2%)	209/622 (33.6%)	249/730 (34.1%)	153/475 (32.2%)	291/895 (32.5%)	0/38 (0%)
Chronic kidney disease	252/539 (46.8%)	456/1103 (41.3%)	429/1045 (41.1%)	278/660 (42.1%)	236/575 (41.0%)	261/622 (42.0%)	292/730 (40.0%)	220/475 (46.3%)	369/895 (41.2%)	18/38 (47.4%)

Patient characteristics	HbA1c in participants with T2DM (n=539)	SBP (n=1,103)	DBP (n=1,045)	TC (n=660)	LDL-C (n=575)	HDL-C (n=622)	TG (n=730)	ACR (n=475)	eGFR (n=895)	Estimated primary CVD risk* (n=38)
Patients with a diagnosis of rheumatic heart disease (RHD) or Acute rheumatic fever (ARF)	10/539 (1.9%)	32/1103 (2.9%)	27/1045 (2.6%)	19/660 (2.9%)	13/575 (2.3%)	13/622 (2.1%)	18/730 (2.5%)	15/475 (3.2%)	23/895 (2.6%)	1/38 (2.6%)
Chronic obstructive pulmonary disease (COPD)	31/539 (5.8%)	87/1103 (7.9%)	82/1045 (7.9%)	61/660 (9.2%)	46/575 (8.0%)	50/622 (8.0%)	56/730 (7. 7%)	35/475 (7.4%)	63/895 (7.0%)	6/38 (15.8%)
Depressive disorder	17/539 (3.2%)	64/1103 (5.8%)	60/1045 (5.7%)	36/660 (5.5%)	28/575 (4.9%)	30/622 (4.8%)	35/730 (4.8%)	20/475 (4.2%)	42/895 (4.7%)	0/38 (0%)
Patients with comorbidity (1 or more chronic diseases)	482/539 (89.4%)	967/1103 (87.7%)	914/1045 (87.5%)	577/660 (87.4%)	518/575 (90.1%)	561/622 (90.2%)	645/730 (88.4%)	423/475 (89.1%)	787/895 (87.9%)	33/38 (86.8%)
Patients with multi-morbidity (2 or more chronic diseases)	422/539 (78.3%)	851/1103 (77.2%)	804/1045 (76.9%)	507/660 (76.8%)	452/575 (78.6%)	490/622 (78.9%)	563/730 (77.1%)	368/475 (77.5%)	693/895 (77.4%)	25/38 (65.8%)
Median (IQR) length of stay in the study [days]	284 (232-350)	266 (210-325)	268 (210-325)	314 (239-360)	295 (239-351)	294 (237-350)	296 (237-356)	301 (238-365)	296 (234-359)	255 (203-316)

SD = cluster-adjusted standard deviation (ACCHS cluster);IQR = inter-quartile range;
ACR= albumin-creatine ratio
BP= blood pressure;
CTG= Close the Gap prescriptions (for Aboriginal peoples and Torres Strait Islanders) to waive or reduce the Pharmaceutical Benefits Scheme (PBS) patient contribution (co-payment).
CVD= cardiovascular disease.
DBP= diastolic blood pressure
eGFR= estimated glomerular filtration rate
HbA1C= glycated haemoglobin
HDL-C= high density lipoprotein cholesterol
LDL-C= low density lipoprotein cholesterol
MBS= Medicare Benefits Schedule.
SBP= systolic blood pressure
TC= total cholesterol
TG= triglycerides
[#] Sourced from the pharmacist's logbook.
[*] Estimated 5-year risk of a primary cardiovascular event according to the Framingham risk equation for those not at high risk according to clinical criteria (http://www.cvdcheck.org.au/)[185]

[a] Health Care Homes (HCH) program funded by the Australian Government designed to better coordinate the health care of patients with chronic disease
[b] Denominator was sourced from logbook data entered by pharmacists with regard to the medication adherence of participants.
[c] Prior MBS item 900 claim measured for the 12-month period prior to participant enrolment. This rebate pertains to a Home Medicines Review (HMR).
[d] Medicare GP consultation claim items: vocational registration: 3, 23, 36, 44. Non-vocational registration: 52, 53, 54, 57.
[e] A self-reported single-item question ('*How many days in the last week have you taken this medication?*') exploring the extent of non-adherence, assessed as a mean score for all medications. An 'adherent day' was defined as not missing any doses of prescribed medicines on that day. Pharmacists recorded the number of adherent days for each medication the patient was taking.
[f] Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'
[g] CVD= cardiovascular disease: It refers to any of the following: coronary heart disease, cerebrovascular disease, and peripheral vascular disease.

Table 2. Mean difference in primary and secondary clinical endpoints in IPAC study participants using paired pre and post-intervention measures, adjusted for health service cluster and the length of follow-up time.

Variable	Value pre-enrolment *mean (SD)*	Value during follow-up *mean (SD)*	Mean difference *mean (SD, 95% CI)*	p-value^
Primary clinical endpoints				
HbA1c*, mmol/mol [%units] (n=539 with a clinical diagnosis of T2DM)	66.8 (37.2) *[8.3% (5.5%)]*	64.0 (39.5) *[8.0% (5.8%)]*	-2.8 (19.5, -4.5 to -1.0) *[-0.3% (3.9%, - 0.4% to -0.1%]*	**0.001**
SBP, mmHg (n=1103)	132.7 (33.2)	132.0 (29.9)	-0.7 (16.6, -1.7 to 0.4)	0.16
DBP, mmHg (n=1045)	80.0 (35.6)	79.2 (29.1)	-0.8 (9.4, -1.4 to -0.2)	**0.008**
TC, mmol/L# (n=660)	4.51 (1.80)	4.35 (2.06)	-0.15 (0.77, -0.22 to -0.09)	**<0.001**
LDL-C, mmol/L# (n=575)	2.35 (1.20)	2.27 (1.20)	-0.08 (0.48, -0.13 to -0.03)	**0.001**
HDL-C, mmol/L# (n=622)	1.05 (0.5)	1.06 (0.5)	0.01 (0.25, -0.02 to 0.03)	0.32
TG, mmol/L# (n=730)	2.39 (2.43)	2.29 (2.21)	-0.11 (1.08, -0.20 to -0.01)	**0.006**
ACR, mg/mmol* n=475	57.9 (183.1)	61.7 (224.5)	3.8 (102.4, -6.32 to 13.83)	0.42
CVD 5-year risk, %units (n=38)	11.9 (7.2)	10.9 (5.4)	-1.0 (2.6, -1.8 to -0.12)	**0.027**
Secondary clinical endpoints				
eGFR* (no minimum follow-up time), ml/min/1.73m^2 (n=895)	49.1 (159.2)	48.4 (160.4)	1.9 (25.7, 0.1 to 3.7)**	**<0.001**
eGFR* (6-month minimum follow-up time), ml/min/1.73m^2 (n=720)	49.6 (140.6)	48.1 (145.4)	-0.2 (36.0, -2.99 to 2.7)**	**0.034**

Bold p-values imply statistically significant change at the 0.05 level.
^P-values (paired data) were derived from the cluster-adjusted (ACCHS cluster) comparison of differences against zero and were determined using the svy linearized : regress Stata command. The follow-up time in days between the enrolment date and the end of study date was added to all cluster-adjusted linear regression models.
SD = cluster-adjusted standard deviation (ACCHS cluster)
*Refers to last observation pre-enrolment and at follow-up. Unit conversion from IFCC (International Federation of Clinical Chemistry, mmol/mol) to DCCT (Diabetes Control and Complications Trial, %) units using the https://www.diabetes.co.uk/hba1c-units-converter.html units converter. eGFR reference range: Normal or Stage 1: CKD >89, Stage 2: 60-89 Stage 3A: 45-59, Stage 3B: 30-44, Stage 4: 15-29, Stage 5:<15. (Units in ml/min/1.73m^2), sourced from the National Guide (3rd Edn).[186] Albumin:creatinine ratio normal reference range: >2.5 mg/mmol for males and >3.5mg/mmol for females. Macroalbuminuria is defined as >25mg/mmol in males and >35 mg/mmol in females. Absolute CVD 5-year risk sourced from the National Guide (3rd Edn).[187]
**Mean annualised difference. P-value (paired data) were derived from the cluster-adjusted (ACCHS cluster) comparison of annualised differences against -3, as this is equivalent to a paired t-test. The value of -3 is the expected mean annual eGFR (ml/min/1.73m2) linear decline in Aboriginal and Torres Strait Islander adults (*see Tables 12-14*).
# Dyslipidaemia is defined by one or more of the following: Low Density Lipoprotein (LDL) >=3.5mmol/L; Total cholesterol (TC) >= 5.5mmol/L; Triglycerides (TG) > =2.0mmol/L; High density lipoprotein (HDL) < 1.0 mmol/L for men and <1.3 mmol/L for women [*Source: National Aboriginal and Torres Strait Islander Health Measure Survey, 2012-13*].[188]
ACR= albumin-creatine ratio
BP= blood pressure;
CVD= cardiovascular disease.
DBP= diastolic blood pressure
eGFR= estimated glomerular filtration rate
HbA1C= glycated haemoglobin
HDL-C= high density lipoprotein cholesterol
LDL-C= low density lipoprotein cholesterol
SBP= systolic blood pressure
TC= total cholesterol
TG= triglycerides
T2DM= type 2 diabetes mellitus

Table 3. Number and proportion of participants with clinical endpoint measures who were in receipt of medication management reviews, and services based on MBS item 10987 and 10997 (follow-up) during the intervention (intervention-related characteristics for covariate analysis).

	HbA1c* N=539 (n,%)	SBP N=1103 (n,%)	DBP N=1045 (n,%)	TC N=660 (n,%)	LDL-C N=575 (n,%)	HDL-C N=622 (n,%)	TG N=730 (n,%)	ACR N=475 (n,%)	eGFR N=895 (n,%)	CVD-risk N=38 (n,%)
Non-HMR	248 (46.0)	527 (47.8)	527 (50.4)	279 (42.3)	281 (48.9)	311 (50.0)	339 (46.4)	192 (40.4)	396 (44.2)	22 (57.9)
HMR	177 (32.8)	344 (31.2)	344(32.9)	251 (38.0)	184 (32.0)	192 (30.9)	246 (33.7)	182 (38.3)	316 (35.3)	8 (21.1)
MBS item 10987/10997	288 (53.4)	484 (43.9)	453 (43.3)	419 (63.5)	341 (59.3)	375 (60.3)	410 (56.2)	284 (59.8)	456 (50.9)	19 (50.0)

*From participants with T2DM.
HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
MBS items 10987 and 10997 provide a rebate for a service by a practice nurse or an Aboriginal and Torres Strait Islander Health Practitioner (e.g. staff within ACCHSs) that includes a follow-up the assessment of the medication adherence of an Indigenous patient.
ACR= albumin-creatine ratio
BP= blood pressure;
CVD= cardiovascular disease.
CVD-risk= Estimated 5-year risk of a primary cardiovascular event according to the Framingham risk equation for those not at high risk according to clinical criteria.[189]
DBP= diastolic blood pressure
eGFR= estimated glomerular filtration rate
HbA1C= glycated haemoglobin
HDL-C= high density lipoprotein cholesterol
LDL-C= low density lipoprotein cholesterol
SBP= systolic blood pressure
TC= total cholesterol
TG= triglycerides
T2DM= type 2 diabetes mellitus

Table 4: Mean difference in *HbA1c in participants with a clinical diagnosis of Type 2 diabetes mellitus* (T2DM, n=539) using paired pre and post-intervention measures, stratified by selected participant, health service, and intervention characteristics, and adjusted for health service cluster and the length of follow-up time.

T2DM patients with paired data for HbA1c (n=539)	HbA1c (mmol/mol) *[%units]**			P-value
	Last observation pre-enrolment	Last observation at follow-up	Difference	
	Mean (SD)	*Mean (SD)*	*Mean (SD, 95% CI)*	**0.001^**
	66.8 (37.2) *[8.3% (5.5%)]*	64.0 (39.5) [*8.0% (5.8%)*]	-2.8 (19.5, -4.5 to -1.0) *[-0.3% (3.9%, - 0.4% to -0.1%]*	
Participant-related characteristics				
Median age at baseline =58 years	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.79^^
<Median (n=249)	71.5 (34.7)	68.5 (44.2)	-3.0 (20.5)	
≥Median (n=290)	62.7 (30.7)	60.2 (20.4)	-2.5 (17.0)	
Median length of time between measurements =196 days#	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.24^^
<Median (n=269)	67.4 (29.5)	63.1 (34.4)	-4.3 (16.4)	
≥Median (n=270)	66.2 (31.2)	64.9 (27.9)	-1.3 (19.7)	
Sex	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.44^^
Male (n=351)	66.9 (33.7)	64.5 (31.9)	-2.4 (16.9)	
Female (n=188)	66.5 (24.7)	63.2 (30.2)	-3.3 (15.1)	
Number of adherent days (*baseline score*)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.95^^
0-5 days (n=87)	75.0 (28.0)	72.0 (24.3)	-3.0 (17.7)	
6-7 days (n=354)	65.1 (33.9)	62.4 (39.5)	-2.7 (20.7)	
Median number of medications =8	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.11^^
<Median (n=234)	67.5 (31.5)	63.4 (35.2)	-4.1 (21.4)	
≥Median (n=207)	66.6 (33.2)	65.4 (29.6)	-1.2 (13.0)	
Self -assessed health status at baseline (SF1)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.76^^
'Good, Fair, Poor, Very Poor' (n=314)	68.3 (33.7)	65.7 (30.1)	-2.6 (16.0)	
'Excellent' or 'very good' (n=74)	62.2 (15.5)	60.1 (12.9)	-2.1 (13.8)	
Health service-related characteristics				
Patient attended a health service with a median IRSEO score	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.95^^
< 60 (n=244)	65.1 (42.2)	62.4 (54.7)	-2.7 (17.2)	
>= 60 (n=295)	68.2 (34.4)	65.4 (25.8)	-2.8 (20.6)	
Intervention-related characteristics				
Patient who had a HMR compared to patient who had a non-HMR	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.27^^
Non-HMR (n=248)	66.8 (28.4)	63.7 (29.9)	-3.1 (21.0)	
HMR (n=177)	66.2 (41.2)	65.6 (37.3)	-0.6 (20.8)	
Patients who received an MBS service for item 10987 or 10997 during the follow-up period**	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.91^^
No (n=251)	67.4 (22.2)	64.3 (38.0)	-3.1 (20.6)	
Yes (n=288)	66.2 (40.7)	63.7 (30.6)	-2.5 (17.0)	

Bold p-values imply statistically significant change at the 0.05 level.
^P-value (paired data) was derived from the cluster-adjusted (ACCHS cluster) comparison of HbA1c differences against zero and was determined using the svy linearized : regress Stata command.
^^Cluster adjusted p-values (ACCHS cluster) were determined using the svy linearized : regress Stata command with differences of HbA1c as the outcome measure. The follow-up time in days between the enrolment date and the end of study date was added to all cluster-adjusted linear regression models.
*Unit conversion from IFCC (International Federation of Clinical Chemistry, mmol/mol) to DCCT (Diabetes Control and Complications Trial, %) units using the https://www.diabetes.co.uk/hba1c-units-converter.html units converter.
**MBS items 10987 and 10997 provide a rebate for a service by a practice nurse or an Aboriginal and Torres Strait Islander Health Practitioner (e.g. staff within ACCHSs) that includes a follow-up the assessment of the medication adherence of an Indigenous patient.
The median length of stay in the study was 284 days (IQR:232-350).

SD= cluster adjusted standard deviation (ACCHS cluster).
Health service= Aboriginal community-controlled health service (ACCHS)
HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
IRSEO= Indigenous Relative Socioeconomic Outcomes index. The IRSEO reflects relative advantage or disadvantage at the Indigenous Area level, where a score of one (1) represents the most advantaged area and a score of 100 represents the most disadvantaged area.[190]
MBS= Medicare Benefits Schedule
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
SF1= Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'
T2DM= type 2 diabetes mellitus

Table 5: Mean difference in *systolic blood pressure* (SBP) in IPAC study participants (n=1,103) using paired pre and post-intervention measures, stratified by selected participant, health service, and intervention characteristics, and adjusted for health service cluster and the length of follow-up time.

IPAC participants with paired data for systolic blood pressure (n=1,103)	Systolic blood pressure (mm Hg)			P-value
	Mean value pre-enrolment	Mean value during follow-up	Difference	
	Mean (SD)	*Mean (SD)*	*Mean (SD, 95% CI)*	0.16^
	132.7 (33.2)	132.0 (29.9)	-0.7 (16.6, -1.7 to 0.4)	
Participant-related characteristics				
Median age at baseline =57 years	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
<Median (n=515)	131.6 (28.1)	129.8 (21.1)	-1.8 (12.5)	**0.004^^**
≥Median (n=588)	133.6 (29.8)	133.9 (27.4)	0.3 (11.2)	
Median length of stay in the study =266 days *(IQR: 210-325)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
<Median (n=545)	132.0 (22.4)	132.3 (19.4)	0.3 (8.4)	**0.03^^**
≥Median (n=558)	133.4 (30.9)	131.8 (23.4)	-1.6 (14.9)	
Sex	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
Female (n=675)	131.6 (33.8)	131.2 (23.4)	-0.4 (15.3)	0.36^^
Male (n=428)	134.5 (20.7)	133.4 (20.7)	-1.1 (11.4)	
Number of adherent days (*baseline score*)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
0-5 days (n=172)	132.2 (22.3)	131.8 (26.0)	-0.4 (8.4)	0.70^^
6-7 days (n=663)	132.7 (23.2)	132.0 (18.5)	-0.7 (12.4)	
Median number of medications =7	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
<Median (n=375)	132.2 (27.1)	131.2 (21.3)	-1.0 (13.9)	0.74^^
≥Median (n=460)	133.0 (25.7)	132.6 (21.5)	-0.4 (11.8)	
Self -assessed health status at baseline (SF1)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
'Good, Fair, Poor, Very Poor' (n=650)	132.7 (24.5)	132.2 (22.7)	-0.5 (11.5)	0.94^^
'Excellent' or 'very good' (n=137)	132.0 (23.0)	131.0 (17.3)	-1.0 (12.2)	
Health service-related characteristics				
Patient attended a health service with a median IRSEO score (=60)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
< 60 (n=525)	133.8 (41.2)	132.4 (32.1)	-1.4 (17.2)	0.40^^
>= 60 (n=578)	131.7 (28.9)	131.7 (26.5)	-0.0 (12.0)	
Intervention-related characteristics				
Patient who had a HMR compared to patient who had a non-HMR	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
Non-HMR (n=527)	131.9 (25.3)	131.6 (20.7)	-0.3 (11.9)	0.84^^
HMR (n=344)	133.2 (22.3)	132.7 (18.6)	-0.5 (7.8)	
Patients who received an MBS service for item 10987 or 10997 during the follow-up period**	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
No (n=619)	133.5 (29.9)	132.7 (19.9)	-0.8 (17.7)	0.62^^
Yes (n=484)	131.6 (24.2)	131.1 (22.0)	-0.5 (10.3)	

Bold p-values imply statistically significant change at the 0.05 level.

^P-value (paired data) was derived from the cluster-adjusted (ACCHS cluster) comparison of SBP differences against zero and was determined using the svy linearized : regress Stata command.
^^Cluster adjusted p-values (ACCHS cluster) were determined using the svy linearized : regress Stata command with differences of SBP as the outcome measure. The follow-up time in days between the enrolment date and the end of study date was added to all cluster-adjusted linear regression models.
**MBS items 10987 and 10997 provide a rebate for a service by a practice nurse or an Aboriginal and Torres Strait Islander Health Practitioner (e.g. staff within ACCHSs) that includes a follow-up the assessment of the medication adherence of an Indigenous patient.

SD= cluster adjusted standard deviation (ACCHS cluster).
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HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
IRSEO= Indigenous Relative Socioeconomic Outcomes index. The IRSEO reflects relative advantage or disadvantage at the Indigenous Area level, where a score of one (1) represents the most advantaged area and a score of 100 represents the most disadvantaged area.[191]
MBS= Medicare Benefits Schedule
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
SF1= Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'

Table 6: Mean difference in *diastolic blood pressure* (DBP) in IPAC study participants (n=1,045) using paired pre and post-intervention measures, stratified by selected participant, health service, and intervention characteristics, and adjusted for health service cluster and the length of follow-up time.

IPAC participants with paired data for diastolic blood pressure (n=1,045)	Diastolic blood pressure (mm Hg)			P-value
	Mean value pre-enrolment	Mean value during follow-up	Difference	
	Mean (SD)	*Mean (SD)*	*Mean (SD, 95% CI)*	**0.008^**
	80.0 (35.6)	79.2 (29.1)	-0.8 (9.4, -1.4 to -0.2)	
Participant-related characteristics				
Median age at baseline =57 years	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
<Median (n=515)	82.7 (18.8)	81.3 (16.8)	-1.4 (7.5)	**0.012^^**
≥Median (n=588)	77.5 (25.9)	77.3 (20.8)	-0.2 (6.4)	
Median length of stay in the study =268 days *(IQR:210-325)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
<Median (n=522)	79.5 (20.6)	79.3 (16.0)	-0.2 (8.0)	0.052^^
≥Median (n=523)	80.4 (29.7)	79.0 (27.4)	-1.4 (7.3)	
Sex	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
Female (n=639)	78.8 (28.8)	78.1 (20.7)	-0.7 (10.1)	0.92^^
Male (n=406)	81.6 (19.8)	80.8 (20.2)	-0.8 (6.0)	
Number of adherent days (*baseline score*)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
0-5 days (n=159)	81.4 (11.4)	81.0 (11.7)	-0.4 (5.0)	0.77^^
6-7 days (n=633)	79.2 (25.2)	78.6 (24.7)	-0.6 (7.6)	
Median number of medications =7	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
<Median (n=351)	80.9 (15.0)	80.1 (13.1)	-0.8 (7.5)	0.40^^
≥Median (n=441)	78.6 (25.2)	78.2 (23.1)	-0.4 (6.3)	
Self -assessed health status at baseline (SF1)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
'Good, Fair, Poor, Very Poor' (n=608)	79.7 (22.2)	79.0 (22.2)	-0.7 (6.2)	0.16^^
'Excellent' or 'very good' (n=138)	78.4 (14.1)	78.1 (12.9)	-0.3 (4.5)	
Health service-related characteristics				
Patient attended a health service with a median IRSEO score (=60)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
< 60 (n=510)	80.0 (49.7)	78.8 (42.9)	-1.2 (9.0)	0.47^^
>= 60 (n=535)	79.9 (9.3)	79.5 (9.3)	-0.4 (4.6)	
Intervention-related characteristics				
Patient who had a HMR compared to patient who had a non-HMR	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
Non-HMR (n=527)	80.4 (15.5)	79.7 (13.3)	-0.7 (4.4)	0.52^^
HMR (n=344)	78.9 (23.9)	78.0 (18.4)	-0.9 (9.2)	
Patients who received an MBS service for item 10987 or 10997 during the follow-up period**	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
No (n=592)	80.6 (26.8)	79.8 (21.9)	-0.8 (9.7)	0.86^^
Yes (n=453)	79.1 (23.4)	78.4 (21.3)	-0.7 (6.4)	

Bold p-values imply statistically significant change at the 0.05 level.

^P-value (paired data) was derived from the cluster-adjusted (ACCHS cluster) comparison of DBP differences against zero and was determined using the svy linearized : regress Stata command.
^^Cluster adjusted p-values (ACCHS cluster) were determined using the svy linearized : regress Stata command with differences of DBP as the outcome measure. The follow-up time in days between the enrolment date and the end of study date was added to all cluster-adjusted linear regression models.
**MBS items 10987 and 10997 provide a rebate for a service by a practice nurse or an Aboriginal and Torres Strait Islander Health Practitioner (e.g. staff within ACCHSs) that includes a follow-up the assessment of the medication adherence of an Indigenous patient.

SD= cluster adjusted standard deviation (ACCHS cluster).
Health service= Aboriginal community-controlled health service (ACCHS)
HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
IRSEO= Indigenous Relative Socioeconomic Outcomes index. The IRSEO reflects relative advantage or disadvantage at the Indigenous Area level, where a score of one (1) represents the most advantaged area and a score of 100 represents the most disadvantaged area.[192]
MBS= Medicare Benefits Schedule
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
SF1= Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'

Table 7: Mean difference in *total cholesterol* (TC) in IPAC study participants (n=660) using paired pre and post-intervention measures, stratified by selected participant, health service, and intervention characteristics, and adjusted for health service cluster and the length of follow-up time.

IPAC participants with paired data for total cholesterol (n=660)	Total cholesterol (mmol/L)			P-value
	Mean value pre-enrolment	Mean value during follow-up	Difference	
	Mean (SD)	*Mean (SD)*	*Mean (SD, 95% CI)*	**<0.001^**
	4.51 (1.80)	4.35 (2.06)	-0.15 (0.77, -0.22 to -0.09)	
Participant-related characteristics				
Median age at baseline =59 years	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.08^^
<Median (n=315)	4.63 (1.77)	4.43 (1.77)	-0.20 (0.89)	
≥Median (n=345)	4.39 (1.11)	4.28 (1.49)	-0.11 (0.76)	
Median length of stay in the study =314 days *(IQR:239-360)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.08^^
<Median (n=328)	4.42 (1.45)	4.33 (1.81)	-0.10 (0.91)	
≥Median (n=332)	4.59 (1.46)	4.38 (1.28)	-0.21 (0.73)	
Sex	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.33^^
Female (n=419)	4.58 (1.64)	4.46 (1.84)	-0.11 (0.61)	
Male (n=241)	4.39 (0.93)	4.16 (1.55)	-0.22 (1.4)	
Number of adherent days (*baseline score*)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.42^^
0-5 days (n=110)	4.83 (1.05)	4.61 (1.05)	-0.21 (0.94)	
6-7 days (n=448)	4.42 (1.48)	4.30 (1.9)	-0.12 (1.06)	
Median number of medications =7	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.28^^
<Median (n=244)	4.75 (1.56)	4.55 (1.56)	-0.20 (1.09)	
≥Median (n=314)	4.31 (1.24)	4.22 (1.24)	-0.09 (0.53)	
Self -assessed health status at baseline (SF1)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.49^^
'Good, Fair, Poor, Very Poor' (n=382)	4.49 (1.76)	4.34 (2.35)	-0.15 (0.98)	
'Excellent' or 'very good' (n=102)	4.34 (1.31)	4.26 (0.61)	-0.08 (0.91)	
Health service-related characteristics				
Patient attended a health service with a median IRSEO score (=60)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	**0.014^^**
< 60 (n=291)	4.55 (1.19)	4.35 (1.54)	-0.20 (0.51)	
>= 60 (n=369)	4.47 (1.92)	4.35 (2.5)	-0.12 (0.77)	
Intervention-related characteristics				
Patient who had a HMR compared to patient who had a non-HMR	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.10^^
Non-HMR (n=279)	4.54 (2.0)	4.43 (2.34)	-0.11 (0.84)	
HMR (n=251)	4.43 (1.9)	4.30 (2.53)	-0.13 (0.95)	
Patients who received an MBS service for item 10987 or 10997 during the follow-up period**	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.57^^
No (n=241)	4.50 (1.09)	4.37 (1.24)	-0.13 (0.62)	
Yes (n=419)	4.51 (2.05)	4.35 (2.25)	-0.17 (0.61)	

Bold p-values imply statistically significant change at the 0.05 level.

^P-value (paired data) was derived from the cluster-adjusted (ACCHS cluster) comparison of total cholesterol differences against zero and was determined using the svy linearized : regress Stata command.
^^Cluster adjusted p-values (ACCHS cluster) were determined using the svy linearized : regress Stata command with differences of total cholesterol as the outcome measure. The follow-up time in days between the enrolment date and the end of study date was added to all cluster-adjusted linear regression models.
**MBS items 10987 and 10997 provide a rebate for a service by a practice nurse or an Aboriginal and Torres Strait Islander Health Practitioner (e.g. staff within ACCHSs) that includes a follow-up the assessment of the medication adherence of an Indigenous patient.

SD= cluster adjusted standard deviation (ACCHS cluster).
Health service= Aboriginal community-controlled health service (ACCHS)
HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
IRSEO= Indigenous Relative Socioeconomic Outcomes index. The IRSEO reflects relative advantage or disadvantage at the Indigenous Area level, where a score of one (1) represents the most advantaged area and a score of 100 represents the most disadvantaged area.[193]
MBS= Medicare Benefits Schedule
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
SF1= Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'

Table 8: Mean difference in *low density lipoprotein cholesterol* (LDL-C) in IPAC study participants (n=575) using paired pre and post-intervention measures, stratified by selected participant, health service, and intervention characteristics, and adjusted for health service cluster and the length of follow-up time.

IPAC participants with paired data for low density lipoprotein cholesterol (n=575)	Low density lipoprotein cholesterol (mmol/L)			P-value
	Mean value pre-enrolment	Mean value during follow-up	Difference	
	Mean (SD)	*Mean (SD)*	*Mean (SD, 95% CI)*	**0.001^**
	2.35 (1.20)	2.27 (1.20)	-0.08 (0.48, -0.13 to -0.03)	
Participant-related characteristics				
Median age at baseline =59 years	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
<Median (n=279)	2.49 (1.17)	2.39 (0.84)	-0.10 (0.67)	0.36^^
≥Median (n=296)	2.22 (0.86)	2.16 (1.03)	-0.06 (0.52)	
Median length of stay in the study =295 days *(IQR: 239-351)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
<Median (n=287)	2.33 (0.85)	2.28 (1.19)	-0.05 (0.85)	0.83^^
≥Median (n=288)	2.37 (0.85)	2.26 (0.85)	-0.11 (0.51)	
Sex	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
Female (n=359)	2.40 (1.14)	2.34 (1.14)	-0.05 (0.38)	0.27^^
Male (n=216)	2.28 (1.18)	2.15 (1.03)	-0.13 (0.88)	
Number of adherent days (*baseline score*)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
0-5 days (n=86)	2.70 (1.21)	2.56 (1.39)	-0.14 (0.74)	0.48^^
6-7 days (n=384)	2.27 (0.98)	2.20 (1.37)	-0.06 (0.78)	
Median number of medications =7	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
<Median (n=194)	2.60 (1.25)	2.49 (0.97)	-0.11 (0.7)	0.23^^
≥Median (n=276)	2.17 (0.66)	2.11 (0.83)	-0.06 (0.5)	
Self -assessed health status at baseline (SF1)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
'Good, Fair, Poor, Very Poor' (n=339)	2.35 (1.29)	2.24 (1.29)	-0.11 (0.74)	0.08^^
'Excellent' or 'very good' (n=75)	2.25 (0.95)	2.26 (0.78)	0.01 (0.43)	
Health service-related characteristics				
Patient attended a health service with a median IRSEO score (=60)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
< 60 (n=264)	2.35 (0.97)	2.26 (0.81)	-0.09 (0.49)	0.05^^
>= 60 (n=311)	2.35 (1.23)	2.28 (1.41)	-0.07 (0.53)	
Intervention-related characteristics				
Patient who had a HMR compared to patient who had a non-HMR	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
Non-HMR (n=281)	2.38 (1.34)	2.31 (1.34)	-0.07 (0.67)	0.76^^
HMR (n=184)	2.27 (0.68)	2.17 (1.36)	-0.09 (1.09)	
Patients who received an MBS service for item 10987 or 10997 during the follow-up period**	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
No (n=234)	2.41 (0.92)	2.34 (0.76)	-0.06 (0.76)	0.66^^
Yes (n=341)	2.31 (1.11)	2.22 (1.29)	-0.09 (0.37)	

Bold p-values imply statistically significant change at the 0.05 level.

^P-value (paired data) was derived from the cluster-adjusted (ACCHS cluster) comparison of low density lipoprotein cholesterol differences against zero and was determined using the svy linearized : regress Stata command.
^^Cluster adjusted p-values (ACCHS cluster) were determined using the svy linearized : regress Stata command with differences of low density lipoprotein cholesterol as the outcome measure. The follow-up time in days between the enrolment date and the end of study date was added to all cluster-adjusted linear regression models.
**MBS items 10987 and 10997 provide a rebate for a service by a practice nurse or an Aboriginal and Torres Strait Islander Health Practitioner (e.g. staff within ACCHSs) that includes a follow-up the assessment of the medication adherence of an Indigenous patient.

SD= cluster adjusted standard deviation (ACCHS cluster).
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IRSEO= Indigenous Relative Socioeconomic Outcomes index. The IRSEO reflects relative advantage or disadvantage at the Indigenous Area level, where a score of one (1) represents the most advantaged area and a score of 100 represents the most disadvantaged area.[194]
MBS= Medicare Benefits Schedule
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
SF1= Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'

Table 9: Mean difference in *high density lipoprotein cholesterol* (HDL-C) in IPAC study participants (n=622) using paired pre and post-intervention measures, stratified by selected participant, health service, and intervention characteristics, and adjusted for health service cluster and the length of follow-up time.

IPAC participants with paired data for high density lipoprotein cholesterol (n=622)	High density lipoprotein cholesterol (mmol/L)			P-value
	Mean value pre-enrolment	Mean value during follow-up	Difference	
	Mean (SD)	*Mean (SD)*	*Mean (SD, 95% CI)*	0.32^
	1.05 (0.5)	1.06 (0.5)	0.01 (0.25, -0.02 to 0.03)	
Participant-related characteristics				
Median age at baseline =58 years	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
<Median (n=284)	1.02 (0.34)	1.02 (0.34)	0.00 (0.34)	0.59^^
≥Median (n=338)	1.08 (0.18)	1.09 (0.18)	0.01 (0.18)	
Median length of stay in the study =294 days *(IQR: 237-350)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
<Median (n=304)	1.02 (0.35)	1.04 (0.17)	0.02 (0.17)	0.43^^
≥Median (n=318)	1.08 (0.36)	1.08 (0.36)	0.00 (0.36)	
Sex	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
Female (n=385)	1.08 (0.2)	1.09 (0.35)	0.00 (0.17)	0.89^^
Male (n=237)	1 (0.31)	1 (0.36)	0.00 (0.36)	
Number of adherent days (*baseline score*)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
0-5 days (n=100)	1.09 (0.5)	1.10 (0.4)	0.01 (0.5)	0.97^^
6-7 days (n=408)	1.04 (0.2)	1.05 (0.2)	0.01 (0.2)	
Median number of medications =7	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
<Median (n=216)	1.07 (0.29)	1.07 (0.29)	0.01 (0.29)	0.94^^
≥Median (n=292)	1.04 (0.34)	1.05 (0.34)	0.01 (0.34)	
Self -assessed health status at baseline (SF1)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
'Good, Fair, Poor, Very Poor' (n=365)	1.05 (0.38)	1.06 (0.38)	0.01 (0.38)	**0.048^^**
'Excellent' or 'very good' (n=83)	1.02 (0.18)	1.05 (0.18)	0.03 (0.18)	
Health service-related characteristics				
Patient attended a health service with a median IRSEO score (=60)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
< 60 (n=280)	1.06 (0.33)	1.06 (0.33)	0.00 (0.33)	0.97^^
>= 60 (n=342)	1.04 (0.37)	1.06 (0.37)	0.01 (0.18)	
Intervention-related characteristics				
Patient who had a HMR compared to patient who had a non-HMR	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
Non-HMR (n=311)	1.04 (0.35)	1.04 (0.35)	0.01 (0.18)	0.61^^
HMR (n=192)	1.03 (0.28)	1.05 (0.14)	0.02 (0.28)	
Patients who received an MBS service for item 10987 or 10997 during the follow-up period**	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
No (n=247)	1.04 (0.31)	1.03 (0.31)	-0.01 (0.31)	0.07^^
Yes (n=375)	1.06 (0.19)	1.08 (0.19)	0.02 (0.19)	

Bold p-values imply statistically significant change at the 0.05 level.

^P-value (paired data) was derived from the cluster-adjusted (ACCHS cluster) comparison of high density lipoprotein cholesterol differences against zero and was determined using the svy linearized : regress Stata command.
^^Cluster adjusted p-values (ACCHS cluster) were determined using the svy linearized : regress Stata command with differences of high density lipoprotein cholesterol as the outcome measure. The follow-up time in days between the enrolment date and the end of study date was added to all cluster-adjusted linear regression models.
**MBS items 10987 and 10997 provide a rebate for a service by a practice nurse or an Aboriginal and Torres Strait Islander Health Practitioner (e.g. staff within ACCHSs) that includes a follow-up the assessment of the medication adherence of an Indigenous patient.

SD= cluster adjusted standard deviation (ACCHS cluster).
Health service= Aboriginal community-controlled health service (ACCHS)
HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
IRSEO= Indigenous Relative Socioeconomic Outcomes index. The IRSEO reflects relative advantage or disadvantage at the Indigenous Area level, where a score of one (1) represents the most advantaged area and a score of 100 represents the most disadvantaged area.[195]
MBS= Medicare Benefits Schedule
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
SF1= Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'

Table 10: Mean difference in *triglycerides* (TG) in IPAC study participants (n=730) using paired pre and post-intervention measures, stratified by selected participant, health service, and intervention characteristics, and adjusted for health service cluster and the length of follow-up time.

IPAC participants with paired data for triglycerides (n=730)	Triglycerides (mmol/L)			P-value
	Mean value pre-enrolment	Mean value during follow-up	Difference	
	Mean (SD)	*Mean (SD)*	*Mean (SD, 95% CI)*	**0.006^**
	2.39 (2.43)	2.29 (2.21)	-0.11 (1.08, -0.20 to -0.01)	
Participant-related characteristics				
Median age at baseline =59 years	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.26^^
<Median (n=347)	2.60 (3.17)	2.47 (2.61)	-0.12 (0.93)	
≥Median (n=383)	2.21 (1.17)	2.12 (0.98)	-0.09 (1.17)	
Median length of stay in the study =296 days *(IQR: 237-356)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	**0.024^^**
<Median (n=365)	2.35 (1.91)	2.33 (1.91)	-0.02 (0.96)	
≥Median (n=365)	2.44 (1.91)	2.24 (1.34)	-0.20 (1.34)	
Sex	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.99^^
Female (n=450)	2.40 (2.12)	2.30 (1.91)	-0.10 (1.06)	
Male (n=280)	2.38 (1.67)	2.27 (1.67)	-0.11 (1.51)	
Number of adherent days (*baseline score*)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.89^^
0-5 days (n=111)	2.65 (3.16)	2.55 (2.84)	-0.10 (0.84)	
6-7 days (n=495)	2.34 (2.00)	2.25 (1.56)	-0.09 (1.11)	
Median number of medications =7	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.54^^
<Median (n=246)	2.33 (1.57)	2.22 (1.57)	-0.11 (0.78)	
≥Median (n=360)	2.45 (1.90)	2.37 (1.9)	-0.08 (1.33)	
Self -assessed health status at baseline (SF1)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.31^^
'Good, Fair, Poor, Very Poor' (n=421)	2.43 (2.46)	2.32 (1.88)	-0.12 (0.78)	
'Excellent' or 'very good' (n=112)	2.18 (1.59)	2.18 (2.66)	0.00 (1.90)	
Health service-related characteristics				
Patient attended a health service with a median IRSEO score (=61)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.71^^
< 61 (n=364)	2.37 (2.29)	2.24 (1.72)	-0.12 (0.76)	
>= 61 (n=366)	2.42 (2.87)	2.33 (2.49)	-0.09 (1.34)	
Intervention-related characteristics				
Patient who had a HMR compared to patient who had a non-HMR	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.47^^
Non-HMR (n=339)	2.42 (2.95)	2.40 (2.39)	-0.02 (1.29)	
HMR (n=246)	2.37 (1.73)	2.24 (2.2)	-0.13 (0.78)	
Patients who received an MBS service for item 10987 or 10997 during the follow-up period**	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	**0.027^^**
No (n=320)	2.24 (1.61)	2.23 (1.25)	-0.01 (0.89)	
Yes (n=410)	2.51 (2.23)	2.33 (1.82)	-0.18 (1.01)	

Bold p-values imply statistically significant change at the 0.05 level.

^P-value (paired data) was derived from the cluster-adjusted (ACCHS cluster) comparison of triglyceride differences against zero and was determined using the svy linearized : regress Stata command.
^^Cluster adjusted p-values (ACCHS cluster) were determined using the svy linearized : regress Stata command with differences of triglycerides as the outcome measure. The follow-up time in days between the enrolment date and the end of study date was added to all cluster-adjusted linear regression models.
**MBS items 10987 and 10997 provide a rebate for a service by a practice nurse or an Aboriginal and Torres Strait Islander Health Practitioner (e.g. staff within ACCHSs) that includes a follow-up the assessment of the medication adherence of an Indigenous patient.

SD= cluster adjusted standard deviation (ACCHS cluster).
Health service= Aboriginal community-controlled health service (ACCHS)
HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
IRSEO= Indigenous Relative Socioeconomic Outcomes index. The IRSEO reflects relative advantage or disadvantage at the Indigenous Area level, where a score of one (1) represents the most advantaged area and a score of 100 represents the most disadvantaged area.[196]
MBS= Medicare Benefits Schedule
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
SF1= Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'

Table 11: Mean annualised difference in *albumin-creatinine ratio* (ACR) in IPAC study participants (n=475) using paired pre and post-intervention measures, stratified by selected participant, health service, and intervention characteristics, and adjusted for health service cluster and the length of follow-up time.

IPAC participants with paired data for albumin-creatinine ratio (n=475)	ACR (mg/mmol)			P-value
	Last observation pre-enrolment	Last observation at follow-up	Difference	
	Mean (SD)	*Mean (SD)*	*Mean (SD, 95% CI)*	0.42^
	57.9 (183.1)	61.7 (224.5)	3.8 (102.4, -6.3 to 13.8)	
Participant-related characteristics				
Median age at baseline =58 years	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
<Median (n=230)	58.5 (162.3)	61.0 (187.3)	2.4 (94.5)	0.78^^
≥Median (n=245)	57.4 (134.6)	62.4 (185.6)	5.0 (108.0)	
Median length of stay in the study =301 days *(IQR: 238-365)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
<Median (n=237)	61.1 (178.6)	69.1 (200.8)	8.0 (44.6)	0.17^^
≥Median (n=238)	54.8 (126.5)	54.3 (142.4)	-0.5 (111.1)	
Sex	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
Female (n=295)	57.4 (159.4)	63.7 (184.8)	6.3 (85.9)	0.49^^
Male (n=180)	58.8 (137.3)	58.4 (141.9)	-0.4 (107.3)	
Number of adherent days (*baseline score*)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
0-5 days (n=69)	83.7 (132.1)	88.4 (119.6)	4.7 (113.8)	0.90^^
6-7 days (n=330)	56.3 (183.5)	59.5 (210.7)	3.2 (67.2)	
Median number of medications =7	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
<Median (n=160)	54.1 (134.1)	58.1 (153.0)	4.0 (64.5)	0.83^^
≥Median (n=239)	65.7 (160.8)	68.8 (180.9)	3.1 (85.0)	
Self -assessed health status at baseline (SF1)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
'Good, Fair, Poor, Very Poor' (n=267)	68.4 (204.3)	67.1 (235.3)	-1.3 (81.7)	**0.047^^**
'Excellent' or 'very good' (n=69)	33.4 (106.3)	50.2 (191.1)	16.8 (83.1)	
Health service-related characteristics				
Patient attended a health service with a median IRSEO score (=61)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
< 61 (n=233)	47.5 (119.1)	49.5 (135.9)	2.0 (27.5)	0.78^^
>= 1 (n=242)	68.1 (194.5)	73.5 (252.0)	5.4 (140.0)	
Intervention-related characteristics				
Patient who had a HMR compared to patient who had a non-HMR	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
Non-HMR (n=192)	71.3 (185.3)	70.0 (223.2)	-1.3 (77.6)	0.08^^
HMR (n=182)	45.1 (89.2)	56.7 (139.8)	11.6 (70.2)	
Patients who received an MBS service for item 10987 or 10997 during the follow-up period**	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	
No (n=191)	43.8 (192.1)	50.1 (215.6)	6.3 (55.3)	0.62^^
Yes (n=284)	67.5 (143.2)	69.5 (197.2)	2.0 (123.0)	

Bold p-values imply statistically significant change at the 0.05 level.

^P-value (paired data) was derived from the cluster-adjusted (ACCHS cluster) comparison of differences in albumin creatinine ratio against zero and was determined using the svy linearized : regress Stata command.
^^Cluster adjusted p-values (ACCHS cluster) were determined using the svy linearized : regress Stata command with differences in albumin creatinine ratios as the outcome measure. The follow-up time in days between the enrolment date and the end of study date was added to all cluster-adjusted linear regression models.
**MBS items 10987 and 10997 provide a rebate for a service by a practice nurse or an Aboriginal and Torres Strait Islander Health Practitioner (e.g. staff within ACCHSs) that includes a follow-up the assessment of the medication adherence of an Indigenous patient.

SD= cluster adjusted standard deviation (ACCHS cluster).
Health service= Aboriginal community-controlled health service (ACCHS)
HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
IRSEO= Indigenous Relative Socioeconomic Outcomes index. The IRSEO reflects relative advantage or disadvantage at the Indigenous Area level, where a score of one (1) represents the most advantaged area and a score of 100 represents the most disadvantaged area.[197]
MBS= Medicare Benefits Schedule
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
SF1= Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'

Table 12. Mean annualised difference in *estimated glomerular filtration rate* (eGFR) in IPAC study participants (n=895) using paired pre and post-intervention measures (cluster adjusted) and sensitivity analysis by follow-up time.

IPAC participants with paired data	Estimated glomerular filtration rate (eGFR) (mL/min/1.73m^2) n=895					P-value^
	Last observation pre-enrolment	Last observation at follow-up	Observed crude difference	Follow-up time (days) *	Observed mean annualised difference	
No minimum follow-up time *N=895* Mean (SD), [95% CI]	49.1 (159.2)	48.4 (160.4)	-0.8 (21.8) [-2.3 to 0.8]	298 (320) *Range: 27-661*	1.90 (25.7), [0.08 to 3.74]	**<0.001**
6-month minimum follow-up time *N=720*** Mean (SD), [95% CI]	49.6 (140.6)	48.1 (145.4)	-1.5 (31.9) [-4.0 to 1.0)	340 (271) *Range: 180-661*	-0.16 (36.0), [-2.99 to 2.68]	**0.034**

Bold p-values imply statistically significant change at the 0.05 level.

^P-values (paired data) were derived from the cluster-adjusted (ACCHS cluster) comparison of annualised differences in eGFR against -3 and were determined using the svy linearized : regress Stata command. The value of -3 was the theoretically expected mean annual eGFR (ml/min/1.73m^2) linear decline.

* Follow-up time is the number of days between two measurements. It was defined as the time between the most recent baseline eGFR value and the follow-up eGFR value closest to the end-of study date (31/10/2019).

** Participants with <6 months (≤180 days) days between two eGFR measurements were excluded.

Table 13: Mean annualised difference in *estimated glomerular filtration rate* (eGFR) in IPAC study participants (n=895) using paired pre and post-intervention measures, stratified by selected participant, health service, and intervention characteristics, and adjusted for health service cluster, *with no minimum follow-up time.*

IPAC participants with paired data for estimated glomerular filtration rate (n=895)	Estimated glomerular filtration rate (mL/min/1.73m²)					P-value
	Last observation pre-enrolment	Last observation at follow-up	Observed crude difference	Follow-up time (days)*	Observed mean annualised difference	
	Mean (SD)	*Mean (SD)*	*Mean (SD, 95% CI)*	*Mean (SD, range)*	*Mean (SD, 95% CI)*	**<0.001^**
	49.1 (159.2)	48.4 (160.4)	-0.8 (21.8, -2.3 to 0.8)	298 (320, 27-661)	1.9 (25.7, 0.1 to 3.7)	
Participant-related characteristics						
Median age at baseline =59 years	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD), range*	*Mean (SD)*	0.34^^
<Median (n=446)	45.7 (171.5)	43.6 (181.6)	-2.1 (40.1)	296 (299, 40-661)	0.2 (46.7)	
≥Median (n=449)	52.5 (81.4)	53.1 (84.8)	0.6 (23.3)	300 (203, 27-650)	3.6 (34.5)	
Median length of stay = 296 days *(IQR: 234-359)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD, 95% CI)*	*Mean (SD), range*	*Mean (SD)*	**<0.001^^**
<Median (n=445)	47.0 (109.7)	49.3 (105.5)	2.3 (15.8)	240 (150, 27-601)	6.5 (27.4)	
≥Median (n=450)	51.2 (131.5)	47.5 (140.0)	-3.7 (18.0)	356 (163, 43-661)	-2.7 (17.0)	
Sex	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD), range*	*Mean (SD)*	0.98^^
Female (n=549)	47.0 (124.2)	46.1 (124.2)	-0.9 (23.4)	295 (284, 34-661)	1.9 (30.7)	
Male (n=346)	52.5 (102.3)	51.9 (104.2)	-0.6 (22.3)	304 (225, 27-650)	1.9 (37.4)	
Number of adherent days (*baseline score*)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD), range*	*Mean (SD)*	0.80^^
0-5 days (n=128)	42.9 (79.2)	41.3 (80.33)	-1.6 (32.8)	310 (232, 44-661)	-0.3 (46.4)	
6-7 days (n=594)	51.1 (121.9)	49.6 (124.3)	-1.5 (29.3)	306 (324, 27-650)	0.9 (36.6)	
Median number of medications =7	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD), range*	*Mean (SD)*	0.06^^
<Median (n=292)	46.3 (103)	46.2 (102.5)	-0.1 (25.6)	305 (263, 40-661)	4.2 (38.5)	
≥Median (n=430)	51.9 (112)	49.5 (109.9)	-2.4 (24.9)	310 (257, 27-650)	-1.7 (28.8)	
Self -assessed health status at baseline (SF1)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD), range*	*Mean (SD)*	0.67^^
'Good, Fair, Poor, Very Poor' (n=511)	49.1 (126.6)	48.4 (119.8)	-0.7 (22.2)	294 (258, 40-650)	1.7 (32.3)	
'Excellent' or 'very good' (n=125)	47.9 (54.8)	45.4 (59.3)	-2.5 (17.3)	300 (139, 27-609)	0.3 (27.4)	
Health service-related characteristics						
Patient attended a health service with a median IRSEO score (=61)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD), range*	*Mean (SD)*	0.13^^
< 61 (n=420)	53.9 (186.49)	52.2 (194.7)	-1.7 (12.3)	314 (311, 27-661)	0.6 (14.8)	
>= 61 (n=475)	44.9 (128.59)	45.0 (124.2)	0.1 (24.0)	285 (259, 34-650)	3.1 (30.3)	
Intervention-related characteristics						
Patient who had a HMR compared to patient who had a non-HMR	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD), range*	*Mean (SD)*	0.61^^
Non-HMR (n=396)	48.9 (119.4)	48.7 (111.4)	-0.2 (19.7)	292 (245, 34-613)	1.3 (25.1)	
HMR (n=316)	48.9 (112.0)	46.2 (115.6)	-2.7 (21.3)	305 (251, 43-650)	0.1 (27.7)	
Patients who received an MBS service for item 10987 or 10997 during the follow-up period**	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD), range*	*Mean (SD)*	0.93^^
No (n=439)	57.6 (136.2)	57.1 (132.0)	-0.5 (16.1)	287 (350, 34-622)	2.0 (32.3)	
Yes (n=456)	41.0 (61.9)	40.0 (61.9)	-1.0 (23.5)	309 (333, 27-661)	1.8 (27.6)	

Bold p-values imply statistically significant change at the 0.05 level.
^P-values (paired data) were derived from the cluster-adjusted (ACCHS cluster) comparison of annualised differences in eGFR against -3 and were determined using the svy linearized : regress Stata command. The value of -3 was the theoretically expected mean annual eGFR (ml/min/1.73m^2) linear decline.
^^Cluster adjusted p-values (ACCHS cluster) were determined using the svy linearized : regress Stata command with differences of annualised eGFR as the outcome measure.
* Follow-up time is the number of days between two measurements. It was defined as the time between the most recent baseline eGFR value and the follow-up eGFR value closest to the end-of study date (31/10/2019).
**MBS items 10987 and 10997 provide a rebate for a service by a practice nurse or an Aboriginal and Torres Strait Islander Health Practitioner (e.g. staff within ACCHSs) that includes a follow-up the assessment of the medication adherence of an Indigenous patient.

SD= cluster adjusted standard deviation (ACCHS cluster).
Health service= Aboriginal community-controlled health service (ACCHS)
HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
IRSEO= Indigenous Relative Socioeconomic Outcomes index. The IRSEO reflects relative advantage or disadvantage at the Indigenous Area level, where a score of one (1) represents the most advantaged area and a score of 100 represents the most disadvantaged area.[198]
MBS= Medicare Benefits Schedule
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
SF1= Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor*?'

Table 14: Mean annualised difference in *estimated glomerular filtration rate* (eGFR) in IPAC study participants (n=720) using paired pre and post-intervention measures, stratified by selected participant, health service, and intervention characteristics, and adjusted for health service cluster, *with 6-months minimum follow-up time.*

IPAC participants with paired data for estimated glomerular filtration rate (n=720)	Estimated glomerular filtration rate (mL/min/1.73m²)					P-value
	Last observation pre-enrolment	Last observation at follow-up	Observed crude difference	Follow-up time (days)*	Observed mean annualised difference	
	Mean (SD)	*Mean (SD)*	*Mean (SD, 95% CI)*	*Mean (SD, range)*	*Mean (SD, 95% CI)*	**0.034^**
	49.6 (140.6)	48.1 (145.4)	-1.5 (31.9, -4.0 - 1.0)	340 (271, 180-661)	-0.2 (36.0, -2.99 to 2.7)	
Participant-related characteristics						
Median age at baseline =59 years	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD), range*	*Mean (SD)*	0.93^^
<Median (n=359)	45.6 (155.4)	43.6 (164.8)	-2.0 (47.4)	337 (296, 180-661)	0.001 (51.2)	
≥Median (n=361)	53.7 (68.4)	52.7 (77.9)	-1.0 (24.7)	343 (137, 181-650)	-0.3 (30.4)	
Median length of stay = 317 days *(IQR: 252-366)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD, 95% CI)*	*Mean (SD), range*	*Mean (SD)*	**0.003^^**
<Median (n=348)	47.9 (100.4)	49.1 (94.7)	1.2 (24.6)	295 (116, 180-601)	3.4 (32.2)	
≥Median (n=372)	51.3 (115.9)	47.2 (131.1)	-4.1 (22.8)	382 (139, 181-661)	-3.5 (22.8)	
Sex	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD), range*	*Mean (SD)*	0.76^^
Female (n=437)	47.6 (108.7)	46.0 (112.9)	-1.6 (33.5)	338 (234, 180-661)	-0.4 (35.5)	
Male (n=283)	52.8 (92.5)	51.4 (95.9)	-1.4 (18.5)	343 (214, 181-650)	0.3 (28.6)	
Number of adherent days (*baseline score*)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD), range*	*Mean (SD)*	0.96^^
0-5 days (n=106)	44.3 (74.1)	42.5 (81.3)	-1.8 (36.0)	347 (189, 180-661)	-0.6 (46.3)	
6-7 days (n=489)	51.8 (106.1)	49.8 (110.6)	-2.0 (33.17)	346 (257, 180-650)	-0.9 (31.0)	
Median number of medications =7	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD), range*	*Mean (SD)*	0.33^^
<Median (n=236)	47.0 (93.7)	46.0 (95.3)	-1.0 (30.7)	347 (258, 180-661)	0.8 (35.3)	
≥Median (n=359)	52.8 (92.8)	50.1 (94.7)	-2.7 (26.5)	346 (182, 180-650)	-1.9 (28.4)	
Self -assessed health status at baseline (SF1)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD), range*	*Mean (SD)*	0.22^^
'Good, Fair, Poor, Very Poor' (n=409)	49.8 (111.2)	49.0 (107.2)	-0.8 (30.3)	335 (229, 180-650)	0.3 (34.0)	
'Excellent' or 'very good' (n=103)	49.8 (45.7)	45.5 (49.7)	-4.3 (15.2)	335 (130, 183-609)	-2.8 (19.1)	
Health service-related characteristics						
Patient attended a health service with a median IRSEO score (=55)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD), range*	*Mean (SD)*	0.15^^
< 55 (n=346)	55.0 (160.0)	52.2 (176.7)	-2.8 (20.5)	354 (245, 181-661)	-2.0 (16.7)	
>= 55 (n=374)	44.7 (112.2)	44.4 (108.3)	-0.3 (34.8)	327 (232, 180-650)	1.5 (40.6)	
Intervention-related characteristics						
Patient who had a HMR compared to patient who had a non-HMR	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD), range*	*Mean (SD)*	**0.035^^**
Non-HMR (n=314)	48.6 (108.1)	49.2 (95.7)	0.6 (24.8)	336 (253, 180-613)	2.2 (30.1)	
HMR (n=258)	50.7 (101.2)	46.5 (112.4)	-4.2 (22.5)	345 (180, 182-650)	-2.9 (19.3)	
Patients who received an MBS service for item 10987 or 10997 during the follow-up period**	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD), range*	*Mean (SD)*	0.32^^
No (n=334)	58.8 (118.8)	57.9 (113.3)	-0.9 (21.9)	337 (292, 180-622)	0.7 (29.2)	
Yes (n=386)	41.7 (55.0)	39.7 (60.9)	-2.0 (27.5)	342 (248, 180-661)	-0.9 (29.5)	

Bold p-values imply statistically significant change at the 0.05 level.
^P-values (paired data) were derived from the cluster-adjusted (ACCHS cluster) comparison of annualised differences in eGFR against -3 and were determined using the svy linearized : regress Stata command. The value of -3 was the theoretically expected mean annual eGFR (ml/min/1.73m^2) linear decline.
^^Cluster adjusted p-values (ACCHS cluster) were determined using the svy linearized : regress Stata command with differences of annualised eGFR as the outcome measure.
* Follow-up time is the number of days between two measurements. It was defined as the time between the most recent baseline eGFR value and the follow-up eGFR value closest to the end-of study date (31/10/2019).
**MBS items 10987 and 10997 provide a rebate for a service by a practice nurse or an Aboriginal and Torres Strait Islander Health Practitioner (e.g. staff within ACCHSs) that includes a follow-up the assessment of the medication adherence of an Indigenous patient.

SD= cluster adjusted standard deviation (ACCHS cluster).
Health service= Aboriginal community-controlled health service (ACCHS)
HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
IRSEO= Indigenous Relative Socioeconomic Outcomes index. The IRSEO reflects relative advantage or disadvantage at the Indigenous Area level, where a score of one (1) represents the most advantaged area and a score of 100 represents the most disadvantaged area.[199]
MBS= Medicare Benefits Schedule
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
SF1= Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor*?'

Table 15: Mean difference in *absolute cardiovascular disease risk (CVD risk) in IPAC study participants (n=38) using paired pre and post-intervention measures, stratified by selected participant, health service, and intervention characteristics, and adjusted for health service cluster and the length of follow-up time.**

IPAC participants with paired data for CVD risk (n=38)	CVD risk (% unit)*			P-value
	Mean value pre-enrolment	Mean value during follow-up	Difference	
	Mean (SD)	*Mean (SD)*	*Mean (SD, 95% CI)*	**0.027^**
	11.9 (7.2)	10.9 (5.4)	-1.0 (2.6, -1.8 to -0.12)	
Participant-related characteristics				
Median age at baseline =58 years	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.78^^
<Median (n=18)	9.5 (9.8)	8.3 (8.9)	-1.2 (1.4)	
≥Median (n=20)	14.0 (5.8)	13.2 (4.9)	-0.8 (2.7)	
Median length of stay in the study =255 days *(IQR: 203-316)*	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.30^^
<Median (n=19)	12.2 (9.5)	11.6 (7.8)	-0.6 (2.2)	
≥Median (n=19)	11.5 (5.1)	10.2 (3.6)	-1.3 (2.1)	
Sex	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.17^^
Female (n=29)	10.2 (2.9)	9.5 (1.9)	-0.7 (2.2)	
Male (n=9)	17.2 (8.1)	15.4 (6.6)	-1.8 (2.0)	
Number of adherent days (*baseline score*)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.28^^
0-5 days (n=6)	13.0 (5.2)	10.7 (3.3)	-2.3 (3.3)	
6-7 days (n=26)	10.5 (3.6)	9.8 (2.4)	-0.7 (2.1)	
Median number of medications =5	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.28^^
<Median (n=14)	11.4 (2.7)	10.8 (3.8)	-0.6 (2.7)	
≥Median (n=18)	10.7 (7.4)	9.3 (6.5)	-1.3 (1.8)	
Self -assessed health status at baseline (SF1)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.10^^
'Good, Fair, Poor, Very Poor' (n=26)	10.8 (4.7)	10.0 (3.7)	-0.8 (2.6)	
'Excellent' or 'very good' (n=5)	10.6 (5.6)	8.4 (4.3)	-2.2 (1.8)	
Health service-related characteristics				
Patient attended a health service with a median IRSEO score (=61)	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.64^^
< 61 (n=13)	10.5 (5.1)	9.4 (2.9)	-1.1 (2.4)	
>= 61 (n=25)	12.6 (7.5)	11.7 (5.4)	-0.9 (2.7)	
Intervention-related characteristics				
Patient who had a HMR compared to patient who had a non-HMR	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	**0.039^^**
Non-HMR (n=22)	11.4 (6.9)	10.9 (5.4)	-0.5 (1.9)	
HMR (n=8)	15.8 (2.4)	13.4 (1.2)	-2.4 (1.1)	
Patients who received an MBS service for item 10987 or 10997 during the follow-up period**	*Mean (SD)*	*Mean (SD)*	*Mean (SD)*	0.16^^
No (n=19)	14.0 (4.1)	12.4 (1.9)	-1.6 (3.2)	
Yes (n=19)	9.8 (8.3)	9.4 (8.0)	-0.4 (1.1)	

Bold p-values imply statistically significant change at the 0.05 level.

^P-value (paired data) was derived from the cluster-adjusted (ACCHS cluster) comparison of CVD risk differences against zero and was determined using the svy linearized : regress Stata command.
^^Cluster adjusted p-values (ACCHS cluster) were determined using the svy linearized : regress Stata command with differences in CVD risk as the outcome measure. The follow-up time in days between the enrolment date and the end of study date was added to all cluster-adjusted linear regression models.
* Estimated 5-year risk of a primary cardiovascular event according to the Framingham risk equation (1991) for those not at high risk according to clinical criteria (http://www.cvdcheck.org.au/)[200]
**MBS items 10987 and 10997 provide a rebate for a service by a practice nurse or an Aboriginal and Torres Strait Islander Health Practitioner (e.g. staff within ACCHSs) that includes a follow-up the assessment of the medication adherence of an Indigenous patient.

SD= cluster adjusted standard deviation (ACCHS cluster).
CVD= cardiovascular disease
Health service= Aboriginal community-controlled health service (ACCHS)
HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
IRSEO= Indigenous Relative Socioeconomic Outcomes index. The IRSEO reflects relative advantage or disadvantage at the Indigenous Area level, where a score of one (1) represents the most advantaged area and a score of 100 represents the most disadvantaged area.[201]
MBS= Medicare Benefits Schedule
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
SF1= Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor*?'

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Assessment of medication appropriateness using the Medication Appropriate Index (MAI) in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC project)

REPORT TO THE PHARMACEUTICAL SOCIETY OF AUSTRALIA FOR THE IPAC PROJECT

Final Report, February 2020.

Prepared by: Couzos S, Smith D, Buttner P, Biros E. College of Medicine and Dentistry, James Cook University, on behalf of the IPAC Project Team.

Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project.

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ABSTRACT

Objective

Suboptimal prescribing quality is a barrier to achieving equitable health outcomes for Aboriginal and Torres Strait Islander peoples who experience a higher burden of chronic disease than other Australians. The study objective was to assess the effect of an integrated non-dispensing pharmacist on medication appropriateness in Aboriginal and Torres Strait Islander adults with chronic disease compared with usual care pre-intervention.

Design and participants

Participants attended Aboriginal Community Controlled Health Services (ACCHSs) and were enrolled in the *Integrating Pharmacists within* ACCHSs *to improve chronic disease management* (IPAC) project- a non-randomised, prospective, pre and post quasi-experimental, community-based, participatory, and pragmatic study. Consented participants were recipients of integrated pharmacist care within ACCHSs that also included a prescription quality review as part of 10 core pharmacist roles. Prescribing quality (medication appropriateness and overuse) was assessed by pharmacists with the medication appropriateness index (MAI). Deidentified participant data was electronically extracted from health records.

Outcome measures

A subset of the enrolled cohort was assessed for change in prescribing quality: summated mean MAI scores per participant and per medication, and the proportion of: medications rated inappropriate according to ten MAI criteria; participants receiving ≥1 medication rated inappropriate and/or unnecessary (≥ 1 overuse MAI criteria); and prescribed medications with an inappropriateness rating by medication type.

Results

Of participants (n=1,456) from 18 ACCHSs involving 26 integrated pharmacists, 390 were selected (non-probabilistic) for MAI assessments at baseline and at the end of the study. Loss to follow-up (n=33 without repeat MAI) left 357 participants for paired data analysis (median interval of 270 days). Participants had cardiovascular disease (CVD), Type 2 diabetes mellitus (T2DM), chronic kidney disease (CKD), or other chronic disease, and 93% were Aboriginal and/or Torres Strait Islander [mean age 57 years (SD 14.4)]. Chronic disease co-morbidity was present in 87.4%. MAI participant characteristics differed little from the remaining cohort (n=1,099). The median number of medications taken by MAI participants at baseline was 7.0 (IQR 5-9). MAI evaluations each took 60 minutes (median) to complete. A total of 2,804 and 2,963 medications were evaluated at baseline and at the end of the study respectively. At baseline, 67.8% (n=242) of participants were prescribed ≥1 medications rated as inappropriate in at least one MAI criterion; 23.1% of all medications had ≥1 inappropriateness rating; the mean MAI score per participant was 6.02 (SD±23.6); and the mean MAI score per medication was 0.76 (SD±8.5). The most common reason for medication inappropriateness was incorrect dosage. The intervention significantly reduced mean MAI scores per participant (to 3.20, SD ±11.7, p=0.003); the mean MAI score per individual medication (to 0.39, SD ±4.4, p=0.004); the proportion of participants receiving medications rated as inappropriate (to 44.5% n=159, p<0.001), and the proportion of medications with the following prescribing risks: incorrect dosage, impractical directions, unacceptable therapy duration, drug-disease interactions; and unnecessary medications due to absent clinical indications, or lack of clinical effectiveness (all p <0.05). There was a 34.1% relative reduction in the number of participants with medications meeting ≥ 1 medication overuse criteria. Significant reductions in participant numbers prescribed medications with an inappropriateness rating was observed for: cardiovascular (-19.9% absolute reduction, p<0.001), endocrine (-11.2%, p<0.001), and respiratory conditions (-4.5%, p=0.019). Quality prescribing improved for participants with medications for hypertension, diabetes and/or dyslipidaemia (absolute reductions of -5.3%, p=0.01; -9.5%, p<0.001 and -9.8%, p<0.001 respectively).

Conclusion

Nearly two-thirds of participants were prescribed a medication that was rated as inappropriate pre-intervention. Prescribing quality improved significantly for participants following the integrated pharmacist intervention within ACCHSs. Improvements were significant in participants challenged by chronic disease comorbidity and polypharmacy and within a short follow-up period. Prescribing quality improvements are generalisable to the broader subset of IPAC participants, and potentially to other Aboriginal peoples and Torres Strait Islanders in receipt of pharmacist services integrated within primary health care settings such as ACCHSs.

INTRODUCTION

Inappropriate prescribing is defined as the 'use of medications with the potential for risks that outweigh the benefits to the patient'.[1] It refers to pharmaceutical prescribing that does not agree with accepted medical standards or poses more risks than benefits to the patient. Quality prescribing is judicious, patient-centred, and evidence-based so that the use of medicines with no clinical need or dubious efficacy is reduced to a minimum.[2] In Australia, this is fostered through a health systems approach known as the quality use of medicines (QUM).[3] Substantial benefits in healthcare services and the wider community can be realized with improvements in QUM,[4] with national health programs now developed to support better prescribing decisions.[5] Quality prescribing is particularly pertinent for Aboriginal and Torres Strait Islander peoples who concurrently experience health system access constraints[6] as well as much higher levels of co-morbidity than other Australians.[7] There is evidence that prescribing quality is suboptimal in this population,[8] and this serves to worsen already significant systems barriers to equitable health outcomes and resource use.[9]

A range of strategies to reduce inappropriate prescribing have been reported (mainly for the elderly) and these include the integration of pharmacists in multidisciplinary teams, pharmacist interventions alone, computerized systems, audit and feedback, and other strategies.[10] [11] [12]

The addition of pharmacists to healthcare teams has been found to enhance quality prescribing,[13] biomedical outcomes,[14] and to reduce hospitalisation.[15] [16] Whilst co-location of pharmacists within general practice has enabled greater communication, collaboration and relationship building among health professionals,[17] this intervention has never been evaluated in Aboriginal health settings before. Moreover, the quality of prescribing is not systematically examined for Aboriginal peoples and Torres Strait Islanders with chronic disease. National key performance indicators for health services to this population encourage regular clinical audit to improve activity,[18] but are lacking indicators of prescribing quality. The National Prescribing Service supports general practices to undertake small prescribing audits,[19] but it is unclear if this reduces inappropriate prescribing.

In order to investigate the potential gains in health outcomes arising from integrated models of care within Aboriginal health settings, the *Integrating Pharmacists within Aboriginal Community Controlled Health Services* (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project was developed. The IPAC project was a community-based, participatory, pragmatic, non-randomized, prospective, pre and post quasi-experimental study (Trial Registration Number and Register: ACTRN12618002002268) that integrated a registered non-dispensing pharmacist within the primary healthcare team of ACCHS for up to a 15-month period. The project explored if this intervention led to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples with chronic diseases. It was anticipated that pharmacists integrated within Aboriginal primary health care settings would facilitate increased access to medication-related expertise and assessments, which when coupled with increased engagement with participants, staff and other stakeholders, would result in improved services and quality use of medicines.

This project commenced in 2018 and measured the medication appropriateness index (MAI) of a subset of enrolled adult patients with chronic diseases (participants) at baseline and at the end of the study. Pharmacists functioned within existing and usual primary health care service delivery systems and focused on pre-determined core roles that included providing medication management reviews, assessing participant adherence and medication appropriateness, providing medicines information and education and training, collaborating with healthcare teams, delivering preventive care, liaising with stakeholders, providing transitional care, and undertaking a drug utilisation review.[20] The study explored changes to the proportion of study participants with inappropriateness ratings to their medications according to the MAI criteria as assessed by pharmacists.

METHOD

Study setting and Intervention

IPAC pharmacists delivered non-dispensing clinical medication-related services within ACCHSs through a coordinated, collaborative and integrated approach to improve the quality of care of patients with chronic diseases. Their intervention targeted consented

patients and practice-specific activities directed to health professionals and systems within the service. Pharmacists were integrated within these services with identified positions, having shared access to clinical information systems, providing continuous clinical care to patients, receiving administrative and other supports from primary health care staff, and adhering to the governance, cultural, and clinical protocols within ACCHSs as part of their shared vision. A full description of the intervention, participant and service recruitment, and pharmacist training is described elsewhere.[21] In short, this project was conducted in 18 ACCHSs across 22 service settings located in urban, rural, and remote Australian regions in three jurisdictions: Queensland, Northern Territory, and Victoria.

Study Participants

The study adopted a non-probabilistic, pragmatic sampling method where health service staff and pharmacists invited IPAC participants into the study from patients attending ACCHSs for usual care. The study enrolled adult participants (≥18 years) with cardiovascular disease, type 2 diabetes mellitus, chronic kidney disease or other chronic conditions at high risk of developing medication-related problems. Pharmacists selected a sample of enrolled participants for MAI assessment according to their clinical need for a medication review. The MAI was undertaken as a comprehensive prescribing quality review of participants medications assessing for medication appropriateness. The clinical need for such a review was reflective of usual care and based on criteria such as for Home Medicines Review where the patient must have 'a chronic medical condition or a complex medication regimen, and not [have] their therapeutic goals met'.[22] The study did not formally randomize the selection of participants for MAI audit in order to reflect usual care clinical processes and services consistent with a pragmatic trial.[23] Pharmacists used the MAI assessment findings to inform medication management plans and recommendations for prescribers, as needed.

For feasibility reasons, for every full-time equivalent (FTE) pharmacist position, at least 30 MAI assessments of IPAC participants were required. The numbers of participants to be audited for medication appropriateness was adjusted pro-rata to be consistent with the level of pharmacist appointment within the ACCHS. Given 12.57 FTE pharmacist positions within all ACCHSs, the project goal was to complete 377 MAI's in total. This goal was set due to the length of time usually required for pharmacists to undertake the MAI assessment and

the large number of participants expected to be enrolled into the study.[24] Pharmacists were instructed to complete the assessments within the first three months after participant recruitment into the study (baseline), and again prior to the end of the study (set as the 31st October 2019). The attendance of the patient was not required to undertake the assessment.

Medication Appropriateness Index

Medication appropriateness in this study was measured by assigning a Medication Appropriateness Index (MAI) weighted score to each medicine based on an internationally validated tool[25 26] that assesses the potential for medicine-related risks that outweigh the benefits to the patient. The MAI criteria inform on the potential for prescribing quality improvements and can be used to measure changes in quality over time.

Instructions on the use of the index and how to assign scoring were sourced from the author in Canada.[27] The MAI has 10 items investigating measures of medication appropriateness, each rated as 'appropriate' (A), 'neutral' (B), 'inappropriate' (C), or 'unknown' (Z) and weighting is applied to the 'C' rating which generates a score that can then be summated per patient (Table 1). The 10 items include medication indication, effectiveness, correct dosage, correct direction, practical direction, drug–drug interaction, drug–disease interaction, drug duplication, duration of therapy, and cost. Pharmacists reviewed each participant's medical record containing their currently prescribed medications and assigned the 10 -item ratings to each medication. The assessed ratings were then entered by pharmacists into an electronic logbook. Pharmacists used this medication review and other assessments related to their core role to formulate recommendations for the prescriber.

Higher MAI scores indicate increasing inappropriateness of prescribed medicines. A score of 18 represents maximal inappropriateness with regard to a single medication and refers to a 'C- rating' for every one of the 10 MAI criteria. A total score for the participant was derived by summating all the scores assigned for each medication.

Overuse of medications, defined as participants' medications deemed to be 'unnecessary', was measured by assigning a MAI score[28] to three items. Items 1,2,8 of the MAI tool specifically informed on the overuse of medications measuring if the prescribed medicine was clinically indicated, effective, or if there was unnecessary duplication of a medicine. The assessment of medication overuse defined by polypharmacy (five or more medications per patient) was not used as an outcome measure as some polypharmacy can be appropriate when this number of medicines is clinically indicated.[29 30]

An analysis of mean MAI scores per participant, the mean total MAI score per medication, and the number and proportion of participants receiving inappropriate medications was assessed at baseline and at the end of the study. Pharmacists were blinded to the results of the MAI assessment as scores were only measured by the research team. Ratings that were assigned to 'A' or 'B' or 'Z' categories were weighted as zero for scoring, meaning that medications assigned this rating were considered 'appropriate'.

IPAC Pharmacist training

There were 26 registered pharmacists who were recruited into the study and appointed to ACCHS sites, with 20 accredited to offer a Home Medicines Review (HMR) during the intervention phase of the study. Pharmacists were trained by the Pharmaceutical Society of Australia (PSA) to evaluate each medicine using the MAI tool in the ACCHS context at the time of their induction into the project. Attention was paid to the MAI instructions provided by Hanlon et al.[31] The aim was to adopt a standardised approach to rating each medicine to enable individual pharmacists to use the tool accurately, consistently and reliably. Examples of how to assess each item in the MAI were developed by the PSA with input from the project team and adapted to Australian pharmaceuticals (Appendix A). The training also explored the reasons for allocating A, B, C or Z responses.

For each question, the use of Australian evidence-based references to assist assessment was recommended. For example, for MAI question 1, the Australian Medicines Handbook[32] was used to detail how a drug may have an 'accepted' use, as opposed to an 'indication for use'. Pharmacists were also instructed to ensure MAI assessments took account of clinical information such as laboratory results when assessing medications. Pharmacists were

expected to communicate the findings of the MAI assessment to prescribers so that appropriate clinical action was considered, and to follow-up participants as per usual clinic processes.

Training aimed to minimise intra-rater errors (the same person interpreting the same data differently). To minimise inter-rater errors (different observers reporting the same information differently), the same pharmacist was instructed to conduct the end of study MAI assessments they initially completed at baseline. Reliability testing was conducted with a small sample of pharmacists. For intra-rater reliability testing, pharmacists in six services repeated their MAI assessment of the same randomly selected participant, whilst inter-rater testing required two pharmacists to reassess three of each other's participants.

Classification of medicines

Pharmacists were required to classify the type of each MAI-rated medication when entering data into the logbook. For pragmatic study purposes, medicines were classified as per the Australian Medicines Handbook (AMH) as IPAC pharmacists used the AMH in their daily activity. The AMH has 20 main groups, most of which are anatomical, and others are pharmacological/therapeutic groups such as vaccines, and psychotropic drugs. A classification was assigned for 17 of the 20 groups included in the AMH. Categories of medicines excluded were: anaesthetics, antidotes and antivenoms, and obstetrics and gynaecological drugs, as these medicines are less relevant in the management of the chronic diseases investigated in this study.

Participant and service characteristics

Data was collected on health service and participant characteristics, as well as their self-assessed health status and self-report on medication adherence. The participants primary place of residence was not collected for privacy reasons, and so the location of the health service providing the intervention was used instead.

Remoteness and Indigenous disadvantage

The geographical location of IPAC sites was defined to the Australian Statistical Geography Standard-Remoteness Area (ASGS-RA, 2016) which is a classification based on the physical

distance of a location from the nearest urban centre.[33] The Indigenous Relative Socioeconomic Outcomes (IRSEO) index was used to define the relative advantage or disadvantage of geographical areas based on nine socioeconomic measures such as education, employment, housing and income for the Aboriginal and Torres Strait Islander population. The measure is Indigenous-specific and assigns a score of one (1) for the most advantaged area and a score of 100 for the most disadvantaged area.[34] IRSEO data was sourced from publicly available datasets.[35]

Health systems assessment

Health service information was sourced directly from each site through a 'health systems assessment' (HSA) survey completed by two project officers each visiting individual sites. The aim was to identify if incidental changes to health service systems during the IPAC intervention may confound the interpretation of study outcomes. The baseline site visits were conducted between 12th June 2018 and 13th September 2018, whilst the end of study site visits were conducted at least 12 months later between 6th September 2019 and 22 October 2019. Respondents to the HSA survey included the Chief Executive Officer, practice or clinic manager, human resources manager, quality manager and/or clinical staff. On most occasions, interviewees comprised at least two different service representatives, whilst interviewees at the end of the study may not have been the same person/s interviewed at baseline. To minimise bias, the same project officer conducted the site interview on both occasions. Information was collected on service and client population size, number of episodes of care (annualised number of client contacts with the service, where all contacts with the same client on the same day are counted as one episode), number and types of staff, access to on-site specialist and allied health services, engagement with and the support received from community pharmacy, and systems for clinical management and chronic disease care.

Health systems assessment information was collected using a form adapted from a Systems Assessment Tool (SAT) to assist ACCHSs to self- audit their capacity for continuous quality improvement.[36] The SAT was based on the 'chronic disease care model' which is a systematic approach to delivering chronic disease care within primary health care settings.[37] [38] This approach explores delivery system design; information systems and decision support; self-management support; linkages with other services; and organisational influence and

integration. Whilst permission to use the SAT tool for the IPAC project was provided by the developers,[39] a shortened and more context-specific survey was developed that was also informed by the Kanyini Audit Health Assessment Form used with ACCHSs to explore organisational barriers to improved quality care. [40 41] Permission to adapt and use the Kanyini form was provided by Prof Alex Brown from the South Australian Health and Medical Research Institute (SAHMRI).[42]

The items subsequently included in the IPAC HSA form were agreed by the project team and evaluation committee to significantly reduce the time required to collect site information yet still retain elements of the key chronic disease care model domains (Appendix B). For these items, respondents were asked to score them on a scale from 1-10 where 10 represented 'routine or established' activity and 1 represented 'minimal or absent activity'. Items with 'Yes' or 'No" answers were scored 10 for 'yes' and 1 for 'no'. The overall score for each domain was derived for each service, and the median and interquartile range was reported per domain.

The use of point of care (POC) pathology testing within health services was also assessed to ensure the reliability of the biomedical markers describing participant characteristics. Services using POC testing were asked if they were participating in the Australian Government supported *Quality Assurance for Aboriginal and Torres Strait Islander Medical Services* (QAAMS) program. The QAAMS program supports participating ACCHSs to ensure that testing is conducted under a quality management framework, delivering analytically sound performance.[43]

Self-assessed health status

Self-assessed health status was determined using the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?'.* An extra response option – 'very poor' – was added (as in the SF-8 survey) to reduce the potential for respondents to overstate their health status.[44] Responses to this single-item (SF-1) question have been shown to correlate well with multi-item tools measuring the same construct,[45] and are used in the National Aboriginal and Torres Strait Islander Social Survey.[46]

Medication adherence

The extent of medication adherence for each participant was assessed using a self-reported indirect method of assessment with a single-item question: '*How many days in the last week have you taken this medication?*' This was asked for each medication the participant was taking. Pharmacists were trained to express the score as a proportion of the number of days the participant took the correct doses of the medication as prescribed in the preceding week. For example, if the patient took half the doses prescribed for the preceding week, this would be expressed as 50% of the days in the previous 7 days. An 'adherent day' was defined as not missing any doses of prescribed medicines on that day.[47] The mean number of adherent days in the preceding week ranged from 0-7 days, based on the mean score for all medications. This informed on the proportion of days with the correct number of doses taken, which is a frequent summary statistic used for reporting medication adherence.[48] If the mean number of adherent days for participants was least 6 of 7 days, this approximated medication adherence for at least 80% of the days indicated.

This single question and its variations have been used in the Kanyini study involving Aboriginal and Torres Strait Islander peoples in Australia[49] and internationally.[50, 51, 52] Even though self-report adherence measures have significant limitations, one study of medication non-adherence measured objectively by gaps in prescription fills was significantly associated with self-reported non-adherence defined by at least 'two days missed' taking medicines over the past week.[53] Multi-item internationally developed psychometric tools for assessing medication adherence were not used as they lacked validation for use within the ACCHS context,[54] used inappropriate language, and placed substantial data burdens on pharmacists and participants.

Data collection

A bespoke online database (pharmacist logbook) was developed for pharmacists to record the medication appropriateness findings and other pharmacist activity. The logbook was a secure password protected online database, accessible from any device connected to the internet, with dual recording and reporting functionality. The electronic interface was intuitive and user-friendly to minimise the burden of data entry and reporting.

Participant characteristics were sourced from two existing clinical information systems (CIS) used to store patient electronic health records and were used by participating ACCHSs (Best Practice and Communicare). Deidentified participant data was extracted from these systems

using an electronic tool called GRHANITE that required remote installation and regular extraction from IPAC sites for the term of the project.[55] GRHANITE extracted data only for consented patients and copied it to a JCU SQL server database employing internationally recognised point-to-point encryption (P2PE) mechanisms to protect data in transit.

The scope of the data extractions was agreed based on IPAC-specific data requirements and extract definitions for GRHANITE XML's (site interfaces) to ensure they were fit-for-purpose. All ACCHSs consented to the installation of GRHANITE and the de-deidentified data extractions required for the project. Each ACCHS successfully completed 'site acceptance testing' that confirmed the extraction of fit-for purpose data. The integrity of the data extraction process was monitored through weekly uploads. XML interface maintenance ensured that any software vendor upgrades to the CIS were aligned with data extract definitions.

The deidentified CIS participant identification numbers in the GRHANITE extractions linked with participant data recorded by pharmacists in the logbook. For assessed participants, pharmacists also recorded in the CIS that the MAI had been completed in order to assist with their follow-up.

Private laboratories conducted all pathology testing for IPAC sites as per usual care and were all accredited for testing by the National Association of Testing Authorities. Point of care testing by some sites for particular biomedical measures complied with QAAMS requirements. A laboratory diagnosis of dyslipidaemia was defined as one or more of the following four measures: low density lipoprotein (LDL) >=3.5mmol/L; total cholesterol (TC) >= 5.5mmol/L; triglycerides (TG) > =2.0mmol/L; high density lipoprotein (HDL) < 1.0 mmol/L for men and <1.3 mmol/L for women.[56] A participant missing the result of any of these measures, even with the remainder within the normal range, was excluded from the diagnosis. Albuminuria was defined as a urinary albumin:creatinine ratio (ACR) >2.5 mg/mmol for males and >3.5mg/mmol for females. [57] [58] Estimated glomerular filtration rate (eGFR) as reported in CISs was used without derivation from serum creatinine measures.

Patients already at a clinically high risk for a CV event were those with any of the following: diabetes mellitus and age >60 years, diabetes mellitus and microalbuminuria (urinary ACR >2.5 mg/mmol for males and >3.5 mg/mmol for females), eGFR <45 mL/min per 1.73 m^2,

systolic blood pressure (BP) ≥180 mm Hg, diastolic BP ≥110 mm Hg, and serum total cholesterol >7.5 mmol/L.[59]

Data analysis

All participants with less than 90 days of follow-up were removed from the analysis due to their short length of stay in the study (n=90). Health Care Homes (HCH) participants who were also concomitantly enrolled in another program- the '*Community Pharmacy in Health Care Homes Trial* '[60] - were also removed from the analysis (n=47).

Participant characteristics data was extracted from the JCU SQL Server database using the Navicat 15 for SQL Server (PremiumSoft) database management tool; MAI data was extracted from the pharmacist logbook as Microsoft Excel files; and health services data was sourced from HSA survey. All data was subsequently analysed using a number of statistical tools including the SPSS Statistics Premium version 24 (IBM) statistical package, Stata/MP 13.0 (StataCorp LP), and Microsoft Office 2016 (Microsoft). Nominal variables are presented as absolute and relative frequencies. Depending on their distribution, continuous variables are presented as mean and standard deviation (SD) or median and interquartile range (IQR) as indicated accordingly.

The characteristics of participating ACCHSs were described and compared for changes between baseline and end of the study using the Wilcoxon test (median values) or the McNemar test (paired proportions).

The study design of IPAC involved cluster sampling using ACCHSs as the primary sampling units. As a consequence, statistical analyses were cluster-adjusted for the design effect of ACCHSs (one-stage) for comparisons at the level of participants and were cluster-adjusted for the design effects of ACCHS and participant (two-stage) for comparisons at the level of medications.

The percentages of participants with improvements in outcomes were compared to determine the absolute and relative change pre and post intervention. P-values for changes in numerical MAI outcome variables for participants (paired data) were derived from the cluster-adjusted confidence interval (ACCHS cluster) of the differences as this is equivalent to a paired t-test. P-values for comparisons between baseline and end of the study for

changes in medications (unpaired data, nominal variables) were determined using logistic regression analyses that were cluster-adjusted for ACCHSs and participants. P-values for comparisons between baseline and end of the study for changes in participants and the type of medications prescribed for them (paired data, nominal variables) were determined using conditional logistic regression analyses that were cluster-adjusted for ACCHSs. Statistical significance was assumed at the conventional 5% level.

Ethics approval

Ethics approval for the project was received from four ethics committees in the three jurisdictions including St Vincent's Hospital Melbourne (SVHM) Human Research Ethics Committee (HREC), Victoria (HREC/17/SVHM/280), James Cook University HREC (mutual recognition of SVHM HREC, approval HREC/H7348), Menzies School of Health Research (HREC/2018-3072) and the Central Australian HREC (HREC/CA-18-3085).

RESULTS

The total IPAC project cohort comprised 1,456 participants who remained in the study until the end. From this, 390 participants had a baseline MAI, with a loss to follow-up of 33 participants, meaning the final MAI subset comprised 357 (24.5%) participants with both a baseline and follow-up MAI from 18 ACCHSs (Figure 1). MAI assessments were completed by pharmacists at each of these ACCHSs. The mean time from participant enrolment to the completion of the baseline MAI was 22 (SD± 96) days, with 94% completed within 100 days, consistent with the project protocol. Follow-up MAIs were completed within a median of 270 days (IQR: 218-316) from the baseline assessment. The median length of stay in the study for MAI participants was 329 (IQR: 289-364) days.

Health service characteristics

The majority of services were located in outer regional and remote locations of Australia, and in IRSEO regions of relative greater disadvantage for Indigenous Australians (Table 2). Services were mostly large in size with a median of 2,066 regular clients per service at baseline, of which 88% were Aboriginal and/or Torres Strait Islander. At baseline, services that used the Communicare CIS software provided more patient services (based on episodes of care) than those using Best Practice software. Only about half of all services were able to

offer on-site access to a cardiologist, with fewer providing on-site endocrinology support. However, 72% and 83% of services were able to offer diabetes educator and podiatry support to patients on-site (respectively).

Two-thirds of services (12) conducted POC pathology testing and all were participating in the QAAMS program. The remaining IPAC services (6) did not utilise point-of-care testing for biomedical measures assessed in the IPAC project.

Half of the services engaged with two or more community pharmacies at baseline. Almost all services that reported receiving community pharmacy support did so for dose administration aids. Medicines dispensing and response to queries about medications were other forms of support given to services by community pharmacy. Only 50% of services received support for an HMR.

At baseline, eight services reported that pharmacists had provided on-site support prior to the IPAC intervention. In these settings, the pharmacist's role was to provide medication support for the section 100 remote-area Aboriginal health services program,[61] or to undertake HMRs. Only one service reported employing a pharmacist prior to IPAC, but their role was predominantly related to medicines policy and governance and did not involve delivering the intervention defined by the IPAC study [*Personal communication, NACCHO*].

By the end of the study, the vast majority of the broad health service level factors explored in the IPAC study had not changed ($p>0.05$, Table 2). There were still six services eligible for remote area support from community pharmacy through the Section 100 Pharmacy Support program, and one additional service participated in the Health Care Homes (HCH) program designed to better coordinate the health care of patients with chronic disease,[62] with all located in the NT. Most of the access to specialists and allied health staff did not change during the study.

Health systems assessment

IPAC services had high performing systems for chronic disease management at baseline with median scores across all domains ranging from 7-9. By the end of the study, no score change was evident with three domains ('organisational influences and integration', 'information system and decision support', 'self-management'), but two domains

significantly improved ('delivery system design', and 'links with community and other health services', Table 3, Figure 2).

Participant characteristics

At baseline, the mean age of participants was 57 years (SD±16.4), 93% were of Aboriginal and/or Torres Strait Islander origin, and 57% were female (Table 4). One third of participants attended ACCHSs in major cities or inner regional areas, one-third in outer regional, and the remaining third in remote or very remote locations. The vast majority were attending ACCHSs in locations outside major cities. Most participants were pensioners or had concessional eligibility status (83%). Half of all MAI participants were prescribed 7 or more medications, consistent with the definition of polypharmacy (≥ 5 medications). Despite this large number of per patient medications, only 11.5% of participants had an HMR (MBS item 900) completed in the 12 months prior to study enrolment.

Only a small proportion of participants assessed for the MAI were also engaged in the Health Care Homes program (10.6%), whilst most were registered with the Close the Gap (CTG) Pharmaceutical Benefits Scheme (PBS) co-payment measure (75%). The remainder of this cohort were mostly likely patients of remote-area health services with access to PBS medicines under the section 100 medicines supply scheme,[63] who did not need to be registered with CTG.

Most MAI participants self-assessed as having 'good to very poor' health status (82%) with only 18% of MAI subgroup participants defining their health as 'very good to excellent'. Almost all had evidence of comorbidity or multimorbidity (up to 87%) with a median of 2 chronic diseases per participant. Diabetes, hypertension, dyslipidaemia, chronic kidney disease, and obesity (BMI>30) were highly prevalent.

Overall, the vast bulk of participant characteristics at baseline were similar between those who were MAI assessed or not (n=1,099) (Table 4). Similarities were observed in age, sex, Aboriginality, geographical location, pensioner status, number of medications, CTG script eligibility, Health Care Homes enrolment, prior HMR, self-assessed health status, clinical diagnoses, type of chronic disease, degree of comorbidity or multimorbidity, obesity, glycaemic control, or prevalence of eGFR levels. The proportion of participants who self-reported as adherent to medications was similar between cohorts. MAI participants had

more doctors' visits per 12 months at baseline than the remainder of the IPAC cohort with a median of 7 visits compared with 5 respectively (p<0.001).

Medication appropriateness index

The total number of medications used by participants increased between assessments to 2,963 medications by the end of the study with a mean 8.3 medications- an increase of 0.45 medications per participant or 5.7% increase to the end of the study although this change was not statistically significant (p=0.147, Table 5).

At baseline, 67.8% of participants had at least one medication that was rated as inappropriate in any of the 10 criteria, but this reduced significantly to 44.5% of participants by the end of the study (p<0.001). Compared to baseline, this is a relative reduction of 34.3% in the number of participants with at least one inappropriate medication. By the end of the study, 83 fewer participants were prescribed one or more medications with an inappropriateness rating than at baseline. To achieve this result, 4.3 participants needed to be assessed by a pharmacist so that one less participant was prescribed a medication rated as inappropriate.

When the outcome was assessed by change in the mean MAI score per participant, the score reduced significantly by 47% from 6.02 (SD ±23.6) to 3.20 (SD ±11.7) (p=0.003). The mean MAI score per medication also reduced significantly by 48.7% from 0.76 (SD ±8.5) to 0.39 (SD ±4.4), (p= 0.004).

Of 2,804 medications, 23.1% were rated as inappropriate in any of the 10 criteria at baseline compared with just 12% at the end of the study - a significant reduction in the proportion of medications that were rated inappropriate by 48% (p= 0.008). On average, 1.8 medications per participant were rated inappropriate at baseline and this reduced significantly to 1.0 medications per participant (p= 0.001).

Clinical examples of the medication type and the reason for the inappropriateness rating given by IPAC pharmacists are shown in Table 6. Of all the medications prescribed at baseline, the most common reason for an inappropriateness rating was for 'incorrect dosage' affecting 7% of all medications (Table 7). Unacceptable therapy duration, significant drug-drug interactions, and the drug lacking an indication were the next most common reasons according to ratings. Only a small proportion of medicines were rated as

inappropriate due to the medicine not being the least expensive option for the patient (1.5%).

By the end of the study, the proportion of medicines with incorrect dosage reduced significantly by 55% with an absolute change of -3.81% ($p<0.001$). A significant reduction in medication inappropriateness was also evident for most other MAI criteria (Table 7). Participants were prescribed significantly fewer medications that were ineffective for the condition, or had incorrect dosage, impractical directions, significant drug to disease interactions, or unacceptable therapy duration compared with baseline ($p<0.05$). Although reductions in medication inappropriateness were also evident with regard to incorrect directions, significant drug to drug interactions, unnecessary duplication of drugs, and the use of a more expensive drug than necessary, these changes did not reach statistical significance ($p>0.05$) after cluster adjustment.

Overall, the number of participants with any medication that met at least one overuse criteria was reduced significantly with an absolute decline of 12.6% ($p<0.001$, Table 5) and 34.1% relative reduction compared to baseline. This suggests that 8 participants needed to be assessed for one less participant to be prescribed an unnecessary medication (Table 5). There was a statistically significant decline in medication overuse according to two of three MAI criteria for medication overuse with a -2.29%, and -1.95% absolute decline in the number of prescribed medications that were either not indicated, or ineffective for the condition ($p<0.05$, Table 7). Very few medications fulfilled all three criteria for overuse. The mean number of medications (per participant) that met at least one overuse criteria was significantly reduced by 41.4% ($p=0.016$, Table 5)

The proportion of medications with a Z-rating at baseline was negligible for all MAI questions at baseline (0.2-2.2% of all medications), except for question 8, which was one of the three questions that explored the overuse of medications (Table 8). Question 8 rated if the medication was an unnecessary duplication of other drugs. For 16% of all medications (446/2,804), pharmacists could not rate if the medicine was an unnecessary duplication. By the end of the study, the proportion of medications with Z-ratings reduced for every MAI criterion compared with baseline. The reduction in the degree of pharmacist uncertainty was only significant with regard to whether the prescribed medication was the least expensive.

Type of medications assessed by MAI

Of 2,963 medications assessed by IPAC pharmacists at the end of the study, 35.6% were cardiovascular (CV) medications, with antihypertensives (16%) and medications for dyslipidaemia (10%) being the most commonly prescribed (Table 9). Medications for endocrine disorders were the next most common type (21%), of which the vast majority were for the management of diabetes (17%). Respiratory medications comprised about 9% of all medication types.

The relative distribution of medication types prescribed for participants stayed the same throughout the study, with the exception of those for dyspepsia contributing a significantly smaller proportion of all types (Table 9). Of all medications rated as inappropriate in any criterion, the medication type did not change from baseline to the end of the study (Table 10). Most of the medications that were inappropriate in any one or more MAI criteria were for cardiovascular and endocrine conditions.

There were significant reductions in the proportion of medication-types that had an inappropriateness rating (Table 11). Medications for cardiovascular conditions were significantly less likely to have an inappropriateness rating by the end of the study when compared to baseline. This was particularly evident for medications used to treat dyslipidaemia (p=0.008). For cardiovascular conditions, 16.2% of medications were rated inappropriate at baseline, reducing to 7.3% by the end of the study (-8.9% absolute, p=0.013). Significant reductions in inappropriateness was also seen with medications for endocrine conditions and especially for diabetes (-12.9% absolute reduction, p<0.001).

By the end of the study, nearly all participants were prescribed medications for cardiovascular conditions (91%), most of them for hypertension (77%) and predominantly using angiotensin-converting enzyme (ACE) inhibitors (53%). More participants were prescribed antihypertensives (+3.6% absolute change, p=0.048), at the end of the study than at baseline with a significant increase in prescribed sartans (p=0.014) and beta-blockers (p=0.012), but no change in the proportion prescribed ACE inhibitors (p=0.312, Table 12). There was no change in the proportion of participants prescribed medications for dyslipidaemia (p=0.143), but prescribing for 'blood and electrolyte' conditions (a category that includes anti-platelet medications) was significantly increased (p=0.006). The number of participants on endocrine medications (72%), and on analgesics (26%) did not change.

Significantly fewer participants were prescribed gastrointestinal, musculoskeletal, and antidepressant medications by the end of the study (-5.0%, p=0.009; -5.0%, p=0.009; -3.6%, p=0.014, respectively), compared with baseline.

For many clinical conditions, fewer participants were prescribed medications rated as inappropriate by the end of the study (Table 13). Significant reductions in the number of participants prescribed medications with an inappropriateness rating were observed for the following conditions: cardiovascular (-19.9% absolute reduction, p<0.001), endocrine (-11.2%, p<0.001), 'blood and electrolyte' conditions (-7.0%, p=0.0034), respiratory conditions (-4.5%, p=0.019), for dyspepsia (-4.5%, p=0.02), and psychotropic use (-3.4%, p=0.031). The number of participants with medication for hypertension, diabetes and/or dyslipidaemia that was inappropriate in one or more MAI criteria reduced significantly by the end of the study (absolute reductions of -5.3%, p=0.01; -9.5%, p<0.001 and -9.8%, p<0.001 respectively). The proportion of participants prescribed non-opioid medications that had an inappropriateness rating also reduced significantly (-2.8%, p=0.035, Table 13).

Reliability testing

The majority of the follow-up MAIs (79%) were completed by the same pharmacist who completed the baseline MAI. The remaining follow-up MAI assessments were completed by a different pharmacist due to pharmacist turnover in some sites.

Inter-rater reliability testing was conducted with a sample of two pharmacists, each assessing three participant MAI's completed by the other pharmacist. This involved an assessment of 31 medications (310 MAI questions) from 6 participants within a mean 3 (range 0-6) days between assessments. Only 4 of 310 questions (1.3%) generated discordant answers with regard to C-ratings. A discordant C-rating for medications applied to only one MAI criterion (drug to drug interactions) and to 4 of 31 medications, indicating 87.1% concordance (Table 14).

Intra-rater reliability testing was conducted with a sample of six pharmacists reassessing 6 participant MAIs they had completed earlier (totalling 43 medications). This sample made up 6% of their combined 101 participants within a mean 8 (range of 6-14) days between assessments. Only 2 responses (from one pharmacist) from 430 MAI questions were discordant based on C-ratings indicating 99.5% concordance overall. The two discordant C-ratings for 43 medications indicated 95.3% concordance in ratings amongst pharmacists.

DISCUSSION

Integrating a pharmacist within 18 ACCHSs led to significant improvements in prescribing appropriateness by reducing the number of participants with medications rated as inappropriate or that met medication overuse criteria, amongst adult study participants with chronic disease and polypharmacy. Improvements were evident in Aboriginal and Torres Strait Islander participants following a median of 270 days (approximating 9 months) between repeat prescribing quality assessments. The intervention significantly reduced summated mean MAI scores per participant; the mean MAI score per individual medication; and the number and proportion of medications rated as inappropriate due to one or more of the following prescribing risks: incorrect dosage, impractical directions, unacceptable therapy duration, drug-disease interactions; and unnecessary medications due to absent clinical indications, and/or lack of clinical effectiveness. There was a 34.3% relative reduction in the number of participants with at least one medication rated as inappropriate, and a similar relative reduction in the number meeting at least one overuse criteria.

These significant improvements occurred within a context where most study participants (68%) at baseline were prescribed medications that were rated inappropriate in at least one prescribing risk criterion, and 37% had evidence of at least one medication that was potentially unnecessary. Almost all participants were Aboriginal peoples and/or Torres Strait Islanders with substantial chronic disease comorbidity, polypharmacy, chronic kidney disease, glycaemic control above the recommended target level for most of those with T2DM with available results, but only 11.5% had an HMR prior to the study intervention. As the presence of chronic disease was a participant inclusion criterion, at baseline, participants self-rated their health at worse levels than reported in the National Aboriginal and Torres Strait Islander Social Survey (2014-15).[64] Of respondents to the national survey, the proportion aged 15 years or older who self-rated their health as 'excellent or very good' was 40%, whereas only 18% of adult IPAC participants rated their health to this level. In a separate study, 22% of remote North Queensland Aboriginal and Torres Strait Islander adults with poorly controlled T2DM reported 'excellent or very good' self-assessed health.[65]

Only 4.3 participants needed to be assessed by a pharmacist to result in one less participant with suboptimal prescribing, and 8 participants needed to be assessed to result in one less

participant with an unnecessary medication. The proportion of medications that were rated as inappropriate reduced by half for most of the prescribing risk criteria. Moreover, there was an almost 4% absolute decline in the number of medications with incorrect dosage by the end of the study ($p<0.001$), indicating that the assessment of just 25 medications would result in one less medication with an incorrect dosage.

Improvements in appropriate prescribing were particularly evident with medications used for cardiovascular conditions and for diabetes. By the end of the study, significantly fewer participants were prescribed cardiovascular medications that had met an inappropriate criterion. With 71 participants no longer in receipt of cardiovascular-type medications with an inappropriateness rating, only five needed to receive the intervention for one to benefit.

Baseline MAI assessments were repeated with the same participants by predominantly the same pharmacists. There were very few discordant MAI results within and between pharmacists when participant samples were investigated for inter and intra-rater reliability. Pharmacist uncertainty in assigning MAI criteria (Z-rating) was also shown to be consistently very low. The only criterion for which change was not found pertained to the use of a more expensive drug in the presence of cheaper alternatives. This is one of the most commonly identified problems when reported in other international studies,[66 67] but was the least problematic medication issue in this study. This is likely because the PBS caps a patient co-payment for medications, the co-payment is reduced or waived for at -risk Aboriginal people and Torres Strait Islanders, and the PBS includes medicines specifically listed for health issues disproportionately affecting this population. For these reasons, prescribers were unlikely to prescribe a medication not listed on the PBS.

The characteristics of participants assessed for medication appropriateness were similar to the remaining IPAC study cohort. If we infer the same degree of prescribing quality improvements to the whole cohort of 1,456 participants, there would be 339 fewer patients with suboptimal prescribing and 183 fewer patients with medication overuse from pharmacist integration within ACCHSs in a median 9-month period. Being a pragmatic study, changes in prescribing quality occurred from a baseline representing usual care. Integrated pharmacists functioned within existing and usual service delivery systems delivering pre-determined core roles in flexible ways to suit their context. For this reason,

we believe outcomes of the magnitude described would be generalisable to other patients who have a clinical need for a medication review, within a broader ACCHS context.

To our knowledge, assessing prescribing quality using the MAI has never been reported from participants who are predominantly Aboriginal and/or Torres Strait Islanders. Multiple studies have evaluated change in prescribing quality using MAI quality indicators with pharmacist interventions.[68 69] The MAI relies on pharmacist judgement supported by context-specific prescribing guidelines to assess medication appropriateness (implicit criteria). The MAI is not drug nor disease specific, and scores vary depending on the number and individual circumstances of the medications being prescribed making scoring time-consuming and dependent on clinical expertise.[70] Each assessment in the IPAC project took a median of 60 minutes to complete. In return, assessments were very patient-centric and changes in the quality of prescribing over time were clinically meaningful.

The implicit criterion-based MAI contrasts with the explicit Beers criteria[71] that define potentially inappropriate prescribing in older populations (≥ 65 years of age). Beers criteria lists 88 medications (USA) that pose a potentially higher risk for harm or unnecessary increase in drug-related costs and this list can be used to evaluate changes in prescribing quality to reduce medication-related problems. [72 73 74 75] These criteria were not suitable for the IPAC project as participants were much younger than the population for which Beers criteria were designed; the listed medications did not reflect the disease burden of the Aboriginal and Torres Strait Islander population; criteria did not take into account patient preferences and their unique situation; and many criteria were irrelevant given Australia's PBS system that offers a more controlled scope of prescribing than in other countries.

The only study to explore prescribing appropriateness in Aboriginal Australians was an audit of the medication records in remote Western Australia (WA). This study found that 20% (54/273) of patients (54% were aged less than 60 years) had potentially inappropriate prescribing based on selected Beers criteria for older people. An example of potentially inappropriate prescribing was if patients were prescribed non-steroidal anti-inflammatory drugs, glibenclamide, sulphonamide-trimethoprim combinations or other medications that were relatively contraindicated in older people.[76]

When compared with other studies using implicit criteria such as the MAI, the observed improvement in the summated MAI score per IPAC patient was similar to that reported for

much older participants in systematic reviews,[77] [78] in rural patients older than 50 years attending family practices in Canada,[79] and in participants discharged from hospital aged 58 years (mean) in Sri Lanka.[80]

Even though improvements in MAI scores have been validated to represent improvement in prescribing quality, it is unclear what quantum of change can impact clinically on patient outcomes.[81] One estimate is a 9% increase in the risk of medication-related hospital admission for every one point increase in MAI score (mean score per patient), as was shown for patients older than 80 years.[82] Nevertheless, it is well known that overuse, underuse, and inappropriate use of medications resulting in adverse drug events from dosage errors or interactions, leads to increased health system costs largely because of potentially preventable hospitalisations in the elderly.[83] Few studies have explored the impact of inappropriate prescribing on hospitalisation or work capacity in younger populations burdened with chronic disease.

The IPAC study showed that for those who have a disproportionately high chronic disease burden at a younger age, like many Aboriginal peoples and Torres Strait Islanders, and have a clinical need for a medication review, integrating a pharmacist within the primary health care team can significantly improve appropriate prescribing. This clear benefit was observed despite the many challenges influencing optimal prescribing for this population, such as: remoteness, healthcare professionals turnover, lack of integrated care, difficulty with managing medications in those with complex health problems, and unsuccessful existing strategies for medication management reviews.[84] [85] Achieving improvements in prescribing quality and health outcomes in this context depends on health systems change to optimise health workforce skills, support for an expanded scope of practice for pharmacists, integrated services so that patients with significant comorbidity have a joined-up experience of care, patients are assisted to overcome medication adherence challenges, are empowered to self-manage, have access to healthcare professionals they can trust, and can afford these services.

This study showed significant prescribing quality improvements despite these substantial health system challenges and the potential to deliver further downstream health gains. Improvements in quality prescribing are important goals for all healthcare providers and health systems.

LIMITATIONS

A potential bias is that pharmacists may have assessed the appropriateness of medications more favourably in the follow-up MAI given this was a pre-post study without a control group. However, pharmacists were blinded to the results of the baseline MAI assessment and were not responsible for calculating the MAI scores. Pharmacists were neither prescribers, nor dispensers of medications. Post-testing was conducted a lengthy time after initial baseline testing reducing familiarity with the instrument to bias responses. The standardised training received by pharmacists and the continuity of their assessments also served to enhance the pharmacist implicit criteria-based assessments of the MAI. Favourable outcomes from reliability testing, although it comprised only a small sample of pharmacists, also supported the reproducibility of these assessments. Nevertheless, more comprehensive reliability testing of MAI assessments within the ACCHS context would have strengthened confidence in the reproducibility of study outcomes.

Without a control group, it is possible that prescribing quality improved irrespective of this intervention. However, this outcome is highly unlikely. Firstly, maturation effects suggest that prescribing quality would deteriorate over time in patients with substantial multimorbidity where chronic disease worsens over time, and polypharmacy increases with age.[86] Secondly, in qualitative analysis, clinicians and participants reported that the intervention had considerably enhanced health status and prescribing quality.[87] Thirdly, pharmacists had access to participants medical records which is a key success factor in other studies reporting enhanced prescribing quality following pharmacist interventions.[88] Fourthly, changes in prescribing quality favoured high-value care improvements such as for cardiovascular disease and diabetes. Finally, the quantum of improvement we observed is consistent with that reported in a systematic review of other studies using the MAI.[89]

There was little change in health systems assessment within participating sites from baseline to the end of the study that might otherwise explain prescribing improvements (such as from non-IPAC related service activity). Moreover, the health system changes that were observed were most likely explained by improvements generated by integrated pharmacist activity. For example, ACCHSs had more accessible on-site pharmacists at the end of the study than at baseline (Table 2), which is explained by integrated pharmacists

working within sites. By the end of the study, six services received community pharmacy support for educational sessions, but no services reported this activity at baseline. The local community pharmacy employed the IPAC pharmacists in five of these six services which likely explains this increased activity. The remaining service reported increased collaborative activity with community pharmacy as a result of the project. Other perceptions of community pharmacy support to ACCHSs did not change during the study (Table 2).

Although the median total number of staff (clinical and non-clinical) employed within IPAC participating ACCHSs increased during the study, the proportion of services with staff numbers above or below this median did not change. The median (annual) number of 'episodes of care' per service also increased although the median number of regular clients per service did not change, suggesting that services expanded the number of contacts with clients (rather than the number of clients) during the study period. This increase may be a result of integrated pharmacist patient follow-up activity or expanded service activity for other reasons. Alternatively, a change in counts may have been due to variations in the reporting of health services data as has been noted by the Australian Institute of Health and Welfare for episodes of care.[90] The latter is likely given that the number of episodes of care did not change for Communicare users in this project.

Health systems improvements in two domains were also observed during the study (Appendix B). The 'delivery system design' domain explored the quality of communication between the service, hospitals and specialists regarding patient hospitalisation and discharge, their discharge medications, and patient attendance at hospital outpatient services. The domain also explored care planning activity, whether patient follow-up is routine, the provision of translators, cultural orientation and training to staff, appointment systems, and transport support to patients. Based on qualitative analysis of service activity,[91] it is likely that integrated pharmacists influenced some improvement in this domain.

The 'links with community and other health services' domain (Appendix B) explored health service partnership with, and mechanisms for, using support available from other community groups; partnerships with Primary Health Networks; and routine use of patient feedback surveys to ascertain the patient experience, or other forms of seeking community feedback on the quality of care. Whether improvement in this domain acted as a

confounder to reduce prescribing errors independent of the intervention is unclear. This however is unlikely since published evidence is not indicative of an association between social, economic, or political interventions and the willingness of individuals (like healthcare workers) to reduce medication errors.[92]

Only a few participants (n=23) were assessed at baseline more than 100 days after enrolment into the study. These participants may have received pharmacist services prior to the baseline assessment thereby influencing prescribing quality assessments for usual care. If so, this would serve to minimise change over time, biasing study outcomes towards the null.

The selection of MAI participants by pharmacists is unlikely to impact generalisability (external validity) of the findings since the vast bulk of participant characteristics for the MAI assessed and remaining participants were similar. MAI participants were more likely to have more doctor visits, which suggests either they were more compliant with follow-up or had more complex disease. Neither of these possibilities were suggested with regard to other examined characteristics, and it is unclear how this particular characteristic could have increased prescribing quality independent of other factors.

Another potential confounder to the relationship between the intervention and prescribing quality was the HCH program. However, all participants concurrently enrolled in the *Community Pharmacy in Health Care Homes* (HCH) Trial program (undertaken in the NT around the same time as the IPAC project[93]) were removed from the IPAC analysis (Figure 1). The IPAC participants concurrently enrolled in the broader HCH program were not in receipt of additional community pharmacy support beyond usual care and comprised only 10.6% of MAI subjects. Moreover, the IPAC pharmacist was integrated within the HCH site meaning that the HCH intervention could not have acted as a confounder independently of the pharmacist.

The study was pragmatic, adopting a quasi-experimental design across a large sampling frame of 18 services as the goal was to evaluate real-life outcomes affecting an unselected population with chronic disease to enhance the external validity of the quality improvements expected from the intervention.[94] Fidelity to community-based participatory principles were vital for study participants to benefit from the community trust this

supported. These goals favoured the study design that was adopted combined with efforts to minimise bias as have been outlined.

CONCLUSION

Pre-intervention, nearly two-thirds of participants were prescribed medications assessed as being inappropriate posing potential risks that may outweigh benefits. Prescribing quality improved significantly following interventions received by participants from non-dispensing pharmacists integrated within ACCHSs. Participant risks associated with medication errors from inappropriate prescribing such as incorrect dosage, and unnecessary medications was significantly reduced. Only 4.3 participants needed to be assessed by a pharmacist to result in one less participant with a medication rated as inappropriate. Improvements occurred in participants challenged by substantial chronic disease comorbidity and polypharmacy at a relatively younger age than other Australians and within a short follow-up period. These improvements are generalisable to the broader subset of IPAC participants who have a clinical need for a medication review, and potentially to other similar Aboriginal peoples and Torres Strait Islanders in receipt of pharmacist services integrated within primary health care.

Table 1. Medication Appropriateness Index (MAI) and scoring

MAI Question	Assessment			Weighting for C-score
*1. Is there an indication for the drug?	A_____ Indicated	B_____	C_____ Not Indicated	3
*2. Is the medication effective for the condition?	A_____ Effective	B_____	C_____ Ineffective	3
3. Is the dosage correct?	A_____ Correct	B_____	C + or C - Incorrect	2
4. Are the directions correct?	A_____ Correct	B_____	C_____ Incorrect	2
5. Are the directions practical?	A_____ Practical	B_____	C_____ Impractical	1
6. Are there clinically significant drug-drug interactions?	A_____ Insignificant	B_____	C_____ Significant	2
7. Are there clinically significant drug-disease/condition interactions?	A_____ Insignificant	B_____	C_____ Significant	2
*8. Is there unnecessary duplication with other drug(s)?	A_____ Necessary	B_____	C_____ Unnecessary	1
9. Is the duration of therapy acceptable?	A_____ Acceptable	B_____	C_____ Not acceptable	1
10. Is this drug the least expensive alternative compared to others of equal utility?	A_____ Least expensive	B_____	C_____ Most expensive	1

The total score is aggregated (per medicine) to determine the total MAI score for the patient (the total result can range from 0-infinity). Scores in columns A and B are weighted zero. The maximum score per medicine =18.

* Rows represent the MAI ratings for medication overuse (combined MAI scores for question, 1, 2, 8)[95]

Figure 1: Flow-diagram for the Medication Appropriateness Index MAI subset of participants in the IPAC Project.

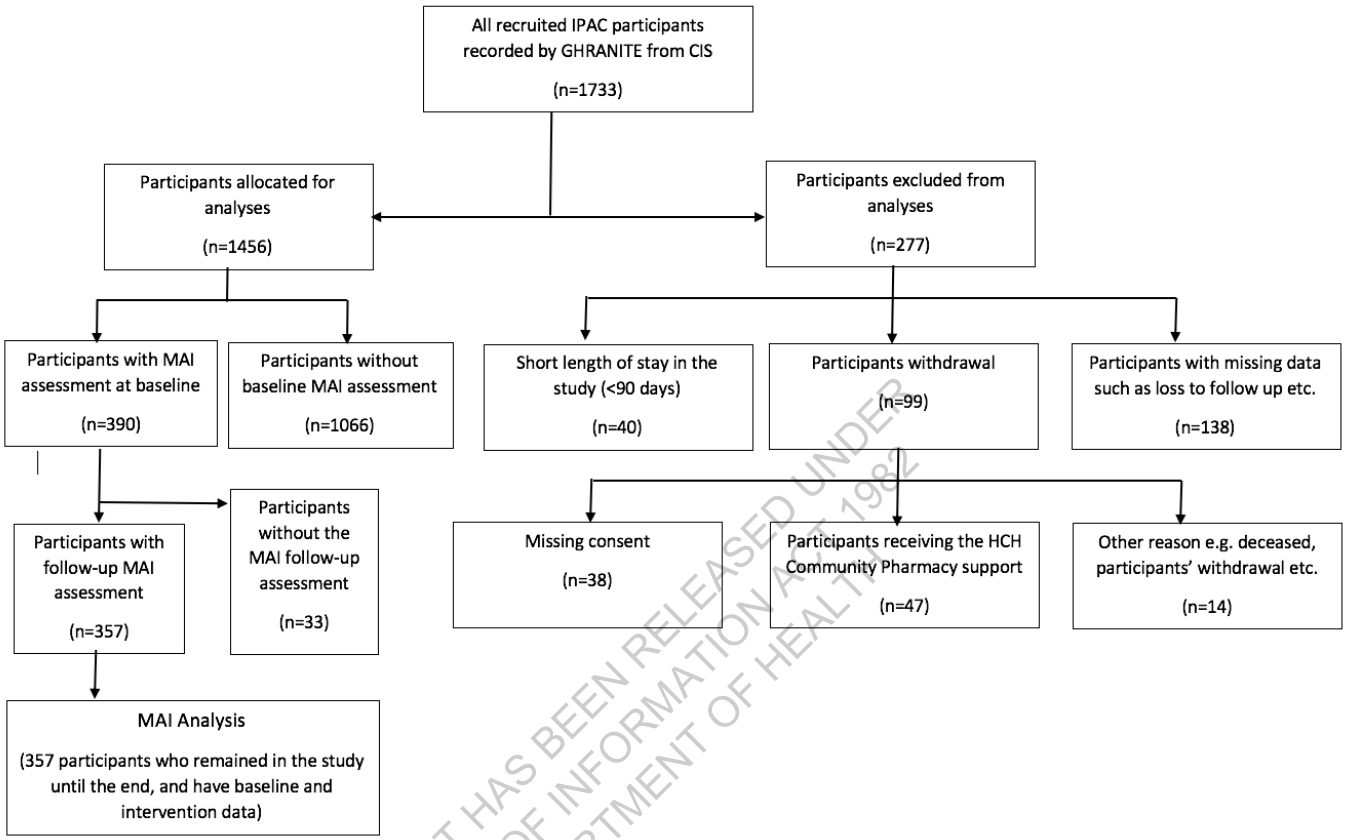


Table 2: The characteristics of Aboriginal Community-controlled health services (ACCHS) that participated in Medication Appropriateness Index MAI assessments at baseline and at the end of the study (n=18).

Health service characteristics	Baseline	End of the study	P-value
State (n %)			
Northern Territory	5 (27.8%)	5 (27.8%)	-
Queensland	7 (38.9%)	7 (38.9%)	-
Victoria	6 (33.3%)	6 (33.3%)	-
Location classified by ASGS-RA* (n, %)			
Major city	1 (5.6%)	1 (5.6%)	-
Inner regional	4 (22.2%)	4 (22.2%)	-
Outer regional	7 (38.9%)	7 (38.9%)	-
Remote	3 (16.7%)	3 (16.7%)	-
Very remote	3 (16.7%)	3 (16.7%)	-
Median IRSEO~ score (IQR)**	60.5 (45-81)	60.5 (45-81)	> 0.999
Service size characteristics			
Median number of regular (active) clients per service (IQR)**	2,066 (1,251-5,209)	2,563 (1,614-3,477)	0.50
Median % Indigenous clients per service (IQR)**	88 (77-94)	83 (77-93)	0.17
Median number of episodes of care[a] per service (IQR)**	32,347 (9,836-47,207)	33,670 (12,072-43,444)	**0.04**
Median number of episodes of care[a] per service that uses *Communicare* (IQR)**	32,347 (8,023-42,559)	33,670 (11,977-41,051)	0.10
Median number of episodes of care [a] per service that uses *Best Practice* (IQR)**	14,456 (10,964-22,077)	N/A	N/A
Median total number of staff per service (IQR)**	30 (14-81)	37 (28-100)	**0.025**
Number of services with total number of staff (n,%):			
< Median	7 (38.9%)	7 (38.9%)	> 0.999
>= Median	11 (61.1%)	11 (61.1%)	> 0.999
Median total number of staff per service who are Aboriginal/TSI (IQR)**	14 (7-25)	16 (13-53)	0.20
Median number of staff per service by type (IQR)**			
Nurses	5 (3-9)	6 (3-8)	0.50
GP	4 (3-6)	5 (3-9)	0.17
Aboriginal health workers	4 (3-6)	4 (4-12)	0.64
Allied health	1 (0-5)	4 (1-9)	**0.04**
Administration	6 (4-16)	8 (4-13)	0.76
Number of ACCHS with access to specialists and allied health on-site (n, %)			
Paediatrician	11 (61.1%)	12 (66.7%)	0.56
Cardiologist	9 (50.0%)	10 (55.6%)	0.56
General physician	7 (38.9%)	6 (33.3%)	0.56
Endocrinologist	4 (22.2%)	5 (27.8%)	0.56
Psychiatrist	5 (27.8%)	6 (33.3%)	0.32
Nephrologist	5 (27.8%)	3 (16.7%)	0.16
Ophthalmologist	4 (22.2%)	4 (22.2%)	>0.999

ENT surgeon	3 (16.7%)	3 (16.7%)	> 0.999
General surgeon	2 (11.1%)	0 (0%)	0.16
Diabetes Educator	13 (72.2%)	13 (72.2%)	> 0.999
Podiatrist	15 (83.3%)	15 (83.3%)	> 0.999
Optometrist	12 (66.7%)	13 (72.2%)	0.71
Audiologist	12 (66.7%)	13 (72.2%)	0.66
Dentist	8 (44.4%)	12 (66.7%)	0.05
Social worker	8 (44.4%)	7 (38.9%)	0.66
Pharmacist	8 (44.4%)	15 (83.3%)	**0.02**
Median number of community pharmacies engaged with ACCHS (IQR)**	2 (1-4)	2 (2-5)	0.16
Community pharmacy support received by ACCHS (n, %)	16 (88.9%)	17 (94.4%)	0.18
Dose administration aids	18 (100.0%)	17 (94.4%)	0.32
Dispensing of medicines	14 (77.7%)	15 (83.3%)	0.71
Home Medicines Reviews	8 (44.4%)	6 (33.3%)	0.48
Response to queries about medications	15 (83.3%)	15 (83.3%)	>0.999
Educational sessions to staff within the clinic	6 (33.3%)	6 (33.3%)	>0.999
Educational sessions to community groups/your patients	0 (0.0%)	6 (33.3%)	**0.01**
Home delivery of medicines to patients	7 (38.9%)	9 (50.0%)	0.16
Delivery of medicines to the clinic	11 (61.1%)	11 (61.1%)	>0.999
Quality control of medicines stock onsite	6 (33.3%)	8 (44.4%)	0.32
Assistance with script collection	8 (44.4%)	8 (44.4%)	>0.999
Participation of ACCHS in QAAMS^ for point of care testing (n, %)	12 (66.7%)	12 (66.7%)	> 0.999
ACCHS with remote area access to medicines (Section 100) (n, %)	6 (33.3%)	6 (33.3%)	> 0.999
ACCHS engaged in Health Care Homes initiative (n, %)	4 (22.2%)	5 (27.8%)	0.32

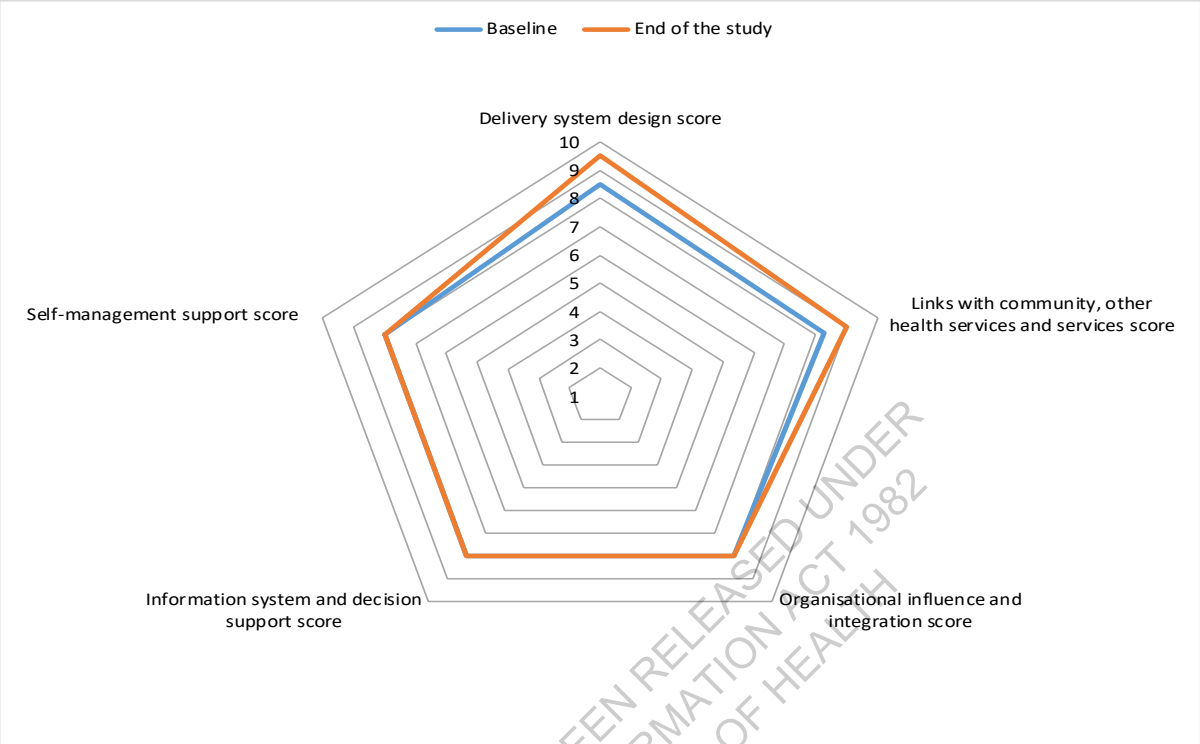
Bold p-value implies statistically significant change at the 0.05 level. The paired groups were compared (baseline versus end of the study) and P-values determined using the Wilcoxon test (median values) or the McNemar test (proportions).
N/A= not available; ACCHS= Aboriginal Community Controlled Health Service.
*Australian Statistical Geography Standard-Remoteness Area (ASGS-RA, 2016)[96]
**IQR = inter-quartile range; ***SD = standard deviation;
^QAAMS= Quality Assurance for Aboriginal and Torres Strait Islander Medical Services program.
~IRSEO= Indigenous Relative Socioeconomic Outcomes index. The IRSEO reflects relative advantage or disadvantage at the Indigenous Area level, where a score of one (1) represents the most advantaged area and a score of 100 represents the most disadvantaged area.[97]
[a] Episodes of care are defined as the number of contacts between an individual client and an Aboriginal and Torres Strait Islander health service, within a calendar day, in the provision of health care. The figure is annualized for the 12-month period in the most recent services reporting to the Australian Institute of Health and Welfare.[98] All contacts with the same client on the same day are counted as one episode of care.

Table 3: **Description of composite systems assessment scores from the IPAC Health Systems Assessment (HSA) Form for health services (ACCHS) that participated in Medication Appropriateness Index (MAI) assessments at baseline (n=18).**

Health system assessment according to five chronic care model domains	Baseline	End of study	P-value
Median **delivery system design** score (IQR)	8.5 (8.0-9.0)	9.5 (9.0-10.0)	**0.002**
Median **links with community, other health services and services** score (IQR)	8.3 (6.0-9.0)	9.0 (8.0-9.5)	**0.027**
Median **organisational influence and integration** score (IQR)	8.0 (7.8-10.0)	8.0 (8.0-10.0)	0.58
Median **information system and decision support** score (IQR)	8.0 (7.0-9.0)	8.0 (7.4-10.0)	0.39
Median **self-management support** score (IQR)	8.0 (6.0-8.0)	8.0 (7.0-8.3)	0.09

Bold p-value implies statistically significant change at the 0.05 level. The paired groups were compared (baseline versus end of the study) with P-values determined using the Wilcoxon test (median values).
IQR = inter-quartile range.
ACCHS= Aboriginal Community Controlled Health Service

Figure 2. Radar plot of the composite systems assessment scores from the IPAC Health Systems Assessment (HSA) Form for health services (ACCHS) that participated in Medication Appropriateness Index (MAI) assessments at baseline (n=18).



ACCHS= Aboriginal Community Controlled Health Service

Table 4. Participant characteristics at baseline (n=357), stratified by Medication Appropriateness Index (MAI) assessment.

Patient characteristics	MAI participants (n=357)	Non-MAI participants (n=1099)	P-value
Location classification by ASGS-RA (2016)			
Major city (RA1)	17 /357 (4.8%)	21 /1099 (1.9%)	
Inner regional (RA2)	93 /357 (26.1%)	338 /1099 (30.8%)	
Outer regional (RA3)	133 /357 (37.3%)	467 /1099 (42.5%)	0.52
Remote (RA4)	53 /357 (14.9%)	127 /1099 (11.6%)	
Very remote (RA5)	61 /357 (17.1%)	146 /1099 (13.3%)	
Mean age at baseline (SD) [years]	*n=356*	*n=1092*	
	57.2 (16.4)	57.2 (36.7)	0.98
Sex (n,%)			
Male	153 /356 (43.0%)	409 /1092 (37.5%)	0.17
Female	203 /356 (57.0%)	683 /1092 (62.6%)	
Ethnicity (n,%)			
Aboriginal and/or Torres Strait Islander	331 /356 (93.0%)	996 /1089 (91.5%)	0.40
Non-Indigenous	25 /356 (7.0%)	93 /1089 (8.5%)	
Mean body mass index (BMI; kg/m2) (SD)	*n=312*	*n=951*	0.43
	31.8 (11.8)	32.4 (24.4)	
BMI<25 kg/m2 (n,%)	61 /312 (19.5%)	180 /951 (18.9%)	0.83
Pensioner/concessional (n,%)	294 /356 (82.6%)	908 /1092 (83.2%)	0.90
CTG scripts eligible (n,%)	267 /356 (75.0%)	792 /1092 (72.5%)	0.65
Engaged in Health Care Home (HCH) program (n,%)	38 /357 (10.6%)	106 /1099 (9.7%)	0.68
Number of medications per participant[#a]	*n=283*	*n=820*	
Mean (SD)	7.2 (8.2)	7.3 (10.6)	0.88
Median (IQR)	7.0 (5-9)	7.0 (5-9)	
Prior medication review (MBS item 900)[b]	41 /357 (11.5%)	108 /1099 (9.8%)	0.61
Doctors' encounters prior to enrolment (per 12 months)[c]	*n=335*	*n=1001*	
Mean (SD)	8.6 (8.2)	7.1 (19.6)	**<0.01**
Median (IQR)	7 (1-11)	5 (3-9)	
Mean number of medication 'adherent days' (SD)[d]	*n=283*	*n=820*	
	6.0 (3.9)	6.2 (4.9)	0.33
Self-assessed health status (SF1) (n,%) [#e]			
Excellent	11 /247 (4.5%)	31 /728 (4.3%)	
Very good	34 /247 (13.8%)	99 /728 (13.6%)	
Good	105 /247 (42.5%)	309 /728 (42.5%)	0.96
Fair	64 /247 (25.9%)	212 /728 (29.1%)	
Poor	30 /247 (12.2%)	59 /728 (8.1%)	
Very poor	3 /247 (1.2%)	18 /728 (2.5%)	
Recorded clinical diagnoses (n,%): [#]			
Diabetes mellitus			
Type 1	1 /357 (0.3%)	10 /1099 (0.9%)	0.23

Type 2	221 /357 (61.9%)	665 /1099 (60.5%)	0.64
Hypertension	219 /357 (61.3%)	712 /1099 (64.8%)	0.24
Dyslipidaemia	191 /357 (53.5%)	539 /1099 (49.0%)	0.14
Patients with established or existing CVD^	117 /357 (32.8%)	343 /1099 (31.2%)	0.67
Coronary heart disease	100 /357 (28.0%)	292 /1099 (26.6%)	0.68
Peripheral vascular disease	11 /357 (3.1%)	32 /1099 (2.9%)	0.85
Cerebrovascular disease (stroke)	13 /357 (3.6%)	54 /1099 (4.9%)	0.44
Chronic kidney disease	127 /357 (35.6%)	437 /1099 (39.8%)	0.40
Patients with a clinically high risk of CVD [f]	73 /203 (36.0%)	229 /650 (35.2%)	0.86
Patients with a diagnosis of rheumatic heart disease (RHD) or acute rheumatic fever (ARF)	8 /357 (2.2%)	34 /1099 (3.1%)	0.24
Chronic obstructive pulmonary disease (COPD)	33 /357 (9.2%)	82 /1099 (7.5%)	0.34
Depressive disorder	21 /357 (5.9%)	56 /1099 (5.1%)	0.53
Mean BP >= 140/90* [mmHg] (n,%)	21 /267 (7.9%)	79 /744 (10.6%)	0.39
Dyslipidaemia[g] (n,%)*	231 /261 (88.5%)	721 /769 (93.8%)	0.16
Patients with comorbidity (1 or more chronic diseases) [#]	312 /357 (87.4%)	966 /1099 (87.9%)	0.79
Patients with multi-morbidity (2 or more chronic diseases) [#]	271 /357 (75.9%)	858 /1099 (78.1%)	0.31
Number of chronic diseases:	*n=357*	*n=1099*	
Mean (SD)	2.2 (0.1)	2.3 (0.1)	0.11
Median (IQR)	2.0 (2-3)	2.0 (2-3)	
Biomedical parameters (n,%): [##]			
Type 2 with HbA1c >8% or >65mmol/mol	77 /166 (46.4%)	208 /489 (42.5%)	0.27
Type 2 with HbA1c >7% or >54 mmol/mol	107 /166 (64.5%)	313 /489 (64.0%)	0.84
Patients with albuminuria [h]	102 /168 (60.7%)	358 /617 (58.0%)	0.52
Participants with eGFR recorded [i] (n,%)			
eGFR ≥90 (Stage 1)	43 /278 (15.5%)	130 /877 (14.8%)	
eGFR ≥60<90 (Stage 2)	94 /278 (33.8%)	339 /877 (38.7%)	
eGFR ≥45<60 (Stage 3a)	30 /278 (10.8%)	79 /877 (9.0%)	0.50
eGFR ≥30<45 (Stage 3b)	15 /278 (5.4%)	50 /877 (5.7%)	
eGFR ≥15<30 (Stage 4)	15 /278 (5.4%)	27 /877 (3.1%)	
eGFR <15 (Stage 5)	81 /278 (29.1%)	252 /877 (28.7%)	

Bold p-value implies statistically significant change at the 0.05 level. Cluster adjusted p-value for ACCHS and patients. P-values were determined using the . svy linearized : logit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means).
Note: The study was not powered to detect differences between MAI assessed and non-MAI assessed participants. Comparisons between these groups have only been made for participant characteristics at baseline.

BMI= body mass index; BP= blood pressure; CTG= Close the Gap prescriptions (for Aboriginal peoples and Torres Strait Islanders) to waive or reduce the Pharmaceutical Benefits Scheme (PBS) patient contribution (co-payment). CVD= cardiovascular disease. MBS= Medicare Benefits Schedule.
SD = standard deviation (cluster adjusted).
IQR = inter-quartile range
*Refers to the mean of variables measured in the 12 months prior to patient enrolment into the study.
[#] Sourced from the pharmacist's logbook.
[##] Biomedical results were sourced from GRHANITE
^ CVD= cardiovascular disease: It refers to any of the following: coronary heart disease, cerebrovascular disease, and peripheral vascular disease.
[a] Denominator sourced from logbook data entered by pharmacists when reporting medication adherence, to source comparative data on non-MAI participants.

[b] Prior MBS claim was measured for the 12-month period prior to participant enrolment.
[c] Medicare GP consultation claim items: vocational registration: 3, 23, 36, 44. Non-vocational registration: 52, 53, 54, 57.
[d] A self-reported single-item question ('How many days in the last week have you taken this medication?') exploring the extent of non-adherence, assessed as a mean score for all medications. An 'adherent day' was defined as not missing any doses of prescribed medicines on that day. Pharmacists recorded the number of adherent days for each medication the patient was taking.
[e] Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'
[f] Patients with any of the following: diabetes mellitus and age >60 years, diabetes mellitus and microalbuminuria (urinary ACR >2.5 mg/mmol for males and >3.5 mg/mmol for females), estimated glomerular filtration rate <45 mL/min per 1.73 m2, systolic blood pressure (BP) ≥180 mm Hg, diastolic BP ≥110 mm Hg, and total cholesterol >7.5 mmol/L.
[g] Dyslipidaemia = Dyslipidaemia is defined by one or more of the following: Low Density Lipoprotein (LDL) >=3.5mmol/L; Total cholesterol (TC) >= 5.5mmol/L; Triglycerides (TG) > =2.0mmol/L; High density lipoprotein (HDL) < 1.0 mmol/L for men and <1.3 mmol/L for women. Data was sourced from GRHANITE information.
[h] Albumin:creatinine ratio >2.5 mg/mmol for males and >3.5mg/mmol for females. Data was sourced from GRHANITE information.
[i] Estimated glomerular filtration rate (eGFR). eGFR reference range: Normal or Stage 1: CKD >89, Stage 2: 60-89 Stage 3A: 45-59, Stage 3B: 30-44, Stage 4: 15-29, Stage 5:<15. (Units in ml/min/1.73m2). Data was sourced from GRHANITE information.

Table 5: Medication Appropriateness Index (MAI) results for IPAC participants who were assessed at both baseline (first assessment after enrolment) and final (end of the study) assessments (n=357).

MAI based outcome measures	MAI assessed patients (n=357)		P-value
	At baseline	At end of study	
Time from patient enrolment to baseline MAI			
Mean time (days), (SD)	21.9 (95.8)		
Range (days)	0-189		
Median time (days), (IQR)	0 (0-29.3		
Number of participants with MAI assessed >100 days since enrolment, N (%)	23 (6.4%)		
Time from baseline MAI to end of study MAI			
Mean time (days), (SD)		268.2 (298.5)	
Range (days)		61-446	
Median time (days), (IQR)		270 (218-316)	
Number of participants with MAI assessed >100 days since baseline assessment, N (%)		356 (99.7%)	
Time taken to complete:			
Mean time (mins) to complete MAI (SD)	67.2 (63.9)	77.2 (127)	0.101
Median time (mins) to complete MAI (IQR)	60 (45-75)	60 (45-90)	
Number of medications:			
Total number of medications	2804	2963	
Mean number of medications/participant (SD)	7.8 (18.5)	8.3 (29.4)	0.147
Appropriate prescribing:			
Mean number of medications/participant rated appropriate (MAI score =0), (SEM)	6.04 (7.4)	7.30 (9.4)	**<0.001**
Number of medications rated appropriate (MAI score =0) (n,%)	2157/2804 (76.9%)	2606/2963 (88.0%)	**0.001#**
Number of participants with medications rated appropriate (MAI score =0 for all prescribed medications, %)	115/357 (32.2%)	198/357 (55.5%)	**<0.001~**
Inappropriate prescribing:			
Mean 'MAI score/participant' (SD)[a]	6.02 (23.6)	3.20 (11.7)	**0.003**
Mean 'MAI score/medication' (SD)[b]	0.76 (8.5)	0.39 (4.4)	**0.004**
Mean number of medications/participant with ≥ 1 inappropriate rating (any C-rating for any medication), (SD)	1.8 (5.3)	1.0 (3.6)	**0.001**
Number of medications with ≥ 1 inappropriate rating (at least one C-rating in any MAI question) (n,%)	647/2804 (23.1%)	357/2963 (12.1%)	**0.008#**

Number of participants with at least one inappropriate medication rating (C-rating for any prescribed medication, %)	242/357 (67.8%)	159/357 (44.5%)	**<0.001~**
Overuse of medicines*:			
Number of *participants* with any medication that met:			
≥ 1 overuse criteria	132/357 (37.0%)	87/357 (24.4%)	**<0.001~**
≥ 2 overuse criteria	30/357 (8.4%)	10/357 (2.8%)	**0.001~**
all 3 overuse criteria	3/357 (0.8%)	0/357 (0.0%)	-
Number of *medications* that met:			
≥ 1 overuse criteria	249/2804 (8.9%)	147/2963 (5.0%)	**0.017#**
all 3 overuse criteria	8/2804 (0.3%)	3/2963 (0.1%)	**0.005#**
Mean number of *medications/participant* with ≥ 1 overuse criteria (SD)	0.70 (2.3)	0.41 (2.1)	**0.016**

C-rating refers any MAI criterion that pharmacists rated as 'inappropriate'. Bold p-value implies statistically significant change at the 0.05 level.
P-values (paired data) were derived from the cluster-adjusted confidence interval (ACCHS cluster) as this is equivalent to a paired t-test.
P-value, cluster adjusted p-value (ACCHS and patients cluster) that were determined using the . svy linearized : logit Stata command (data not paired).
~ P-value, cluster adjusted p-value (ACCHS cluster) that were determined using the . svy linearized : clogit Stata command (paired data).
SD = SD, cluster adjusted standard deviation (ACCHS cluster)
IQR = inter-quartile range.
^Denominator is the number of all medications.
[a] The MAI is scored per drug (across the 10 Q's) for each patient and then summed for that patient. The summated MAI score was then divided by the number of participants for the *mean MAI score per participant*. Only a C-rating gives a weighted score.
[b] The 'summated MAI score' was divided by the total number of medications that were MAI assessed. Only a C-rating gives a weighted score.
*Overuse means 'unnecessary' medications: a 'C-rating' to at least one medication the patient was taking for ANY of the 3 overuse MAI questions (Q1, 2, 8).

Table 6: Clinical examples of medication inappropriateness given by IPAC pharmacists, according to the ten individual Medication Appropriateness Index (MAI) criteria.

Medication appropriateness index (MAI) indicators	Medication	Example of inappropriate rating
Q1: Drug not indicated	*Aspirin*	No clinical history or evidence of cardiovascular disease
	Omeprazole	No clinical history of gastro-oesophageal reflux disease or dyspepsia
	Salbutamol	No clinical history of asthma or chronic obstructive pulmonary disease nor dyspnoea
	Exenatide	No clinical history of diabetes. Using medication for weight-loss in polycystic ovarian syndrome.
Q2: Medication is ineffective for the condition	*Methenamine hippurate*	Limited evidence for use in recurrent urinary tract infections
	Tramadol	Opioids are not recommended for osteoarthritis and neither paracetamol nor non-steroidal anti-inflammatory drugs were in use despite ongoing pain
Q3: Dosage incorrect	*Metformin*	Dose too high given current estimated glomerular filtration rate
	Atorvastatin	Dose too low and not meeting targets for optimal serum lipid levels
	Pregabalin	The planned down-titration has not occurred
Q4: Directions incorrect	*Tiotropium*	Directions from respiratory physician was to use 'as required'. Tiotropium requires once-daily inhalations and is not to be used as a rescue medication.
	Diclofenac	Directions were for one tablet twice daily plus 'as required'. Patient may use as often as needed which may exceed the maximal daily dose.
	Combined oxycodone and naloxone hydrochloride in a controlled -release formulation	Directions were for 'as required' use for pain control. Controlled-release opioid medication is unsuitable for use 'as required' because the time to onset of action is too slow.
Q5: Directions Impractical	*Atorvastatin*	Prescribed for night-time dose but the patient's preference is for all medications to be taken in the morning.
	Metformin	Dosage specified as twice-daily for a patient with memory loss from an accidental brain injury. Can be simplified to once-daily to aid patient adherence.
Q6: Significant drug-drug interactions	*Allopurinol*	Interaction present with perindopril which increases the risk of blood dyscrasias.
	Celecoxib	A 'triple whammy' effect may occur with the combination of frusemide, celecoxib and perindopril (concurrent use of a diuretic, angiotensin converting-enzyme inhibitor and an anti-inflammatory agent) to precipitate acute kidney injury.
	Tramadol	Tramadol being used with dothiepin and amitriptyline which increases the risk of serotonin syndrome
Q7: Significant drug-disease interactions	*Omeprazole*	Patient has osteoporosis. Omeprazole may reduce bone density and increase bone fracture risk.
	Diclofenac	Patient is at high risk of a cardiovascular event with a history of angina and hypertension and this medication may further increase risk.

Q8: Unnecessary duplication of drugs	*Paracetamol*	Prescription duplicates paracetamol 665mg tablets that were already prescribed at maximal daily dose.
	Prazosin	Patient is also taking tamsulosin in a combination product used for benign prostatic hypertrophy, hence the use of prazosin is unnecessary. Concurrent use of two different alpha-receptor blockers increases the risk of postural hypotension and falls.
	Amitriptyline	Prescription is unnecessary as the patient was already prescribed nitrazepam, desvenlafaxine and pregabalin.
Q9: Unacceptable therapy duration	*Rabeprazole*	Medication for gastroprotection should have been stopped when ibuprofen ceased.
	Clopidogrel	Clopidogrel was inadvertently continued beyond the planned cessation date.
Q10: Most expensive drug	*Macrogol laxative*	Not listed on the PBS, could change to a listed laxative
	Mirabegron	Not listed on the PBS, but other alternatives are listed for urge incontinence.

PBS= Pharmaceutical Benefits Scheme

Table 7: Medication Appropriateness Index (MAI) results for participants in this assessment (n=357) at baseline (first assessment after enrolment) compared with final assessment. Presented are the ten individual MAI criteria and the proportion of medications with ≥ 1 inappropriateness rating (C-rating).

Medication appropriateness index (MAI) questions	Number of medications with a C-rating (inappropriate)*		Difference (%)	P-value
	N(%)	N(%)		
	At baseline	At end of study		
Q1: Drug not indicated	156/2804 (5.6%)	97/2963 (3.3%)	-2.29%	**0.033**
Q2: Medication is ineffective for the condition	103/2804 (3.7%)	51/2963 (1.7%)	-1.95%	**0.010**
Q3: Dosage incorrect	194/2804 (7.0%)	92/2963 (3.1%)	-3.81%	**< 0.001**
Q4: Directions incorrect	88/2804 (3.1%)	65/2963 (2.2%)	-0.94%	0.107
Q5: Directions Impractical	89/2804 (3.2%)	16/2963 (0.5%)	-2.63%	**0.001**
Q6: Significant drug-drug interactions	144/2804 (5.1%)	58/2963 (2.0%)	-3.18%	0.059
Q7: Significant drug-disease interactions	72/2804 (2.6%)	38/2963 (1.3%)	-1.29%	**0.008**
Q8: Unnecessary duplication of drugs	83/2804 (3.0%)	46/2963 (1.6%)	-1.41%	0.066
Q9: Unacceptable therapy duration	164/2804 (5.9%)	98/2963 (3.3%)	-2.54%	**0.029**
Q10: Most expensive drug	41/2804 (1.5%)	33/2963 (1.1%)	-0.35%	0.447

Bold p-value implies statistically significant change at the 0.05 level.
P-value, cluster adjusted p-value (ACCHS and patients cluster) that were determined using the . svy linearized : logit Stata command (data not paired).
C-rating refers any MAI criterion that pharmacists rated as 'inappropriate'.
*Column cannot be summated. Each medicine may have an inappropriate rating in several MAI criteria. The total number of medicines with a C-rating are given for each MAI-criterion. The denominator is all medicines.
P-value was determined using Fisher's exact test. Results are cluster adjusted.

Table 8: Medication Appropriateness Index (MAI) results for participants in this assessment (n=357) at baseline (first assessment after enrolment) compared with final assessment. Presented are the ten individual MAI criteria and the proportion of medications with a Z-rating.

Medication appropriateness index (MAI) questions	Number of medications with a Z-rating*		Change (%)	P-value
	N (%)	N (%)		
	At baseline	At end of study		
Q1: Drug not indicated	18/2804 (0.6%)	10/2963 (0.3%)	-0.30	0.253
Q2: Medication is ineffective for the condition	58/2804 (2.1%)	30/2963 (1.0%)	-1.06	0.142
Q3: Dosage incorrect	63/2804 (2.3%)	46/2963 (1.6%)	-0.69	0.579
Q4: Directions incorrect	13/2804 (0.5%)	10/2963 (0.3%)	-0.13	0.611
Q5: Directions Impractical	6/2804 (0.2%)	4/2963 (0.1%)	-0.08	0.511
Q6: Significant drug-drug interactions	19/2804 (0.7%)	10/2963 (0.3%)	-0.34	0.610
Q7: Significant drug-disease interactions	36/2804 (1.3%)	20/2963 (0.7%)	-0.61	0.543
Q8: Unnecessary duplication of drugs	446/2804 (15.9%)	294/2963 (9.9%)	-5.98	0.600
Q9: Unacceptable therapy duration	40/2804 (1.4%)	37/2963 (1.3%)	-0.18	0.832
Q10: Most expensive drug	53/2804 (1.9%)	11/2963 (0.4%)	-1.52	< **0.001**

Bold p-value implies statistically significant change at the 0.05 level.
P-value, cluster adjusted p-value (ACCHS and patients cluster) that were determined using the . svy linearized : logit Stata command (data not paired).
Z-rating refers to any MAI criterion that pharmacists rated as 'unknown'.
*Column cannot be summated. Each medicine may have a Z-rating in several MAI criteria. The total number of medicines with a Z-rating are given for each MAI-criterion. The denominator is all medicines. P-value was determined using Fisher's exact test.

Table 9: Type of medications prescribed for participants assessed with the Medication Appropriateness Index (MAI) at both baseline and final assessments (n=357).

Medication type	Number of medications at baseline (%) (n=2804)	Number of medications at final assessment (%) (n=2963)	Difference (%)	p-value
Cardiovascular [a]	1014/2804 (36.2 %)	1056/2963 (35.6%)	-0.52	0.487
Hypertension [b]	430/2804 (15.3 %)	483/2963 (16.3%)	0.97	0.058
Dyslipidaemia	294/2804 (10.5 %)	302/2963 (10.2%)	-0.29	0.395
Blood and electrolytes [c]	342/2804 (12.2 %)	379/2963 (12.8%)	0.59	0.333
Endocrine [d]	593/2804 (21.2 %)	615/2963 (20.8%)	-0.39	0.475
Diabetes	482/2804 (17.2 %)	506/2963 (17.1%)	-0.11	0.775
Gastrointestinal [e]	152/2804 (5.4 %)	147/2963 (5.0%)	-0.46	0.085
Dyspepsia	125/2804 (4.5 %)	114/2963 (3.9%)	-0.61	**0.011**
Genitourinary [f]	35/2804 (1.3 %)	36/2963 (1.2%)	-0.03	0.911
Musculoskeletal [g]	62/2804 (2.2 %)	80/2963 (2.7%)	0.49	0.255
Neurological [h]	36/2804 (1.3 %)	36/2963 (1.2%)	-0.07	0.786
Respiratory [i]	235/2804 (8.4 %)	277/2963 (9.4%)	0.97	0.111
Asthma and COPD	225/2804 (8.0 %)	269/2963 (9.1%)	1.05	0.069
Psychotropic [j]	127/2804 (4.5 %)	133/2963 (4.5%)	-0.04	0.891
Anti-infectives [k]	27/2804 (1.0 %)	22/2963 (0.7%)	-0.22	0.134
Analgesics [l]	128/2804 (4.6 %)	123/2963 (4.2%)	-0.41	0.372

Bold p-value implies statistically significant change at the 0.05 level.

P-value, cluster adjusted p-value (ACCHS and patients cluster) that were determined using the . svy linearized : logit Stata command (data not paired).

COPD=chronic obstructive pulmonary disease

Medications include those used for the following conditions:

[a] heart failure, angina, hypertension, arrhythmia, dyslipidaemia, pulmonary hypertension, other.

[b] angiotensin converting enzyme inhibitors (ACEI), sartans, calcium-channel blockers, beta blockers, thiazide diuretics, other.

[c] anaemia, anticoagulants, antiplatelets, electrolyte imbalance, thrombolytics, other.

[d] adrenal insufficiency, bone, diabetes, thyroid disorders, other.

[e] antiemetics, diarrhoea, dyspepsia, motility disorders, laxatives, inflammatory bowel disease, other.

[f] benign prostatic hyperplasia and prostatitis; kidney stones; urinary tract disorders, other.

[g] gout, osteoarthritis, rheumatoid arthritis, other.

[h] Alzheimer's, epilepsy, migraine, multiple sclerosis, myasthenia gravis, parkinsonism, other.

[i] asthma and chronic obstructive pulmonary disease, cough, other.

[j] antidepressants, antipsychotics, anxiety and sleep disorders; alcohol dependence; bipolar disorder, nicotine dependence, opioid dependence, other)

[k] antibacterial, antifungal, antiviral, antiretroviral, antiprotozoal, antihelmintic, other.

[l] non-opioid, opioid, other.

The table excludes medications for the following conditions as few participants were prescribed these medications: dermatological; ear, nose and throat; eye; immunomodulators and neoplastics, allergy and anaphylaxis; vaccines.

Table 10: Medications with ≥ 1 inappropriate rating* prescribed for participants as a proportion of all medications rated as such, assessed with the medication appropriateness index (MAI) at both baseline and final assessments (n=357).

Medication type	Number of medications with an inappropriateness rating at baseline (%) (n=647)	Number of medications with an inappropriateness rating at final assessment (%) (n=357)	Difference (%)	p-value
Cardiovascular [a]	164/647 (25.4 %)	77/357 (21.6 %)	-3.78	0.378
Hypertension [b]	52/647 (8.0 %)	31/357 (8.7 %)	0.65	0.828
Dyslipidaemia	57/647 (8.8 %)	22/357 (6.2 %)	-2.65	0.206
Blood and electrolytes [c]	92/647 (14.2 %)	56/357 (15.7 %)	1.47	0.433
Endocrine [d]	136/647 (21.0 %)	64/357 (17.9 %)	-3.09	0.341
Diabetes	104/647 (16.1 %)	44/357 (12.3 %)	-3.75	0.184
Gastrointestinal [e]	54/647 (8.4 %)	39/357 (10.9 %)	2.58	0.271
Dyspepsia	49/647 (7.6 %)	31/357 (8.7 %)	1.11	0.553
Genitourinary [f]	12/647 (1.9 %)	5/357 (1.4 %)	-0.45	0.468
Musculoskeletal [g]	28/647 (4.3 %)	19/357 (5.3 %)	0.99	0.497
Neurological [h]	13/647 (2.0 %)	7/357 (2.0 %)	-0.05	0.971
Respiratory [i]	49/647 (7.6 %)	31/357 (8.7 %)	1.11	0.667
Asthma and COPD	45/647 (7.0 %)	29/357 (8.1 %)	1.17	0.644
Psychotropic [j]	41/647 (6.3 %)	30/357 (8.4 %)	2.07	0.259
Anti-infectives [k]	4/647 (0.6 %)	3/357 (0.8 %)	0.22	0.731
Analgesics [l]	38/647 (5.9 %)	22/357 (6.2 %)	0.29	0.856

P-value, cluster adjusted p-value (ACCHS and patients cluster) that were determined using the . svy linearized : logit Stata command (data not paired). COPD=chronic obstructive pulmonary disease. *A medication with an inappropriateness rating is a medication with at least one 'C-rating' using the Medication Appropriateness Index (MAI).

Medications include those used for the following conditions:

[a] heart failure, angina, hypertension, arrhythmia, dyslipidaemia, pulmonary hypertension, other.

[b] angiotensin converting enzyme inhibitors (ACEI), sartans, calcium-channel blockers, beta blockers, thiazide diuretics, other.

[c] anaemia, anticoagulants, antiplatelets, electrolyte imbalance, thrombolytics, other.

[d] adrenal insufficiency, bone, diabetes, thyroid disorders, other.

[e] antiemetics, diarrhoea, dyspepsia, motility disorders, laxatives, inflammatory bowel disease, other.

[f] benign prostatic hyperplasia and prostatitis; kidney stones; urinary tract disorders, other.

[g] gout, osteoarthritis, rheumatoid arthritis, other.

[h] Alzheimer's, epilepsy, migraine, multiple sclerosis, myasthenia gravis, parkinsonism, other.

[i] asthma and chronic obstructive pulmonary disease, cough, other.

[j] antidepressants, antipsychotics, anxiety and sleep disorders; alcohol dependence; bipolar disorder, nicotine dependence, opioid dependence, other)

[k] antibacterial, antifungal, antiviral, antiretroviral, antiprotozoal, antihelmintic, other.

[l] non-opioid, opioid, other.

The table excludes medications for the following conditions as few participants were prescribed these medications: dermatological; ear, nose and throat; eye; immunomodulators and neoplastics, allergy and anaphylaxis; vaccines.

Table 11. Medication type that was rated as inappropriate* as a proportion of medication type prescribed for participants ('per category') assessed with the Medication Appropriateness Index (MAI) at both baseline and final assessments (n=357).

Medication type	Number of medications with an inappropriateness rating per category at baseline (%)	Number of medications with an inappropriate rating per category at final assessment (%)	Difference (%)	p-value
Cardiovascular [a]	164/1014 (16.2 %)	77/1056 (7.3 %)	-8.88	**0.013**
Hypertension [b]	52/430 (12.1 %)	31/483 (6.4 %)	-5.67	0.175
Dyslipidaemia	57/294 (19.4 %)	22/302 (7.3 %)	-12.10	**0.008**
Blood and electrolytes [c]	92/342 (26.9 %)	56/379 (14.8 %)	-12.12	**0.012**
Endocrine [d]	136/593 (22.9 %)	64/615 (10.4 %)	-12.53	**0.002**
Diabetes	104/482 (21.6 %)	44/506 (8.7 %)	-12.88	**<0.001**
Gastrointestinal [e]	54/152 (35.5 %)	39/147 (26.5 %)	-9.00	0.152
Dyspepsia	49/125 (39.2 %)	31/114 (27.2 %)	-12.01	0.063
Genitourinary [f]	12/35 (34.3 %)	5/36 (13.9 %)	-20.40	**0.035**
Musculoskeletal [g]	28/62 (45.2 %)	19/80 (23.8 %)	-21.41	**0.005**
Neurological [h]	13/36 (36.1 %)	7/36 (19.4 %)	-16.67	0.226
Respiratory [i]	49/235 (20.9 %)	31/277 (11.2 %)	-9.66	0.102
Asthma and COPD	45/225 (20.0 %)	29/269 (10.8 %)	-9.22	0.130
Psychotropic [j]	41/127 (32.3 %)	30/133 (22.6 %)	-9.73	0.079
Anti-infectives [k]	4/27 (14.8 %)	3/22 (13.6 %)	-1.18	0.911
Analgesics [l]	38/128 (29.7 %)	22/123 (17. 9 %)	-11.80	0.051

Bold p-value implies statistically significant change at the 0.05 level. P-value, cluster adjusted p-value (ACCHS and patients cluster) that were determined using the . svy linearized : logit Stata command (data not paired).
COPD=chronic obstructive pulmonary disease
*A medication with an inappropriateness rating is a medication with at least one 'C-rating' using the Medication Appropriateness Index (MAI).

Medications include those used for the following conditions:

[a] heart failure, angina, hypertension, arrhythmia, dyslipidaemia, pulmonary hypertension, other.
[b] angiotensin converting enzyme inhibitors (ACEI), sartans, calcium-channel blockers, beta blockers, thiazide diuretics, other.
[c] anaemia, anticoagulants, antiplatelets, electrolyte imbalance, thrombolytics, other.
[d] adrenal insufficiency, bone, diabetes, thyroid disorders, other.
[e] antiemetics, diarrhoea, dyspepsia, motility disorders, laxatives, inflammatory bowel disease, other.
[f] benign prostatic hyperplasia and prostatitis; kidney stones; urinary tract disorders, other.
[g] gout, osteoarthritis, rheumatoid arthritis, other.
[h] Alzheimer's, epilepsy, migraine, multiple sclerosis, myasthenia gravis, parkinsonism, other.
[i] asthma and chronic obstructive pulmonary disease, cough, other.
[j] antidepressants, antipsychotics, anxiety and sleep disorders; alcohol dependence; bipolar disorder, nicotine dependence, opioid dependence, other)
[k] antibacterial, antifungal, antiviral, antiretroviral, antiprotozoal, antihelmintic, other.
[l] non-opioid, opioid, other.

The table excludes medications for the following conditions as few participants were prescribed these medications: dermatological; ear, nose and throat; eye; immunomodulators and neoplastics, allergy and anaphylaxis; vaccines.

Table 12: Participants and the type of medications prescribed for them, as assessed using the Medication Appropriateness Index (MAI) at both baseline and final assessments (n=357).

Medication type	Number of participants at baseline (%) (n=357)	Number of participants at final assessment (%) (n=357)	Difference (%)	p-value
Cardiovascular [a]	324/357 (90.8 %)	325/357 (91.0 %)	0.28	0.794
Heart failure	41/357 (11.5 %)	47/357 (13.2 %)	1.68	0.186
Angina	58/357 (16.3 %)	65/357 (18.2 %)	1.96	0.209
Hypertension	262/357 (73.4 %)	275/357 (77.0 %)	3.64	**0.048**
ACE Inhibitors	180/357 (50.4 %)	188/357 (52.7 %)	2.24	0.312
Sartans	45/357 (12.6 %)	58/357 (16.3 %)	3.64	**0.014**
Calcium channel blockers	99/357 (27.7 %)	103/357 (28.9 %)	1.12	0.478
Beta blockers	51/357 (14.3 %)	69/357 (19.3 %)	5.04	**0.012**
Thiazide diuretics	28/357 (7.8 %)	34/357 (9.5 %)	1.68	0.190
Other antihypertensives	23/357 (6.4 %)	26/357 (7.3 %)	0.84	0.579
Arrhythmia	32/357 (9.0 %)	23/357 (6.4 %)	-2.52	0.068
Dyslipidaemia	257/357 (72.0 %)	266/357 (74.5 %)	2.52	0.143
Other (unspecified)	61/357 (17.1 %)	37/357 (10.4 %)	-6.72	**0.005**
Blood and electrolytes [b]	212/357 (59.4 %)	233/357 (65.3 %)	5.88	**0.006**
Anaemia	36/357 (10.1 %)	36/357 (10.1 %)	0.00	>0.999
Anticoagulants	34/357 (9.5 %)	36/357 (10.1 %)	0.56	0.650
Antiplatelets	149/357 (41.7 %)	163/357 (45.7 %)	3.92	0.060
Endocrine [c]	258/357 (72.3 %)	258/357 (72.3 %)	0.00	>0.999
Bones	48/357 (13.5 %)	51/357 (14.3 %)	0.84	0.589
Diabetes	218/357 (61.1 %)	219/357 (61.3 %)	0.28	0.789
Thyroid disorders	22/357 (6.2 %)	23/357 (6.4 %)	0.28	0.572
Other endocrine disorders	21/357 (5.9 %)	18/357 (5.0 %)	-0.84	0.510
Gastrointestinal [d]	134/357 (37.5 %)	116/357 (32.5 %)	-5.04	**0.009**
Dyspepsia	120/357 (33.6 %)	109/357 (30.5 %)	-3.08	0.082
Genitorurinary [e]	24/357 (6.7 %)	31/357 (8.7 %)	1.96	0.197
Musculoskeletal [f]	47/357 (13.2 %)	65/357 (18.2 %)	5.04	**0.009**
Gout	23/357 (6.4 %)	24/357 (6.7 %)	0.28	0.664
Neurological [g]	34/357 (9.5 %)	33/357 (9.2 %)	-0.28	0.856
Respiratory [h]	110/357 (30.8 %)	115/357 (32.2 %)	1.40	0.380
Asthma and COPD	104/357 (29.1 %)	110/357 (30.8 %)	1.68	0.265
Psychotropic [i]	88/357 (24.7 %)	93/357 (26.1 %)	1.40	0.366
Antidepressants	58/357 (16.3 %)	71/357 (19.9 %)	3.64	**0.014**
Nicotine dependence	8/357 (2.2 %)	5/357 (1.4 %)	-0.84	0.280
Anti-infectives [j]	21/357 (5.9 %)	18/357 (5.0 %)	-0.84	0.447
Analgesics [k]	95/357 (26.6 %)	94/357 (26.3 %)	-0.28	0.892
Non-opioid	85/357 (23.8 %)	83/357 (23.3 %)	-0.56	0.792
Opioid	22/357 (6.2 %)	23/357 (6.4 %)	0.28	0.810

Bold p-value implies statistically significant change at the 0.05 level. P-value was cluster adjusted (ACCHS cluster) and determined using the . svy linearized : clogit Stata command (paired data).
Participants were on multiple types of medications, so the number of participants receiving medication in subcategories does not total 100%.
COPD=chronic obstructive pulmonary disease
Medications include those used for the following conditions (not shown, all p>0.05 unless otherwise indicated):

[a] pulmonary hypertension.
[b] electrolyte imbalance, thrombolytics, other.
[c] adrenal insufficiency.
[d] antiemetics, diarrhoea, motility disorders, laxatives, inflammatory bowel disease, other gastrointestinal medications *(-1.40%, p<0.05*).
[e] benign prostatic hyperplasia and prostatitis; kidney stones; urinary tract disorders, other.
[f] osteoarthritis, rheumatoid arthritis, other.
[g] Alzheimer's, epilepsy, migraine, multiple sclerosis, myasthenia gravis, parkinsonism, other.
[h] cough, other.
[i] antipsychotics, anxiety and sleep disorders; alcohol dependence; bipolar disorder, opioid dependence, other.
[j] antibacterial, antifungal, antiviral, antiretroviral, antiprotozoal, antihelmintic, other.
[k] other.

The table excludes medications for the following conditions as few patients were prescribed these medications: dermatological; ear, nose and throat; eye; immunomodulators and neoplastics, allergy and anaphylaxis; vaccines.

Table 13: Participants prescribed medications with an inappropriateness rating,* according to the Medication Appropriateness Index (MAI) by medication type, at both baseline and final assessments (n=357).

Medication type	Number of participants at baseline (%) (n=357)	Number of participants at final assessment (%) (n=357)	Difference (%)	p-value
Cardiovascular [a]	117/357 (32.8 %)	46/357 (12.9 %)	-19.89	**<0.001**
Heart failure	12/357 (3.4 %)	4/357 (1.1 %)	-2.24	**0.047**
Angina	9/357 (2.5 %)	5/357 (1.4 %)	-1.12	0.288
Hypertension	43/357 (12.0 %)	24/357 (6.7 %)	-5.32	**0.010**
ACE Inhibitors	15/357 (4.2 %)	10/357 (2.8 %)	-1.40	0.314
Sartans	6/357 (1.7 %)	2/357 (0.6 %)	-1.12	0.142
Calcium channel blockers	9/357 (2.5 %)	3/357 (0.8 %)	-1.68	0.072
Beta blockers	9/357 (2.5 %)	10/357 (2.8 %)	0.28	0.796
Thiazide diuretics	5/357 (1.4 %)	2/357 (0.6 %)	-0.84	0.274
Other antihypertensives	7/357 (2.0 %)	3/357 (0.8 %)	-1.12	0.220
Arrhythmia	7/357 (2.0 %)	1/357 (0.3 %)	-1.68	0.073
Dyslipidaemia	54/357 (15.1 %)	19/357 (5.3 %)	-9.80	**<0.001**
Other (unspecified)	20/357 (5.6 %)	7/357 (2.0 %)	-3.64	**0.016**
Blood and electrolytes [b]	71/357 (19.9 %)	46/357 (12.9 %)	-7.00	**0.004**
Anaemia	10/357 (2.8 %)	3/357 (0.8 %)	-1.96	0.054
Anticoagulants	11/357 (3.1 %)	5/357 (1.4 %)	-1.68	0.083
Antiplatelets	35/357 (9.8 %)	26/357 (7.3 %)	-2.52	0.168
Endocrine [c]	91/357 (25.5 %)	51/357 (14.3 %)	-11.20	**<0.001**
Bones	14/357 (3.9 %)	11/357 (3.1 %)	-0.84	0.504
Diabetes	70/357 (19.6 %)	36/357 (10.1 %)	-9.52	**<0.001**
Thyroid disorders	3/357 (0.8 %)	4/357 (1.1 %)	0.28	0.654
Other endocrine disorders	10/357 (2.8 %)	3/357 (0.8 %)	-1.96	0.057
Gastrointestinal [d]	51/357 (14.3 %)	37/357 (10.4 %)	-3.92	0.051
Dyspepsia	46/357 (12.9 %)	30/357 (8.4 %)	-4.48	**0.020**
Genitorurinary [e]	9/357 (2.5 %)	4/357 (1.1 %)	-1.40	0.102
Musculoskeletal [f]	19/357 (5.3 %)	17/357 (4.8 %)	-0.56	0.666
Gout	9/357 (2.5 %)	3/357 (0.8 %)	-1.68	0.069
Neurological [g]	13/357 (3.6 %)	7/357 (2.0 %)	-1.68	0.133
Respiratory [h]	35/357 (9.8 %)	19/357 (5.3 %)	-4.48	**0.019**
Asthma and COPD	32/357 (9.0 %)	17/357 (4.8 %)	-4.20	**0.020**
Psychotropic [i]	33/357 (9.2 %)	21/357 (5.9 %)	-3.36	**0.031**
Antidepressants	16/357 (4.5 %)	12/357 (3.4 %)	-1.12	0.366
Nicotine dependence	2/357 (0.6 %)	1/357 (0.3 %)	-0.28	0.572
Anti-infectives [j]	4/357 (1.1 %)	3/357 (0.8 %)	-0.28	0.655
Analgesics [k]	26/357 (7.3 %)	17/357 (4.8 %)	-2.52	0.086
Non-opioid	19/357 (5.3 %)	9/357 (2.5 %)	-2.80	**0.035**
Opioid	10/357 (2.8 %)	10/357 (2.8 %)	0.00	>0.999

Bold p-value implies statistically significant change at the 0.05 level. P-value was cluster adjusted (ACCHS cluster) and determined using the . svy linearized : clogit Stata command (paired data).
Participants were on multiple types of medications, so the number of participants receiving medication in subcategories does not total 100%.
*A medication with an inappropriateness rating is a medication with at least one 'C-rating' from the Medication Appropriateness Index (MAI).
COPD=chronic obstructive pulmonary disease

Medications include those used for the following conditions (not shown, all p>0.05):

[a] pulmonary hypertension.
[b] electrolyte imbalance, thrombolytics, other.
[c] adrenal insufficiency.
[d] antiemetics, diarrhoea, motility disorders, laxatives, inflammatory bowel disease, other.
[e] benign prostatic hyperplasia and prostatitis; kidney stones; urinary tract disorders, other.
[f] osteoarthritis, rheumatoid arthritis, other.
[g] Alzheimer's, epilepsy, migraine, multiple sclerosis, myasthenia gravis, parkinsonism, other.
[h] cough, other.
[i] antipsychotics, anxiety and sleep disorders; alcohol dependence; bipolar disorder, opioid dependence, other.
[j] antibacterial, antifungal, antiviral, antiretroviral, antiprotozoal, antihelmintic, other.
[k] other.

The table excludes medications for the following conditions as few patients were prescribed these medications: dermatological; ear, nose and throat; eye; immunomodulators and neoplastics, allergy and anaphylaxis; vaccines.

Table 14: Inter-rater reliability of the Medication Appropriateness Index (MAI) as applied by two raters (pharmacists) to 6 patients with 31 medications (310 MAI questions).

MAI criterion	A	B	C	D
Drug not indicated	31	0	0	0
Drug ineffective	31	0	0	0
Incorrect dose	31	0	0	0
Incorrect directions	31	0	0	0
Impractical directions	31	0	0	0
Drug-drug interactions	27	0	4	0
Drug-disease interactions	31	0	0	0
Unnecessary duplication	31	0	0	0
Unacceptable duration	31	0	0	0
Cost most expensive	31	0	0	0
	31	0	0	0

'Criterion' refers to the MAI criterion. 'Fulfilled' refers to a C-rating for the criterion.
A = both raters agreed criterion not fulfilled; B = rater 1 scored criterion not fulfilled, rater 2 scored criterion as being fulfilled;
C = rater 1 scored criterion as fulfilled, rater 2 scored criterion as not fulfilled; D = both raters scored criterion as being fulfilled.
For example: If a drug was not indicated, this would generate a C-rating and would indicate that this criterion was fulfilled.

APPENDIX A: Medication Appropriateness Index: Examples for Pharmacist Training for the IPAC Project.

Source: Ms Megan Tremlett: Pharmaceutical Society of Australia

JAMES COOK UNIVERSITY AUSTRALIA

NACCHO

Pharmaceutical Society of Australia

Medication Appropriateness Index (MAI) – Examples

Question	Example
1. Is there an indication for the drug? A= indicated B= marginally indicated C= not indicated Z= do not know	• Amlodipine is prescribed and hypertension is recorded in patient history =A • KCl prescribed to patient taking a diuretic without history of hypokalaemia =B • Olanzapine prescribed but schizophrenia and related psychoses or bipolar disorder not documented=C
2. Is the medication effective for the condition? A= effective B= marginally effective C= ineffective Z= do not know	• Pantoprazole prescribed for peptic ulcer disease =A • Amitriptyline for neuropathic pain =B (not indicated but accepted as effective) • Quinine sulfate prescribed for leg cramps =C
3. Is the dosage correct? A= correct B= marginally correct C= incorrect Z= do not know	• Warfarin 3mg daily for patient with AF and stable INR of 2.2 =A • Atorvastatin at highest end of usual dose range but cholesterol level remains elevated =B (dose is necessary but additional therapy is needed) • Digoxin 250mcg daily for elderly patient with CrCl 25ml/min =C+ (dose too high)
4. Are the directions correct? A= correct B= marginally correct C= incorrect Z= do not know	• Prednisolone 5mg m with food =A • Latanoprost eyedrops instil 1 drop into the eye at night =B (should specify which eye or both eyes) • KCl without directions regarding food =C
5. Are the directions practical? A= practical B= marginally practical C= impractical Z= do not know	• Amitriptyline 25mg tab 1 n =A • Directions given as 'mdu' =B • Ipratropium MDI 2 puffs q6h =C (qds more appropriate to fit waking hours rather than directing every 6 hours)
6. Are there clinically significant drug-drug interactions? A= insignificant B= marginally significant C= significant Z= do not know	• Metoprolol and rabeprazole =A • Metformin and esomeprazole =B (interaction documented but clinical significance not established) • Diltiazem and atorvastatin =C (diltiazem inhibits CYP3A4 metabolism of atorvastatin)

7. Are there clinically significant drug-disease/condition interactions? A= insignificant B= marginally significant C= significant Z= do not know	• Rivaroxaban in a patient with asthma =A (no interaction or precaution documented) • Atenolol in a patient with diabetes and no worsening of glycaemic control =B • Doxepin in an elderly patient with glaucoma =C (contraindicated)
8. Is there unnecessary duplication with other drugs? A= necessary B= marginally necessary C= unnecessary Z= do not know	• Regular indacaterol inhaler plus prn use of salbutamol MDI in patient with COPD =A (necessary duplication of beta agonists for therapeutic effect) • Combination of paracetamol 500mg & 665mg SR tabs not exceeding max total recommended daily dose =B • citalopram m plus fluvoxamine n =C (2 drugs from same SSRI class with resulting risk of serotonin overload)
9. Is the duration of therapy acceptable? A= acceptable B= marginally acceptable C= unacceptable Z= do not know	• Dual antiplatelet therapy with aspirin & clopidogrel for 6-12 months after insertion of drug-eluting stent =A • Long-term PPI use with occasional intermittent symptoms =B • Long term monotherapy with oral corticosteroid in patient with COPD =C (unfavorable risk:benefit ratio) *note that if the drug is not indicated, rating =C
10. Is this drug the least expensive alternative compared to others of equal utility? A= less expensive B= equally expensive C= more expensive Z= do not know	• Magmin tab =A (PBS-subsidised for Aboriginal and Torres Strait Islander patients, cheaper to patient than OTC magnesium supplement) • Ramipril 5mg tab =B (same cost to patient as perindopril 5mg tab, listed in CARPA as alternative option for heart failure) • FerroGrad C tab =C (non-PBS, >10% more expensive than Ferro-tab which is PBS-subsidised for Aboriginal and Torres Strait Islander patients) *note that if the drug is not indicated, rating =C

APPENDIX B. The IPAC Health Systems Assessment (HSA) form used with participating IPAC health services (n=18).

The IPAC140 Health System Assessment Form

Role	Name	Position within health service	Date	Section/s answered
Interviewer				
Interviewed Service representative				

Question	Section A: General and demographic characteristics of the IPAC participating service						
1	Service name:						
2	Street:	Suburb/Town:	State:		Postcode:		
3	IPAC Project 'Go-to' contact person: *(name/phone/email)*						
4	Estimated total service population (not ABS)				%age Indigenous:		
5	Estimated total number of regular (active) clients				%age Indigenous:		
6	Total number of episodes of care (EOC) (Report if data is available from OSR- Online Services Reporting. *All contacts with the same client on the same day are counted as one episode of care.* Reported for the 12 month period in the most recent OSR)		Year (EOC data):		Total	Indigenous	
7	Service opening hours (indicate time in total hours. *E.g. 8 hours)*		Mon	Tue / Wed	Thu / Fri	Sat	Sun
8	Service on public holidays		Opened ☐		Closed ☐		
9	Does this service operate an appointment system?		Yes ☐		No ☐		
10	Does this service have the flexibility to accommodate any of the following?		☐ Drop-ins?	☐ Long/family consults?	☐ Seeing multiple providers in single visit?		
11	Average booking time to see preferred GP.		☐ Same day				
			☐ 1-7 days				
			☐ >7 days but <14 days				
			☐ >14 days				
12	Average waiting time to see a GP in an emergency.		☐ ≤1 hour or ☐ >1 hour				
13	Does this health service provide transport support to clients?		Yes ☐		No ☐		
14	If question 13 is **Yes**, outline the reasons for transport support:		To collect medicines		☐		
			To attend the clinic		☐		
			To go to hospital or other health services		☐		
			Other reasons		☐		
			Please specify:				
15	Does this service use translators as required? *(either on the phone or on-site)*		☐ Yes (Telephone ☐ On-site ☐) No ☐				
16	Does this service offer separate men's and/or women's areas if needed?		Yes ☐ No ☐				
17	Does this service provide cultural orientation and training to new and existing staff?				To all staff ☐ To some staff ☐ (Please specify)		
18	Does this service also operate other clinics?		Yes ☐ No ☐				
19	Will/does the practice pharmacist provide services in separate IPAC site?		Yes ☐ *(If yes, please complete The IPAC Health System Assessment Form for each of the other sites)*				
			No ☐				
20	Clinical Information System used in the service *(please specify version)*		Best Practice ☐ Version.....				
			Communicare ☐ Version.....				

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The IPAC140 Health System Assessment Form

Question	Section B: Staff characteristics of this service		
	Total Staff	Head count #	Total Full time equivalent (FTE)*
21	All staff (clinical and non-clinical)		
22	All staff who are *Aboriginal and/or Torres Strait Islander*		
23	All administrative staff		
24	All administrative staff who are *Aboriginal and/or Torres Strait Islander*		
25	All doctors		
26	All doctors who are *Aboriginal and/or Torres Strait Islander*		
27	All registered nurse practitioners, remote area nurses, and/or Practice Nurses		
28	All registered nurse practitioners, remote area nurses, and/or Practice Nurses who are *Aboriginal and/or Torres Strait Islander.*		
29	All AHWs/practitioners–male		
30	All AHWs/practitioners- female		
31	Aboriginal/Torres Strait Islander hospital liaison officer		

**For example: If there are 8 doctors at the clinic and 4 of them work 1.0FTE each, and 4 work 0.5 FTE each, the total FTE is 4+ 2= 6 FTE*

Question	Section C: Allied health staff employed by this service		
	Staff	Head count #	Full time equivalent (FTE)
32	Physiotherapist		
33	Dietitian		
34	Diabetes educator		
35	Respiratory educator		
36	Tobacco control officer / smoking cessation officer		
37	Exercise Physiologist		
38	Psychologist		
39	Social Worker		
40	Audiologist		
41	Optometrist		
42	Pharmacist		
43	Dentist		
44	Podiatrist		
45	Other –specify:		

Question	Section D: Rate the access to the listed allied health services within your local community										
	Allied health staff	Accessible at the clinic (onsite)	How often are clinic (onsite) sessions available?						If not accessible at the clinic- what is the average travel drive time for a patient to access the allied health staff?		
			daily	weekly	fortnightly	monthly	quarterly	irregularly	0-30 mins	31-60 mins	>61 mins
46	Physiotherapist	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
47	Dietitian	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
48	Diabetes educator	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
49	Respiratory educator	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
50	Tobacco control officer,	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

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	or smoking cessation officer										
51	Exercise Physiologist	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
52	Psychologist	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
53	Social Worker	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
54	Audiologist	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
55	Optometrist	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
56	Pharmacist	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
57	Dentist	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
58	Podiatrist	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
59	Other -specify	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
60	Other -specify	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Question	Section E: Rate the access to the listed specialist medical practitioner services within your local community										
	Specialist	Accessible at the clinic (onsite)	How often are clinic (onsite) sessions available?					If not accessible at the clinic- what is the average travel drive time for a patient to access the specialist?		
			daily	weekly	fortnightly	monthly	quarterly	irregularly	0-30 mins	31-60 mins	>61 mins
61	General Physician	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
62	Surgeon	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
63	Cardiologist	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
64	Nephrologist	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
65	Ophthalmologist	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
66	Rheumatologist	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
67	Paediatrician	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
68	Endocrinologist	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
69	Psychiatrist	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
70	ENT surgeon	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
71	Other- specify:	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Question	Section F: Community engagement by this service		
			Number
72	How many community pharmacies does this health service engage with?		
73	In the last 30 days, how many times has community pharmacy:		
	a. telephoned this service? ☐ <1 time ☐ 1-2 times ☐ 3-5 times ☐ >5 times ☐ On-site pharmacy	*b. emailed this service?* ☐ <1 time ☐ 1-2 times ☐ 3-5 times ☐ >5 times ☐ On-site pharmacy	*c. personally visited this service?* ☐ <1 time ☐ 1-2 times ☐ 3-5 times ☐ >5 times ☐ On-site pharmacy

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74	How many hospitals does this health service regularly engage with?	
75	Does this health service have a partnership (or engagement) with community groups? *(Any of: schools, child care centres, sports centres, Councils, community organizations like Red Cross, etc.)*	Yes ☐ No ☐
76	If question 75 is **Yes**: are there clear mechanisms for healthcare providers to use these services to support patients? *(Choose a response from 1-10, where 10 is 'routine or established mechanism' and 1 is 'minimal or absent').*	

Question	Section G: Other program engagement by this service	
77	Is this health service involved in any other research programs? **If yes**, please provide the name of the research project below:	Yes ☐ No ☐
78	If question 77 is **Yes**: What is the period of involvement in the research project? (MM/YY-MM/YY)	
79	Is this service engaged in any program supporting improvements in quality care indicators like nKPIs? (For example: Healthcare Homes). **If yes**, name the program/s below:	Yes ☐ No ☐

Please use the following scale to answer Section H and Section I:

1-2	3-4	5-6	7-8	9-10
Communication is rare (or has substantial difficulties) or never occurs	Communication is poor with significant difficulties	Communication is average and there are still several difficulties	Communication is generally good, but occasional difficulties exist	Communication is excellent and occurs through well-developed systems and/or relationships.

Question	Section H: How adequate is the quality of communication with the hospital system (*transitional care*) specialists and Primary Health Networks?	
	Communication	**Scale from 1 to 10**
80	Communication that a patient has been admitted	
81	Communication that a patient has attended outpatient services.	
82	Communication that a patient has been seen by a specialist.	
83	Communication that a patient has been discharged.	
84	Communication of the patient's discharge medication.	
85	Communication with specialists (as indicated in section E).	
86	Does this health service have a formal agreement with any Primary Health Networks? *(E.g. Memorandum of understanding, and/or other partnership agreement and/or financial contract, etc.)*	Yes ☐ No ☐
87	If question 86 is **Yes**, please rate the quality of communication:	

Question	Section I: How adequate is the quality of communication with community pharmacy?			
	Communication		**Scale from 1 to 10**	**Yes or No**
88	Communication with community pharmacy/s			
89	Communication with community pharmacists			
90	Is support provided to this clinic by community pharmacy?			☐ or ☐
91	If question 90 is **Yes**, what type of support is provided by community pharmacy to patients/staff of this health service? *(Please tick all appropriate.)*	Dose administration aids		☐
		Dispensing of medicines		☐
		Home medicines reviews		☐
		Response to queries about medications		☐

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		Educational sessions to staff within the clinic	☐
		Educational sessions to community groups/your patients	☐
		Home delivery of medicines to patients	☐
		Delivery of medicines to the clinic	☐
		Quality control of medicines stock onsite	☐
		Assistance with script collection	☐
		Other. *Please specify:*	☐

Question	Section J: Care Planning		
92	Is chronic disease 'care planning' a part of routine practice or ad hoc?	Routine ☐	Ad hoc ☐
93	Is 'care planning' done jointly with patients/families and healthcare providers?	Yes ☐	No ☐
94	Does 'care planning' incorporate self-management goals/strategies?	Yes ☐	No ☐

Question	Section K: *What systems does this health service have to support the clinical management of chronic disease?* For the following, choose a response from 1-10, where 10 is 'routine or established' and 1 is 'minimal or absent'.	
		Ranking 1-10
95	A chronic disease coordinator?	
96	Continuing quality improvement activities?	
97	An identified position to support quality improvement activities (ie a CQI lead)?	
98	External support for CQI (i.e. from State/Terr and/or national CQI support services)?	
99	A commitment to support CQI, from management?	
100	A commitment to support CQI, from staff?	
101	Professional development support for clinical management of chronic diseases?	
102	Training for staff in the prevention and clinical management of chronic diseases?	
103	Clients are identified for preventive and early detection activity (according to risk categories)?	
104	Specific educational support for the patient to be able to self-manage their chronic disease? (i.e. risk reduction, peer support, educational strategies and resources)	
105	Involvement of families in the provision of support to patients as part of routine practice (where appropriate)?	
106	Provision of brief interventions by staff? (smoking, alcohol, nutrition, physical activity)	
107	Chronic disease register? (i.e. to generate and use electronic lists of patients with chronic diseases from any source)	
108	Annual review of the chronic disease register? (I.e. to assess its currency).	
109	Use of chronic disease registers (from any source) for patient recall and reminders?	
110	Follow-up of patients as a routine, and in accordance with best practice?	
111	Follow-up of patients using community knowledge (staff and community) where appropriate?	
112	Routine use of 'patient feedback' surveys (to gauge patient satisfaction/experience with the service) so as to support quality improvement activities?	
113	Routine and systematic use of other methods to seek 'community feedback' on the quality of care? *(i.e. community review of 'performance information')*	
114	Registration of eligible patients to the PBS Co-payment scheme (i.e. CTG scripts)?	Yes ☐ No ☐ Not Applicable ☐
115	Onsite storage of medications?	Yes ☐ No ☐
116	Onsite quality control of medication stock?	Yes ☐ No ☐
117	Online patient request for repeat prescriptions?	Yes ☐ No ☐
118	Access to Section 100 for medicines? (i.e. dispensing of medicines onsite)	Yes ☐ No ☐

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		Not Applicable ☐		
119	If question 118 is **Yes** (to S100), in the last 6 months, how many times has community pharmacy made any contact with this service?	☐ 1-2 times	☐ 3-5 times	☐ >5 times
120	Home medicines review?	Yes ☐	No ☐	
121	If question 120 is **Yes**, how many referrals are made <u>per week</u> by this service?	☐ <2	☐ 2-5	☐ >5
122	Any Healthcare provider in the service who makes home visits?	Yes ☐	No ☐	
123	Medication adherence monitoring? *If yes, please explain:*	Yes ☐	No ☐	
124	Medication audits? *If yes, please explain:*	Yes ☐	No ☐	
125	Onsite pathology testing (such as 'point of care' testing)? (excludes co-located pathology services)	Yes ☐	No ☐	
126	If question 125 is **Yes**: Is participation part of QAAMS? *(Quality Assurance for Aboriginal and Torres Strait Islander Medical Services)*	Yes ☐	No ☐	
126a	**What is the name of the pathology service/s that your health service uses (for patient blood tests such as Hb A1c, lipids, ACR, or eGFR)? (**If this is a hospital, please name the hospital**).**			

Question	Section L: Which of the following resources are used by the service routinely?	
	Choose a response from 1-10, where 10 is 'routine or established use' and 1 is 'minimal or absent'	**Ranking 1-10**
127	Health Pathways (Qld and Vic)	
128	Map of Medicine (Vic)	
129	CARPA Standard Treatment Manual	
130	National Guide to a preventive health assessment for Aboriginal and Torres Strait Islander people (3rd ed.)	
131	CRANAplus Clinical Governance Guide, or other clinical governance protocols	
132	Medication related resources (e.g. Australian Medicines Handbook, Therapeutic guidelines, MIMs, etc.)	
133	Chronic Conditions Manual (Qld).	
134	Other system/guide. *Please indicate:*	

Question	Section M: Economic characteristics of the service	
135	Total budget of the health service (excluding capital works) (AUD).	
136	Estimated budget allocated for chronic diseases (AUD).	
137	Of the patients attending the service – what % are patients with chronic diseases? (from CIS or best estimate)	%
138	Of the patients with chronic disease, what % are HCC holders? (from CIS or best estimate)	%
139	Bulk-billing provided for HCC holders with chronic diseases.	Yes ☐ No ☐
140	Bulk-billing provided for non-HCC clients with chronic diseases.	Yes ☐ No ☐

Code for domains:
Domain 1: brown: Delivery system design
Domain 2: green: Information systems and decision support
Domain 3: blue: Self-management support
Domain 4: grey: Links with community, other health services
Domain 5: yellow: Organisational influences and integration

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Assessment of medicines underutilisation in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC project)

REPORT TO THE PHARMACEUTICAL SOCIETY OF AUSTRALIA FOR THE IPAC PROJECT

Final Report, February 2020.

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Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project.

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ABSTRACT

Objective

To assess the effect of integrated non-dispensing pharmacist interventions on medication underutilisation in Aboriginal and Torres Strait Islander adults with chronic disease attending Aboriginal Community Controlled Health Services (ACCHSs) enrolled in the *Integrating Pharmacists within Aboriginal Community Controlled Health Services* (ACCHSs) *to improve Chronic Disease Management* (IPAC) study, compared with usual care pre-intervention.

Design and participants

Consented participants enrolled in a non-randomised, prospective, pre and post quasi-experimental community-based, participatory, and pragmatic study that integrated a registered pharmacist within ACCHS in Qld, NT and Vic. Participants were recipients of the IPAC intervention which comprised a prescription quality review by pharmacists as part of 10 core integrated-pharmacist roles within ACCHSs. The review included the assessment of the underuse of medications (AoU). Deidentified participant data was electronically extracted from health records.

Outcome measures

Proportion of participants with at least one potential prescribing omission (PPO), and number and type of PPO from high-value pharmacotherapies predominantly for cardiovascular disease (CVD). Omission criteria were based on ten explicit evidence-based recommendations from clinical practice guidelines targeting chronic diseases responsible for Aboriginal and Torres Strait Islander health disparities. IPAC criteria for PPOs: underuse of blood pressure and lipid-lowering therapy in patients at high primary CVD risk; anti-platelet therapy for those with existing CVD; angiotensin-converting enzyme or angiotensin-2 receptor blocker (ACEI, ARB) in those with Type 2 diabetes mellitus (T2DM) and/or chronic kidney disease (CKD) with or without existing CVD; ACEI or ARB therapy in those with heart failure (low ejection fraction <0.4); metformin or other oral hypoglycaemic for T2DM; 23-valent polysaccharide pneumococcal vaccination (23vPPV); antibiotic chemoprophylaxis for acute rheumatic fever (ARF) or rheumatic heart disease (RHD); and 'other' implicitly identified omissions.

Results

Participants (n=1,456) from 18 ACCHSs involving 26 integrated pharmacists, with 390 participants selected (non-probabilistic) by IPAC pharmacists for prescribing quality (AoU) review at baseline and at the end of the study. Loss to follow-up (n=37 without repeat AoU) left 353 participants for paired data analysis (median interval of 266 days). Participants had CVD, T2DM, CKD, or other chronic disease (87.5% had co-morbidity); 93.2% were Aboriginal and/or Torres Strait Islander with a mean age of 57.2 years (SD±15.4) and a mean of 7.2 (SD±8.0) medications each. At baseline, 51.2% (181/353) of participants had at least one PPO from explicit and implicit criteria, totalling 256 PPOs or 0.73 (SD± 1.3) PPOs per participant. The most common PPO of the 10 criteria was for 23vPPV and blood pressure (BP) and/or lipid lowering therapy for those at high primary CVD risk. No chemoprophylactic PPOs for participants with ARF/RHD were identified. Other PPOs included symptomatic therapy for a range of chronic conditions. At follow-up (mean 267 days post-baseline), there was a significant (58%, p<0.001) reduction in the number of participants with potential prescription-based medication underutilisation, and a significant relative reduction in the mean number of PPOs per participant (60.3%%, p<0.001). The PPOs that were averted were for pneumococcal vaccination, BP and/or lipid lowering medication in those clinically at high primary CVD risk, ACEI or ARB for participants with T2DM and albuminuria, and metformin for those with T2DM.

Conclusion

PPOs were common in this cohort. Improvements in prescribing quality arising from non-dispensing pharmacists integrated within ACCHSs significantly averted PPOs to high-value pharmacotherapies. The magnitude of potentially undertreated Aboriginal and Torres Strait Islander patients with chronic disease and the magnitude of benefit observed following integrated pharmacists within ACCHSs, would at a population level, contribute to improved health outcomes for this target group. Generalisability of the outcomes observed from the integrated pharmacist intervention to the broader ACCHS adult patient population with chronic disease who are at risk of developing medication related problems, is supported.

INTRODUCTION

In Australia, Aboriginal peoples and Torres Strait Islanders are five times more likely to die from chronic disease before the age of 75 years (premature mortality) than other Australians (2011-15).[1] This profound health disparity has generated many policies and programs to encourage better chronic disease prevention and management within primary healthcare services. Yet, despite their higher burden of disease, medication underutilisation by Aboriginal peoples and Torres Strait Islanders persists. For years, the Indigenous Australians per person expenditure for medicines through the Pharmaceutical Benefits Scheme (PBS) has been a fraction (33% in 2013-14) of the expenditure for non-Indigenous Australians.[2] The PBS subsidizes the cost of pharmaceuticals for every Australian and requires a capped client co-payment adjusted for concessional status. A safety-net ensures the cost of medicines also does not exceed a capped level for each patient. Medication underuse persists for many Aboriginal peoples and Torres Strait Islanders even though PBS co-payments have either been eliminated or reduced for eligible members of this population since 2008.[3]

Continuing barriers to optimal use of medicines for Aboriginal peoples and Torres Strait Islanders include health system factors such as poorer access to primary health care services,[4] culturally unsafe pharmaceutical support,[5] lack of health service integration,[6] disease profiles inconsistent with medicines listed on the PBS,[7] and suboptimal prescribing quality.[8] Patient factors include insufficient health literacy for optimal self-management of disease,[9] distrust of health services,[10] family and community obligations,[11] and belief in traditional medicines,[12] whilst condition-related factors include disproportionately high multimorbidity.[13] Socioeconomic factors may also affect the personal management of medicines such as adherence and storage.[14]

A whole of health system response is needed to tackle these factors. This is difficult when system improvements are mostly directed to reducing overuse than the underuse of medicines.[15] Moreover, the quality of prescribing is not systematically examined for Aboriginal peoples and Torres Strait Islanders with chronic disease. National key performance indicators for health services to this population encourage regular clinical audit to improve activity such as assessing the absolute risk of a cardiovascular event (over 5

years),[16] but are lacking indicators of prescribing quality. The National Prescribing Service supports general practices to undertake small prescribing audits,[17] but it is unclear if this reduces underprescribing.

For the primary and secondary prevention of cardiovascular disease in the Aboriginal and Torres Strait Islander population, assessing cardiovascular risk is essential to prevent the underuse of treatment in those at high-risk.[18 19] Research has shown that underprescribing with blood pressure and lipid-lowering medications is common in Aboriginal and Torres Strait Islander patients at high-risk for cardiovascular disease (CVD).[20 21 22] High BP and lipid levels are major contributors to CVD risk and the overall disease burden in the Aboriginal and Torres Strait Islander population. Any effort to close the gap in health status will therefore depend on reducing these risks.[23] Pharmacological reductions in BP can significantly reduce the risk of major CVD events, coronary heart disease, stroke, heart failure and all-cause mortality including in patients with comorbidities.[24] These benefits are also evident for populations in resource-poor settings where combined pharmacotherapy for BP, lipid-lowering, plus aspirin use in those at high absolute risk for CVD was estimated to generate a 2-year gain in life expectancy (compared with no treatment) when modelled until death.[25] Addressing the underuse of BP and lipid-lowering therapy are examples of high-value interventions that will confer significant benefits on patients and represent value for money.[26]

Not a great deal is known about how well other best practice pharmacotherapeutic recommendations are applied in practice to reduce the undertreatment of Aboriginal and Torres Strait Islander peoples. An audit of the medication records of Aboriginal Australians in remote Western Australia (WA) found that 12% (33/273) of patients had potential underprescribing. An example of one criterion was if patients with a history of hypertension lacked antihypertensive therapy.[27]

In order to investigate the potential gains in health outcomes arising from integrated models of care within Aboriginal health settings, the *Integrating Pharmacists within Aboriginal Community Controlled Health Services* (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project was developed. The project explored if integrating a registered

pharmacist as part of the primary health care (PHC) team within ACCHSs (the intervention) leads to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples with chronic diseases. Commencing in 2018, this study measured medication appropriateness and underutilisation in a subset of adult patients with chronic diseases who enrolled in this project.

The IPAC project defined the underuse of medications as a *potential prescribing omission* (PPO). A PPO occurs when there is an omission of potentially beneficial medication that is clinically indicated for the treatment or prevention of a disease.[28] IPAC pharmacists undertook an assessment of the underutilisation (AoU) of beneficial medications at baseline by auditing each study participant's pharmacotherapy against a set of current evidence-based clinical practice guideline (CPG) recommendations for the Aboriginal and Torres Strait Islander population. Assessments were repeated at the end of the study to assess change in medication underutilisation following the intervention. In order to explore if underprescribing can be reduced, this study quantified the change in the proportion of participants with at least one PPO and the number and type of PPOs from high-value pharmacotherapies in Aboriginal and Torres Strait Islander participants who received integrated pharmacist services.

METHOD

The IPAC project was a community-based, participatory, pragmatic, non-randomised, prospective, pre and post quasi-experimental study (Trial Registration Number and Register: ACTRN12618002002268) that integrated a registered non-dispensing pharmacist within the ACCHS primary healthcare team for up to a 15-month period. ACCHS sites (n=18) were recruited for the project across three jurisdictions: Victoria, Queensland and the Northern Territory. Health service staff and pharmacists invited patients into the study as they were attending ACCHSs for usual care. Patients recruited into the study were aged 18 years and over with a diagnosis of: cardiovascular disease (CVD), Type 2 diabetes mellitus (T2DM), chronic kidney disease (CKD), or other chronic conditions and at high risk of developing medication-related problems (e.g. polypharmacy).

The IPAC project methodology has been described in detail elsewhere,[29] and health services characteristics were summarized in a separate report.[30] Briefly, IPAC pharmacists delivered non-dispensing clinical pharmaceutical services within ACCHSs through a coordinated, collaborative and integrated approach to improve the quality of care of patients. Their intervention targeted both consented patients and practices, with practice-specific activities directed to health professionals and systems within the service. Pharmacists were required to undertake 10 core roles that comprised: providing medication management reviews, assessing patient adherence and medication appropriateness, providing medicines information and education and training, collaborating with healthcare teams, delivering preventive care, liaising with stakeholders, providing transitional care, and undertaking a drug utilisation review.[31]

Prescription quality review

Prescribing quality was comprehensively assessed by integrated pharmacists in a subset of IPAC participants using the Medication Appropriateness Index (MAI)[32 33] and the AoU. Pharmacists then used the MAI and medication underuse assessments to inform medication management plans and recommendations for prescribers, as needed. The MAI is a prescription quality review tool that assesses the potential for medicine-related risks that outweigh the benefits to the patient. These risks are associated with suboptimal prescribing which is defined as inappropriate use, overuse, and the underuse of medications. However, the MAI is unable to inform on the underutilisation of medications. For this reason, all MAI subset participants were also simultaneously assessed for medication underuse using criteria developed for the project.

Study participants

A non-probabilistic, pragmatic participant sampling method was used by pharmacists to select a sample of enrolled participants for MAI and AoU assessment according to their clinical need for a prescription review. The sample size was set for feasibility reasons, due to the length of time usually required for pharmacists to undertake the MAI assessment and the large number of participants expected to be enrolled into the study.[34] The number of MAI assessments was adjusted pro-rata to be consistent with the level of pharmacist appointment within the ACCHS.

The clinical need for the prescription quality review was reflective of usual care and based on criteria such as for Home Medicines Review where the patient must have 'a chronic medical condition or a complex medication regimen, and not [have] their therapeutic goals met'.[35] The study did not use random selection of participants for MAI audit in order to reflect usual care clinical processes and services consistent with a pragmatic trial.[36] In another report, it was shown that the selected participants did not differ from other IPAC participants in terms of demographic characteristics, by presence and type of chronic disease, utilization of health services, biomedical parameters, or self-assessed health status. Health service characteristics did not effectively change from baseline to the end of the study.[37]

Pharmacists were instructed to complete the assessments shortly after participant enrolment and within the first three months of the study (baseline) and again prior to the end of the study (set as the 31st October 2019). Participant attendance was not required to undertake the review.

Pharmacists

The Pharmaceutical Society of Australia (PSA) recruited pharmacists to be integrated within ACCHSs, whilst the National Aboriginal Community Controlled Health Organization (NACCHO) supported ACCHSs. IPAC pharmacists fulfilled the following eligibility criteria: registration with the Australian Health Practitioners Regulation Agency (AHPRA); more than 2 years' post-registration experience; and post-graduate clinical qualifications or demonstrated clinical experience.

As a member of the health care team, all pharmacists had access to participants electronic medical records held at the ACCHS. Medications were accepted by pharmacists as 'prescribed' if they were included in the patient's current medication list within the records. Pharmacists were also able to check other sources of information to validate the current medication list such as information within the CIS, correspondence from specialist clinicians or discussion with other clinical staff. Pharmacists entered each medication into an

electronic logbook (developed for the project) as they reviewed the participants clinical history systematically against MAI and underuse criteria.

Assessment of medicines underutilisation (AoU)

Clinically relevant potential prescribing omissions (PPO) categories were derived by a team of four pharmacists and a public health physician from appropriate evidence-based clinical practice guidelines (CPG). A list of ten (10) evidence-based categories were agreed by consensus, to define clinically relevant potential prescribing omissions (PPO) for CVD, T2DM, CKD, pneumococcal vaccination, acute rheumatic fever (ARF) and/or rheumatic heart disease (RHD). These conditions were known to contribute significantly to the burden of disease and healthcare disparities in Aboriginal peoples and Torres Strait Islanders (especially in remote Australia).[38] Prescribing recommendations from CPGs were selected if they were unambiguous and represented high-value interventions known to be underused.[39] The recommendations defined the type of PPO within each underuse category, which if ameliorated would benefit Aboriginal peoples and Torres Strait Islanders with the listed conditions. The selection of recommendations was kept small to reflect key omissions and to minimise the reporting burden on pharmacists (Table 1). The use of evidence-based guidelines applicable to Aboriginal and Torres-Strait Islander peoples informed the face and content validity of the underutilisation criteria. Other explicit criteria-based methods to detect PPOs were considered unsuitable in the context of the IPAC study (Table 2).

The final set of prescribing recommendations were explicit (clearly defined clinical circumstances) and categorised potential prescribing omissions from A to J, with a final category K representing 'other' omissions assessed implicitly by the pharmacist. Categories A, B and C defined recommendations for patients at high absolute risk (>15%) of developing a cardiovascular event over the next 5 years for the primary prevention (calculated high-risk or existing clinical criteria for high-risk)[40] and secondary prevention (pre-existing CVD) of cardiovascular events.[41] [42] Category A and B recommendations were mutually exclusive-participants either had a clinically high primary risk for CVD or were at high primary risk based on risk assessment using the Framingham risk equation.[43] Participants already at clinically high risk for a CVD event did not require their absolute CVD risk to be calculated.

These participants had the following conditions: diabetes and aged greater than 60 years; diabetes with microalbuminuria (>2.5mg/mmol for males and >3.5 mg/mmol in females); moderate or severe CKD (persistent proteinuria or eGFR <45 ml/min/1.73m^2); a previous diagnosis of familial hypercholesterolaemia; systolic blood pressure (BP) >= 180mmHg or diastolic BP >=11mmHg); serum total cholesterol >7.5mmol/L; Aboriginal and Torres Strait Islander adults aged over 74 years.[44]

Category D and E recommendations aimed to reduce the risk of CVD events (irrespective of the presence of CVD) in patients with T2DM with albuminuria and to protect against the progression of CKD in those with a clinically high CVD risk (with or without diabetes).[45] [46] [47] [48] These recommendations were to inform on recommended and preferential treatment with angiotensin converting enzyme inhibitor (ACEI) or angiotensin 2 receptor antagonist (ARB) treatment. This treatment is particularly important for the Aboriginal and Torres Strait Islander population (with or without diabetes) in view of their higher prevalence of CKD, evidence indicating that macroalbuminuria is predictive of CKD and CVD deaths, and a demonstrated 50% reduction in all-cause natural deaths with ACEI therapy and additional agents after a mean follow-up of 3.39 years.[49] Therapy with both ACEI and ARB in the same patient is contraindicated.[50]

Category F defined recommendations for patients with heart failure and a reduced left ventricular ejection fraction (of 40% or less) to reduce hospitalisation and mortality.[51] Categories G and H defined recommendations for those with T2DM to improve glycaemic control and prevent macro and microvascular complications.[52] [53] Category I recommended 23-valent polysaccharide pneumococcal vaccination (23vPPV) to prevent invasive pneumococcal disease in patients at high-risk.[54] [55] Category J recommended antibiotic chemoprophylaxis for patients with ARF or RHD for the secondary prevention of recurrent rheumatic fever.[56] [57]

Pharmacists assessed if participants with the above clinical criteria had been prescribed the recommended medications. Category K allowed pharmacists to implicitly identify any other PPO relevant to the participant (Table 1).

The first AoU after participant enrolment was defined as 'baseline'. Medication underutilisation was reported as the *proportion of patients with at least one PPO*. All participants with <90 days of follow-up were removed from the analysis (Figure 1) to allow for a minimum time for pharmacist's recommendations to be acted upon. The intervention phase of the study comprised the period from participant enrolment to the end of the study (31st October 2019).

Data collection

All collected data was deidentified. Participant clinical information was sourced from the electronic health records of participating services as well as data entered by pharmacists into an electronic logbook. Demographic, biomedical and health service utilization indices were extracted from Clinical Information Systems (CISs) in deidentified form using an electronic tool called GRHANITE that required remote installation and regular extraction from IPAC sites for the term of the project.[58] Participant consent was recorded in the CIS by pharmacists. GRHANITE only extracted data for consented patients and copied it to a JCU databank employing internationally recognised point-to-point encryption (P2PE) mechanisms to protect data in transit. The scope of the data extractions was agreed based on IPAC-specific data requirements and extract definitions for GRHANITE XML's (site interfaces) to ensure they were fit-for-purpose. All sites consented to the installation of GRHANITE and the deidentified data extractions required for the project. Each initial site extraction successfully completed 'site acceptance testing' that confirmed the extraction of fit-for purpose data. The integrity of the data extraction was regularly checked with weekly uploads. XML interface maintenance ensured that any software vendor upgrades to the CIS were aligned with data extract definitions. The deidentified CIS patient identification numbers recorded by pharmacists in the logbook linked with patient data in the GRHANITE extractions.

The pharmacist logbook was a secure password protected online database, accessible from any device connected to the internet, with dual recording and reporting functionality. The electronic interface was developed to be intuitive and user-friendly to minimise the burden of data entry and reporting. Pharmacists were trained to assign PPOs to each underuse

category and record the results of the assessment in the logbook. They assessed for contraindications and intolerance to the recommended medications and reported an omission *only* if the medication was indicated and potentially of benefit. Pharmacists were also trained to look for clear documentation of a clinical decision *not* to use the recommended medications (in which case they would not document a PPO).

In order to assess for category A omissions for patients without pre-existing CVD, pharmacists used the participant's electronic health records to check their absolute 5-year risk for a CVD event, which according to Australian guidelines is based on the 1991 Framingham risk equation.[59] Information (if available) on the participants age, sex, systolic blood pressure, smoking status, total cholesterol, high-density lipoprotein cholesterol, and the presence of diabetes was necessary to estimate the calculated CVD risk for Aboriginal and Torres Strait Islander participants aged 30 years to 74 years of age. Pharmacists had the discretion to base CVD risk on local guidelines used by their health service and CIS software.[60] Pharmacists were not instructed to routinely adjust absolute risk estimates upwards (because current risk equations underestimate CVD risk for the Aboriginal and Torres Strait Islander population) as this is subject to clinician discretion or local health service guidelines.[61] Further information on pharmacist training is described elsewhere.[62]

Pharmacists recorded clinical diagnoses in the logbook based on what was documented in electronic health records or supplemented by discussion with clinicians. Patients with 'existing CVD' were defined as participants with a logbook recorded clinical diagnosis of: coronary heart disease, CVD, or peripheral vascular disease (PVD).

After assessing underutilisation, pharmacists recorded an omission (and the category of omission) or a lack of an omission in the logbook. A participant could have several PPO's across multiple omission categories. The pharmacist who determined medication appropriateness also assessed medication underuse in the same participant. The majority of follow-up MAI and underuse assessments (79%) were completed by the same pharmacist who competed the baseline assessment. The remaining follow-up assessments were completed by a different pharmacist due to pharmacist turnover in some sites. There were very few discordant MAI results within and between pharmacists when a sample of

pharmacists were investigated for inter and intra-rater reliability.[63] The reliability of PPO assessments by pharmacists was not tested.

Data analysis

All participants with less than 90 days of follow-up were removed from the analysis due to their short length of stay in the study. Health Care Homes (HCH) participants who were also concomitantly enrolled in another program- the '*Community Pharmacy in Health Care Homes Trial* '[64] - were also removed from the analysis.

Participant characteristics data was extracted from the JCU SQL Server database using the Navicat 15 for SQL Server (PremiumSoft) database management tool; MAI and AoU data was extracted from the pharmacist logbook as Microsoft Excel files; and health services data was sourced from HSA survey. All data was subsequently analysed using a number of statistical tools including the SPSS Statistics Premium version 24 (IBM) statistical package, Stata/MP 13.0 (StataCorp LP), and Microsoft Office 2016 (Microsoft). Nominal variables are presented as absolute and relative frequencies whilst continuous variables are presented as mean and standard deviation (SD) or median and interquartile range (IQR) as indicated accordingly. The percentages of participants with improvements in outcomes were compared to determine the absolute and relative change pre and post intervention.

All participant-related analyses were adjusted for the clustering effects of the ACCHSs. P-values for comparisons of paired data (continuous variables) were derived from the cluster-adjusted confidence interval (ACCHS cluster) as this is equivalent to a paired t-test. P-values for comparisons of unpaired data (continuous variables) were determined using logistic regression analyses that were cluster-adjusted for ACCHSs. P-values for comparisons of paired data (nominal variables) were determined using conditional logistic regression analyses that were cluster-adjusted for ACCHSs. Statistical significance was assumed at the conventional 5% level.

Ethics approval

Ethics approval for the project was received from four ethics committees in the three jurisdictions including St Vincent's Hospital Melbourne (SVHM) Human Research Ethics Committee (HREC), Victoria (HREC/17/SVHM/280), James Cook University HREC (mutual

recognition of SVHM HREC, approval HREC/H7348), Menzies School of Health Research (HREC/2018-3072) and the Central Australian HREC (HREC/CA-18-3085).

RESULTS

The total IPAC project cohort comprised 1,456 participants who remained in the study until the end. From this, 390 participants had a baseline MAI and AoU with a loss to follow-up of 37, meaning the final subset comprised 353 (24.2%) participants with both a baseline and follow-up AoU from 18 ACCHSs (Figure 1). AoU assessments were completed by pharmacists at each of these ACCHSs. The median length of stay in the study for participants with an AoU was 330 (IQR: 288-365) days.

Almost all participants were Aboriginal and/or Torres Strait Islander (93.2%) with a mean age of 57 years and were prescribed a mean of 7.2 medications each. Most of the cohort had T2DM (62.3%) and multimorbidity and were concession card holders. Eight participants had a history of rheumatic heart disease (RHD) or acute rheumatic fever (ARF) (Table 3).

Most baseline assessments were completed within 100 days of participant enrolment and participants were followed-up for a median of 266 days post-baseline (Table 4). A total of 256 individual PPO's were identified at baseline for underuse categories A to K, with a mean number of 0.73 PPO's (SD ±1.3) per participant, or a mean number of 1.41 PPOs (SD ±1.3) for each participant with an identified omission (Table 4). By the end of the study, the total number of individual PPOs had reduced by 59.8% to 103 PPOs, and to a mean of 0.29 PPOs per participant ($p<0.001$). Of participants, 51.3% (181/353) had at least one PPO at baseline. By the end of the study, the number of participants with at least one PPO in any of the underuse categories had significantly reduced by 58.0% to 76 participants ($p<0.001$).

The most common type of PPO identified for AoU categories A-J at baseline and follow-up was for people for whom 23vPPV was indicated (category I, Table 5) affecting 16.7% of all participants and 23.0% of all PPOs at baseline. This was significantly reduced to only 4.2% of participants at follow-up- a relative reduction in this PPO of 74.6% ($p<0.001$). The majority of participants who lacked evidence of necessary vaccination with 23vPPV at follow-up were aged 50 years or older.

The next most common type of PPO was for absent BP and/or lipid- lowering medications for participants who had a high risk for CVD. At baseline, this comprised 22.6% (58/256) of all PPOs from combined category A and B omissions (in those at high primary risk of a CV event). Of the PPO types, 27.1% (13/48) were for absent BP lowering therapy; 52.1% (25/48) were for absent lipid- lowering therapy, and 20.8% (10/48) were for the absence of both BP and lipid-lowering therapy.

The number of participants with a high calculated CVD risk (category A) who had at least one PPO for BP and/or lipid lowering therapy did not change at follow-up. However, significantly fewer participants who were clinically at high risk for a primary cardiovascular event had a PPO for necessary BP and/or lipid-lowering therapy at follow-up (category B, p=0.002). This was a 61.3% relative reduction with 19 fewer participants having a PPO of this type. Anti-platelet therapy was missing in 9 participants with established CVD (category C) at baseline, and 7 fewer participants had a PPO of this type at follow-up, but the difference was not significant after cluster adjustment (p=0.052, Table 5).

Pharmacists identified 30 participants (with T2DM and micro or macroalbuminuria) at baseline who potentially could benefit from an ACEI or an ARB to protect against CKD progression and cardiovascular events but were not receiving this therapy (category D). This reduced significantly to 13 participants at follow-up - a 56.7% relative reduction in the proportion of participants with a PPO of this type (p=0.005).

The number of participants with CKD and macroalbuminuria (without diabetes) with a PPO for ACEI or ARB (category E) was small at baseline and did not change at follow-up (p=0.33). Similarly, only 3 participants were identified to have a PPO with regard to ACEI or ARB in the presence of heart failure (category F) but the reduction at follow-up was also not significant (p=0.57).

There were 17 participants with T2DM who could potentially have benefited from metformin (category G) but were not receiving this therapy at baseline. At follow-up, 12 fewer participants had this PPO -a significant relative reduction of 70.6% and absolute change of -3.4% (p=0.012). The number of participants with T2DM who could have

benefitted from a second hypoglycaemic medication (category H) to better optimise glycaemic control was small and this number did not change at follow-up. No patient was reported to have a PPO with regard to antibiotic chemoprophylaxis for RHD/ARF (category J).

Pharmacists identified 65 (18.4%) participants with 'other' PPOs at baseline (category K) for clinical indications other than for the explicit high-risk underuse categories A-J (Table 6) and this number reduced significantly at follow-up ($p<0.001$). These PPOs included symptomatic treatment such as pain relief, glyceryl trinitrate for angina, bronchodilators for asthma, laxatives, and antiemetics. Other pharmacotherapy for chronic diseases included antipsychotics, insulin, and medication for osteoporosis, hypertension and dyslipidaemia to improve the control of individual risk factors.

DISCUSSION

This project was set in primary health care services that were ACCHSs and is the first to explore the impact of integrated pharmacists on medication underuse for a range of pharmacotherapies in Aboriginal and Torres Strait Islander patients with chronic disease. Medication underuse was defined as a PPO from ten pre-defined explicit clinical categories for high-value pharmacotherapies and one implicit 'other' category. IPAC pharmacists identified a range of clinically relevant and significant PPOs in just over 50% of Aboriginal and Torres Strait Islander study participants at baseline who had a comprehensive review of prescribing quality. At baseline, PPOs for BP and/or lipid- lowering medications were identified in 48 participants who were deemed by pharmacists to be at high primary CVD risk (category A/B), representing 13.6% (n=353) of all participants assessed for medicines underutilisation. There were 30 participants with T2DM (with or without existing CVD) who had a PPO of an ACEI or ARB that was clinically indicated to protect against cardiovascular events and CKD progression (category D). ACEI or ARB potential prescribing omissions in those with macroalbuminuric non-diabetic CKD (with or without CVD) was also found in 6 participants at baseline (category E). A PPO for 23vPPV was evident for 59 (16.7%) participants (category I).

After receiving integrated pharmacist services, the proportion of participants with at least one PPO reduced significantly – an absolute reduction of 29.7% after a median of 266 days between assessments for medication underuse ($p<0.001$). Only 3.4 participants needed to be assessed for medication underutilisation for one of them to potentially benefit from a correction of the omission.

At follow-up, PPOs were significantly reduced for participants at clinically high risk for CVD, those with T2DM and albuminuria (with or without CVD), those with T2DM who need metformin, and participants for whom a 23vPPV was indicated. The magnitude of benefit was such that only 21 participants needed to receive the integrated pharmacist intervention so that one less person with T2DM and albuminuria was potentially underprescribed for an ACEI or ARB. These benefits for Aboriginal and Torres Strait Islander participants were observed even within already high performing ACCHS settings based on their participation in other quality improvement activity.[65]

IPAC underuse criteria explored an absolute-risk approach to the management of BP and cholesterol levels because this has been shown to be more cost-effective than managing single-risk factors[66] and can better avoid under and overtreatment of patients as the risk of future CVD events is more accurately predicted.[67] We found that compared with usual care, for every 19 participants at clinically high risk for CVD who received integrated pharmacist services, there was one less participant with a PPO for BP-lowering, lipid- lowering, or combined BP and lipid-lowering therapy. Reducing omissions of high-value pharmacotherapies like this may generate substantial clinical benefits at a population level according to average treatment effects reported in other studies. For example, in adults clinically assessed to be at high primary CVD risk, lipid-lowering therapy with statins reduced CVD events (pooled composite outcomes such as CV deaths, fatal and nonfatal myocardial infarction, stroke, heart failure) over 1-6 years of follow-up. The relative risk reduction in CVD events from treatment compared with placebo or no-statin was 30% and the number needed to treat (NNT) was 72.[68]

A study involving patients with T2DM (with or without a previous CVD event) who were treated with ACEI for 4.5 years (compared with placebo), demonstrated 37% fewer deaths

from CVD, and a 17% reduction in overt nephropathy. The magnitude of benefit was such that 29 people needed to be treated in this way to prevent one CVD death.[69] For Aboriginal peoples with T2DM and albuminuria, the benefits from ACEI therapy could be even greater. A study including Aboriginal peoples with diabetes and micro or macroalbuminuria who were treated with ACEI plus other agents to reach blood pressure targets (including attempts to control glucose and lipid levels) required only 11.6 people to be treated over a mean 3.39 years to avoid one death.[70] If this finding is applied to IPAC participants, 1.5 deaths could be averted if the intervention was sustained over this time given that ACEI or ARB underprescribing was ameliorated for a net 17 people with T2DM (and albuminuria) following the intervention.

Similarly, UK Prospective Diabetes Study investigators found that metformin therapy reduced death from all causes by 36% (NNT 12-14) compared to conventional treatment for obese patients with T2DM (mean BMI of 31) over a median period of 10.7 years.[71] Based on this potential for benefit if the effect of the IPAC intervention was sustained, and given the mean BMI of IPAC participants with T2DM was 31.8, one death may be averted as the PPO for metformin therapy was eliminated for 12 participants over the study follow-up period (p=0.012). Clearly, the effects of the intervention on distal health outcomes such as mortality depends substantially on medication adherence by the patient as well as health system follow-up.

No PPOs for ARF/RHD chemoprophylaxis were reported by IPAC pharmacists which is most promising, although the number of enrolled participants with these conditions was small. This may be because ACCHS prescribers are now better supported to start and also stop prophylactic therapy through jurisdictional RHD register and control programs, guidelines, performance indicators, and other supports but patient adherence to secondary chemoprophylaxis remains low.[72]

Although half of participants had at least one PPO at baseline, the majority also had polypharmacy (usually defined as a person taking five of more medications) that is often considered an indicator of medication overuse.[73] Up to 76% of participants had two or more chronic diseases and, when they were implicitly assessed for medication appropriateness,

most did not have medicines overuse but had 'appropriate polypharmacy'.[74 75] This suggests that correcting underprescribing will offset attempts to reduce expenditure on medications. For this reason, progress towards *equitable* healthcare resource use should be a health system goal for the Aboriginal and Torres Strait Islander population, avoiding mainstream economic measures such as reductions in medicines expenditure applied to this population. Rather, quality measures to assess reductions in the unnecessary use of medications are needed, where inappropriate medications are replaced with those that are necessary, and prescribing omissions are corrected. For example, the broader impact of integrating pharmacists within ACCHSs as well as other strategies to reduce medication underuse could be monitored using key performance indicators (KPI). In the NT, the use of ACEI or ARB in patients with T2DM and albuminuria (>3.4 mg/mmol) is routinely monitored in primary health care settings for quality assurance,[76] but not elsewhere. Other underuse *studies* have employed single-item CPG recommendations, such as lipid-lowering therapy in those with high primary CVD risk, which may also be a useful indicator for services to use.[77 78]

If a large portion of the CVD disease burden in the Aboriginal and Torres Strait Islander population is to be avoided, then PPO's for those with a high absolute CV risk need to be reduced. This makes pharmacist medication reviews an important risk reduction strategy to identify PPOs in those who are most likely to benefit. The provision of medication management reviews (and prescribing quality reviews such as the MAI) was a core role for integrated pharmacists within ACCHSs. Medication reviews can improve prescribing quality,[79] reduce both underuse and overuse of medications,[80] support patients with medication adherence, chronic disease self-management, and their adoption of a healthy lifestyle.[81] However, pharmacists need to be skilled in identifying medication underuse and to target high- value interventions based on prescribing recommendations for the Aboriginal and Torres Strait Islander population.[82] A receptive clinical environment, trusting relationships with prescribers, and access to patients' medical records were key characteristics of the IPAC intervention that have also been identified in other integrated models of care involving pharmacists.[83] Other system-wide strategies to improve prescribing quality include electronic decision-support,[84] continuing professional development,[85] and access to prescribing guidelines.

Limitations

The use of other relevant explicit criteria-based tools to assess medication underuse[86 87] were not suitable for the IPAC project (Table 2). Instead, CPG recommendations to measure medication underutilisation were used as reported in other studies,[88 89] rather than using established tools. The IPAC explicit criteria for medicines underuse had face and content validity because they were derived from Australian patient-relevant CPGs and also shared criteria with both the START and the RAND/UCLA methods (Table 2). START criteria have been validated to identify underprescribing in a variety of clinical contexts[90] and are reliable,[91] but are unsuitable for use with younger cohorts. The RAND/UCLA method of assessing medication appropriateness had face and content validity for use with an older cohort but duplicated MAI assessment, and its reliability in the Australian context was untested.[92] The reliability of the IPAC AoU criteria when used by pharmacists was not assessed, which is a study limitation. However, the project did adopt measures to enhance reliability with appropriate and focussed training, regular workforce support, and the development of an electronic logbook that reminded pharmacists of the AoU criteria helping to guide assessment and reporting. Pharmacists were also blind to the results at baseline when performing follow-up assessments. The IPAC approach also supports the external validity of the study findings as the use of CPG recommendations when undertaking pharmacist medication management reviews is considered usual care.

Not all physiological systems were included in the IPAC AoU criteria although pharmacists could report 'other' PPOs. This may have underestimated the number of PPOs, especially with regard to musculoskeletal, gastrointestinal and respiratory conditions as these were not included in the AoU. Having fewer clinical criteria for the assessment of medication underuse may have enhanced reliability as pharmacist's attention was directed mainly to high-value PPOs. Nevertheless, many PPOs were identified by pharmacists using clinical judgement (implicit criteria for category K omissions). These PPOs were patient-specific and identified a much broader range of necessary but underused pharmacotherapies including other physiological systems not included in the explicit-criteria AoU. Implicit criteria- based approaches to identify PPOs are believed to be time-consuming and very much dependant on clinical expertise,[93] which is one reason why few methods exist to assess underuse (Table

2). The IPAC approach used both explicit and implicit ways of identifying PPOs for pragmatic reasons to be consistent with usual care.

Pharmacists were trained to account for contraindications to medications that may explain a PPO, but there may have been other patient and clinical factors influencing prescribing decisions than was possible for pharmacists to ascertain from medical records or from contact with the prescriber. Errors in medication lists could have influenced PPO ascertainment although this is a limitation inherent with all tools used to assess prescribing quality. Patient unwillingness to take medications or health professional assumptions about patient unwillingness,[94] or clinical discretion favouring other therapeutic priorities may explain some PPOs. For some 'other' PPO entries, pharmacists included the treatment of uncontrolled hypertension and dyslipidaemia, which suggests that some pharmacist prescribing recommendations for BP or lipid-lowering therapy was based on an elevated individual risk factor rather than on the patient's absolute risk of a CVD event. If an individual risk factor approach to PPO ascertainment influenced results, it is unclear if this would underestimate or overestimate the overall number of PPOs identified. Finally, a reluctance for some prescribers to take-up pharmacist prescribing recommendations may have explained some persistent PPOs,[95] a finding also identified in the qualitative evaluation of the IPAC project.[96] This would have the effect of underestimating the magnitude of the PPO reductions observed.

It is unlikely that the observed PPO reductions are an artefact of making participants medication records more accurate. Pharmacists made efforts to check the validity of participants prescribing information contained within CISs before submitting data to the logbook. The use of logbook data for analysis rather than using medications data extracted directly from health service CISs makes this artefact less likely, as it acted as a quality check. Moreover, the significant improvement in prescribing quality identified through MAI assessments for the same participants as reported elsewhere[97] could not have occured merely by updating CIS medication records. Pharmacists also documented their recommendations for medication changes in the logbook. Medication records in the CIS are also unaffiliated with vaccination records, yet the number of participants with a PPO for

23vPPV significantly declined following the intervention. These factors provide further support that the observed prescribing quality changes were real.

Although this study lacked a control group, it is unlikely that the significant PPO reductions observed in intervention sites would have been observed over the same follow-up period without the intervention. Firstly, the magnitude of the observed reduction in the number of PPOs and participants with at least one PPO was significantly different to baseline (usual care). Factors that may have improved usual care, independent of the intervention, could have been external prescriber influences such as education from other sources, or artefacts (such as improved medical record keeping), or increased consumer demand for quality prescribing. It is unlikely that such independent influences could have occurred across multiple ACCHS settings over the same time period. Secondly, whilst other health service factors (such as the number of clinical staff per service, access to specialists and allied health, community pharmacy support, and the number of Health Care Home participants) may also explain improvements in PPO ascertainment over time, these factors did not significantly change during the project period.[98] Finally, the observed PPO reductions occurred within a short window of time which is difficult to explain if factors other than the intervention influenced this change.

Another potential confounder to the relationship between the intervention and prescribing quality was the HCH program. However, all participants concurrently enrolled in the *Community Pharmacy in Health Care Homes* (HCH) Trial program (undertaken in the NT around the same time as the IPAC project[99]) were removed from the IPAC analysis (Figure 1). Of the few IPAC participants concurrently enrolled in the broader HCH program, they were not in receipt of additional community pharmacy support beyond usual care and comprised only 10.8% of subjects (n=38). Moreover, the IPAC pharmacist was integrated within those services operating concurrently as a HCH trial site, which implies that the HCH program could not have acted as a confounder independently of the pharmacist.

Up to 53% of participants had missing ACR results at baseline. According to CPGs, every Aboriginal and/or Torres Strait Islander patient older than 30 years of age should have an eGFR and ACR at least once every 2 years, and patients with T2DM should have at least

annual screening.[100] Patients in Stage 3A of CKD should have 6-12 monthly ACR and eGFR depending on the presence of microalbuminuria to monitor response to therapy and disease progression.[101] The absence of ACR results in the medical records may have led pharmacists to underestimate PPOs in those with T2DM and CKD (category D) as they would be unaware if the patient had albuminuria. For participating IPAC services, the prevalence of missing ACR results approximates the national average for KPI data in 2017 as 50% of Aboriginal and Torres Strait Islander clients (aged 15 years and over) with T2DM had missing ACR results in the preceding 12 months.[102] Of the IPAC participants with test results in the 12 months prior to study enrolment, an abnormal ACR was common (61%), which is also consistent with national nKPI data for patients with T2DM (also 61% in 2017).[103] As it is difficult to identify a PPO with ACEI or ARB if the patient with T2DM is missing an ACR result, this underlines why comprehensive screening is vital for optimal prescribing practice. It also suggests that integrated pharmacists may be able to play a role in better supporting patients to be screened.

In a separate analysis, the characteristics of the participants assessed for medication appropriateness (which includes those with an AoU) were shown to be similar to the broader IPAC cohort even though they represented about 24% of the whole cohort.[104] It is therefore likely that the whole IPAC cohort had similar rates of medication underuse. Generalisability of the outcomes observed from the integrated pharmacist intervention to the broader ACCHS adult patient population with chronic disease who are at risk of developing medication related problems, is supported. All study participants were accessing ACCHSs, a large number of these services participated, and the study design was pragmatic. It is also possible that the prevalence of PPOs, especially for those who are not accessing primary health care or lack access to culturally appropriate care, may be much higher than estimated in this study. Measures to increase Aboriginal and Torres Strait Islander peoples' access to comprehensive and culturally appropriate primary health care, , is an important priority in efforts to support prescribing quality improvement.

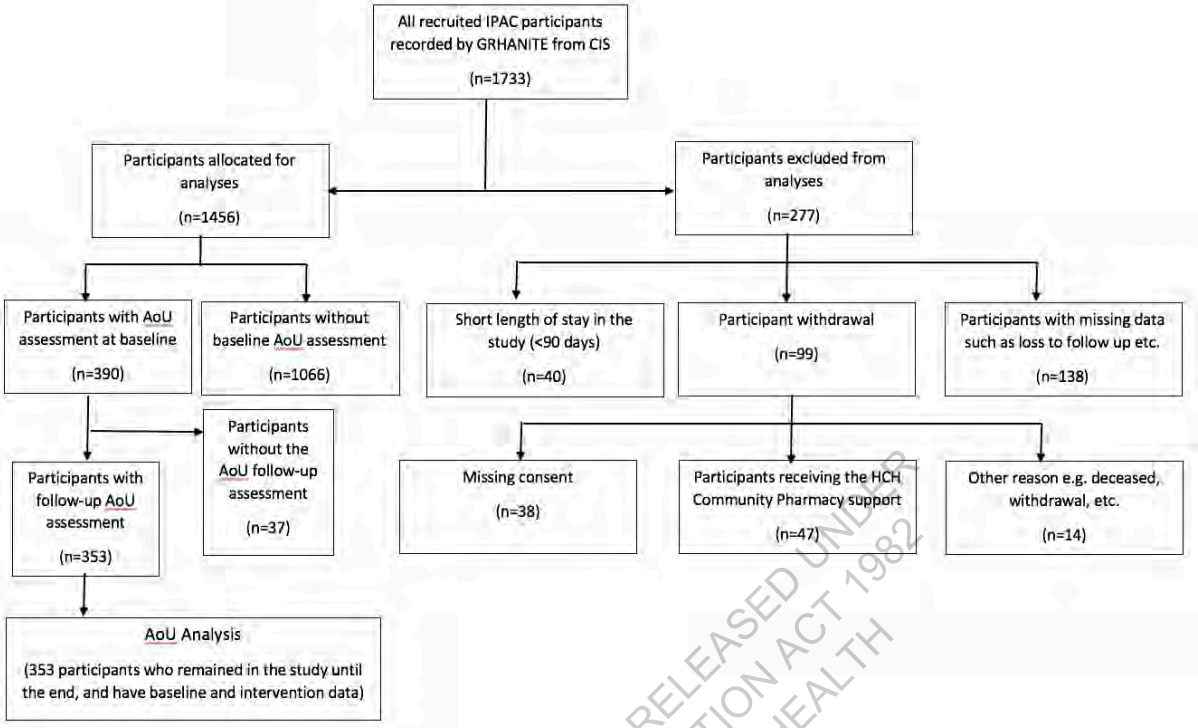
CONCLUSION

Over half of the Aboriginal and Strait Islander patients assessed by pharmacists in this study lacked one or more prescriptions for medicines recommended by CPGs and considered

essential to optimally manage their chronic disease. Following the integration of pharmacists within the primary health care team of ACCHSs, there was a significant (58%) reduction in the number of participants with prescription-based medication underutilisation. Potential prescribing omissions that were averted included: pneumococcal vaccination, BP and/or lipid lowering medication in those clinically at high risk for CVD, ACEI or ARB for participants with T2DM and albuminuria, and metformin for those with T2DM. The magnitude of undertreated patients in each chronic disease group would at a population level, contribute significantly to morbidity that could otherwise be averted through the prescribing quality improvements observed from integrated pharmacist intervention within ACCHSs.

Progress towards *equitable* healthcare resource use should be a health system goal for the Aboriginal and Torres Strait Islander population, meaning that medicines expenditure needs to increase if underuse is to be corrected. In a context where the Aboriginal and Torres Strait Islander population experiences significant medicines underutilisation, the support provided by pharmacists to the health care team when integrated within the ACCHS setting significantly reduced the number of participants with a PPO over a median period of nearly 9 months, compared with their usual care situation at baseline. Reducing PPO's with the support of a pharmacist within primary health care services is one part of a system-wide approach to reducing underuse of high-value health services and inequitable health outcomes[105] for Aboriginal and Torres Strait Islander patients with chronic disease.

Figure 1. Flow diagram for assessment of medication underutilisation (AoU) in the IPAC study



AoU= Assessment of Underutilisation (IPAC method)
CIS= Clinical information systems
GRHANITE= Data extraction tool
HCH= Health Care Homes
HCH Community Pharmacy support= Community Pharmacy in Health Care Homes Trial Program
Baseline = the first AoU after participant enrolment.
Intervention phase= comprised the period from participant enrolment to the end of the study.
End of the study= 31st October 2019.

Table 1. Categories for the assessment of underutilisation of medicines that was used to define a potential prescribing omission (PPO).

Category	Patient	Core Recommendation	Prescribing omission (tick)
A	Patient with high calculated risk (>15%) of CVD	If high risk (calculated>15%) the patient should be prescribed both BP and lipid lowering therapy[106]	• Absence of bp-lowering therapy • Absence of lipid-lowering therapy • Absence of both bp-lowering & lipid- lowering therapy • Other
B	A patient in a clinically high-risk (>15%) category for CVD	If high risk (clinically determined) the patient should be prescribed both BP and lipid lowering therapy [107]	• Absence of bp-lowering therapy • Absence of lipid-lowering therapy • Absence of both bp-lowering & lipid--lowering therapy • Other
C	A patient with an established diagnosis of cardiovascular disease	The patient should be commenced on low-dose aspirin treatment (75- 150mg) unless contraindicated. Consider alternative antiplatelet agents such as clopidogrel (75 mg) if aspirin hypersensitivity is present.[108] [109]	• Low-dose aspirin (75-150mg) • Clopidogrel (75mg) • Other
D	A patient with Type 2 diabetes and micro- or macro - albuminuria	In people with type 2 diabetes and micro- or macro- albuminuria, an ACEI or ARB should be used to protect against progression of kidney disease[110]	• ACEI • ARB • Other
E	A patient without diabetes who has CKD and macro-albuminuria	In adults without diabetes who have CKD and macroalbuminuria, advise treatment with an ACEI or ARB regardless of eGFR or BP level.[111] [112] [113]	• ACEI • ARB • Other
F	A patient with heart failure with a reduced left ventricular ejection fraction (HFrEF)	An ACE inhibitor or ARB is recommended in all patients with HFrEF unless contraindicated or not tolerated.[114]	• ACEI • ARB • Other
G	A patient with T2DM who needs metformin	Metformin is the first- choice antihyperglycaemic drug in T2DM[115] [116]	• Metformin
H	A patient with T2DM who needs a second antihyper-glycaemic drug	If glycaemic targets are not met with lifestyle measures and the maximum tolerated dose of metformin, the next step is to add a second antihyperglycaemic drug[117]	• Sulfonylurea • DPP-4 inhibitor • GLP-1 agonist • Other
I	People for whom 23vPPV vaccine is indicated	Recommend 23vPPV in those aged 15-49 years and all patients >50 years[118] [119]	• >=15-49 years (without chronic disease- as per NT Schedule) • >=15-49 years with chronic cardiac, lung, liver, or other chronic disease • >=15-49 years without chronic disease but is alcohol dependent • >=15-49 years without chronic disease but is a smoker • >=50 years
J	People with Acute Rheumatic Fever (ARF) or Rheumatic Heart Disease (RHD) who still require antibiotic prophylaxis **long term= at least 10 years*	Recommend long-term prophylactic antibiotics (either benzathine penicillin every 21-28 days or the less preferred option of daily oral penicillin V) for the prevention of recurrent rheumatic fever attacks[120] [121]	• Benzathine penicillin • Oral penicillin • Other
K	Other prescribing omission		• No • Yes

Table 2: Comparison of the IPAC method for medication underuse assessment to other explicit criteria-based methods

Method	Description	Target group	Comparison with IPAC method	Criteria that match IPAC method
IPAC method	Explicit evidence-based recommendations for CVD, T2DM, CKD, ARF/RHD and pneumococcal vaccination; and implicit other omissions.	Aboriginal peoples and Torres Strait Islanders >=18 years with chronic disease	N/A	N/A
Beers criteria[122] [123] [124]	Considered the gold standard for assessing potentially inappropriate prescribing. List of 88 medicines (USA) that pose a potentially higher risk for harm or unnecessary increase in drug-related costs.	>=65 years	IPAC participants were much younger than the population for which Beers criteria were designed; medicines do not reflect the age nor disease burden of the Aboriginal and Torres Strait Islander population; many criteria are irrelevant given Australia's PBS system offers a more controlled scope of prescribing than in the USA. Not developed to specifically assess underuse and may miss the underuse of medications.	Nil.
Assessment of underutilisation (AOU) index[125]	Developed in the USA. Identifies medications that have been omitted despite being indicated and potentially beneficial. The tool matches the patient's problem list with a list of drugs for each condition. The absence of a drug for a listed condition is considered an omission unless there are documented contraindications or patient preference	Age not specified.	Relies on a USA-based pharmacopeia that is inappropriate in the Aboriginal and Torres Strait Islander context.	N/A
START (Screening Tool to Alert doctors to the Right Treatment) criteria[126]	Contain 22 indicators of common prescribing omissions developed in the UK and Ireland.	>=65 years	Similar to Beers, recommendations are focused on pharmacotherapy for the elderly, and are not specific to the burden of disease affecting Aboriginal peoples and Torres Strait Islanders.	• metformin use with T2DM; • ACEI or ARB in T2DM with micro or macroalbuminuria; • aspirin or clopidogrel in patients with established CVD
RAND/UCLA method[127]	Adapted to the Australian setting and comprise 41 criteria for medication appropriateness. Includes criteria for medication underuse.	>=65 years	Underuse criteria refer to patients with T2DM (who have both hypertension and albuminuria) and if they are taking an ACEI or ARB. The IPAC method did not require patients with T2DM to be hypertensive, and clinical practice guidelines (CPG) for Aboriginal and Torres Strait Islander patients with T2DM recommend ACEI or ARB therapy if microalbuminuria is also present. The 2008 RAND/UCLA criteria included statin therapy for those at high primary CVD risk but updated this in 2012 for patients only at high-risk of a 'recurrent CVD event' (secondary prevention). Current CPGs include lipid-lowering for those at high primary CVD risk. The RAND/UCLA method excludes medication underuse criteria for CKD, ARF/RHD, or BP lowering in those at high primary CVD risk. The other RAND/UCLA criteria duplicate the MAI method for medication appropriateness and overuse.	• a patient with coronary heart disease is taking an antiplatelet agent, and an ACEI or ARB; • a patient with heart failure and left ventricular systolic dysfunction is taking an ACEI or ARB; and • a patient has received influenza and pneumococcal vaccination.

ACEI= Angiotensin-converting enzyme inhibitor; ARB= Angiotensin 2 receptor blocker; ARF= acute rheumatic fever; CKD= chronic kidney disease; CPG= clinical practice guideline; CVD= cardiovascular disease; RHD= rheumatic heart disease; T2DM= Type 2 diabetes mellitus. N/A= not available.

Table 3. Characteristics of participants with the assessment of medication underutilisation (AoU) at baseline.

Patient characteristics	AoU patients (n=353)
Location classification by ASGS-RA (2016)	
Major city (RA1)	17 /353 (4.8%)
Inner regional (RA2)	91 /353 (25.8%)
Outer regional (RA3)	133 /353 (37.7%)
Remote (RA4)	53 /353 (15.0%)
Very remote (RA5)	59 /353 (16.7%)
Mean age at baseline (SD) [years]	*n=352*
	57.2 (15.4)
Sex (n,%)	
Male	150 /352 (42.6%)
Female	202 /352 (57.4%)
Ethnicity (n,%)	
Aboriginal and/or Torres Strait Islander	328 /352 (93.2%)
Non-Indigenous	24 /352 (6.8%)
Mean body mass index (BMI; kg/m^2) (SD)	*n=309*
	31.8 (11.6)
BMI<25 kg/m2 (n,%)	60/309 (19.4%)
Pensioner/concessional (n, %)	290 /352 (82.4%)
CTG scripts eligible (n,%)	264 /352 (75.0%)
Engaged in Health Care Home (HCH) program (n, %) [a]	38 /353 (10.8%)
Number of medications per participant# [b]	*n=279*
Mean (SD)	7.21 (8.0)
Median (IQR)	7 (5-9)
Prior medication review (MBS item 900) (n,%) [c]	39 /353 (11.1%)
Doctors' encounters prior to enrolment (per 12 months) (SD or IQR) [d]	*n=331*
Mean (SD)	8.60 (8.4)
Median (IQR)	7 (4-11)
Mean number of medication 'adherent days' (SD)[e]	*n=279*
	6.01 (4.0)
Self-assessed health status (SF1) (n,%) # [f]	
Excellent	11 /243 (4.5%)
Very good	33 /243 (13.6%)
Good	104 /243 (42.5%)
Fair	63 /243 (25.9%)
Poor	29 /243 (11.9%)
Very poor	3 /243 (1.2%)

Recorded clinical diagnoses (n,%): [#]	
Diabetes mellitus	
Type 1	1 /353 (0.3%)
Type 2	220 /353 (62.3%)
Hypertension	218 /353 (61.8%)
Dyslipidaemia	189 /353 (53.5%)
Established or existing CVD^	116/353 (32.9%)
Coronary heart disease	99/353 (28.1%)
Peripheral vascular disease	11/353 (3.1%)
Cerebrovascular disease (stroke)	13/353 (3.7%)
Chronic kidney disease	124/353 (35.1%)
Rheumatic heart disease (RHD) or acute rheumatic fever (ARF)	8/353 (2.3%)
Chronic obstructive pulmonary disease (COPD)	32/353 (9.1%)
Depressive disorder	21/353 (6.0%)
Mean BP >= 140/90* [mmHg] (n,%)	21/263 (8.0%)
Dyslipidaemia [g] (n,%)*	228/257 (88.7%)
Comorbidity (1 or more chronic diseases) [#]	309/353 (87.5%)
Multi-morbidity (2 or more chronic diseases) [#]	269/353 (76.2%)
Number of chronic diseases:	*n=353*
Mean (SD)	2.24 (2.3)
Median (IQR)**	2 (2-3)
Biomedical parameters (n,%): [# #]	
Type 2 with HbA1c >8% or >65mmol/mol	76/165 (46.6%)
Type 2 with HbA1c >7% or >54 mmol/mol	106/165 (64.2%)
Albuminuria [h]	102/167 (61.1%)
eGFR (and CKD stage)[i] (n,%):	
eGFR ≥90 (Stage 1)	43 /274 (15.7%)
eGFR ≥60<90 (Stage 2)	92 /274 (33.6%)
eGFR ≥45<60 (Stage 3a)	30 /274 (11.0%)
eGFR ≥30<45 (Stage 3b)	14 /274 (5.1%)
eGFR ≥15<30 (Stage 4)	15 /274 (5.5%)
eGFR <15 (Stage 5)	80 /274 (29.2%)

BMI= body mass index; BP= blood pressure; CKD= chronic kidney disease. CTG= Close the Gap prescriptions (for Aboriginal peoples and Torres Strait Islanders) to waive or reduce the Pharmaceutical Benefits Scheme (PBS) patient contribution (co-payment). CVD= cardiovascular disease. MBS= Medicare Benefits Schedule.
SD = standard deviation (cluster adjusted);
IQR = inter-quartile range
*Refers to the mean of variables measured in the 12 months prior to patient enrolment into the study.
[#] Sourced from the pharmacist's logbook.
[# #] Biomedical results were sourced from GRHANITE
^ CVD= cardiovascular disease: It refers to any of the following: coronary heart disease, cerebrovascular disease, and peripheral vascular disease.

[a] The Health Care Homes program was funded by the Australian Government to better coordinate the health care of patients with chronic disease and was only relevant to NT situated IPAC services. The HCH program was distinct from the *Community Pharmacy in Health Care Homes (HCH) Trial* program. All participants in this latter program were removed from the analysis.
[b] Prior MBS claim was measured for the 12-month period prior to participant enrolment.
[c] Denominator sourced from logbook data entered by pharmacists when reporting medication adherence, to source comparative data on non-MAI participants.
[d] Medicare GP consultation claim items: vocational registration: 3, 23, 36, 44. Non-vocational registration: 52, 53, 54, 57.
[e] A self-reported single-item question ('How many days in the last week have you taken this medication?') exploring the extent of non-adherence, assessed as a mean score for all medications. An 'adherent day' was defined as not missing any doses of prescribed medicines on that day. Pharmacists recorded the number of adherent days for each medication the patient was taking.
[f] Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'
[g] Dyslipidaemia = Dyslipidaemia is defined by one or more of the following: Low Density Lipoprotein (LDL) >=3.5mmol/L; Total cholesterol (TC) >= 5.5mmol/L; Triglycerides (TG) > =2.0mmol/L; High density lipoprotein (HDL) < 1.0 mmol/L for men and <1.3 mmol/L for women. Data was sourced from GRHANITE information.
[h] Albumin:creatinine ratio >2.5 mg/mmol for males and >3.5mg/mmol for females. Data was sourced from GRHANITE information.
[i] Estimated glomerular filtration rate (eGFR). eGFR reference range: Normal or Stage 1: CKD >89, Stage 2: 60-89 Stage 3A: 45-59, Stage 3B: 30-44, Stage 4: 15-29, Stage 5:<15. (Units in ml/min/1.73m2). Data was sourced from GRHANITE information.

Table 4. Potential prescribing omissions (PPOs) for participants who had medication underuse assessed at both baseline (first assessment after enrolment) and at follow-up (end of the study) assessment (N=353).

Outcome measures for medication underuse	Baseline	Follow-up	p-value
Time from participant enrolment to baseline AOU			
Mean time (days), (SD)	24.4 (112.5)	-	-
Range (days)	0-189	-	-
Median time (days), (IQR)	2 (0-35)	-	-
Number of participants with AOU assessed >100 days since enrolment, N (%)	26 (7.4%)	-	-
Time from baseline AOU to end of study AOU			
Mean time (days), (SD)	-	266.7 (286.9)	-
Range (days)	-	61-446	-
Median time (days), (IQR)	-	266 (217-315)	-
Number of participants with AOU assessed >100 days since baseline assessment, N (%)	-	352 (99.7%)	-
Number of participants *with at least one PPO* (positively assessed)*	181/353 (51.3%)	76/353 (21.5%)	**<0.001~**
Number of participants with this number of PPOs:			
None	172/353 (48.7%)	277/353 (78.5%)	**<0.001~**
One	130/353 (36.8%)	59/353 (16.7%)	
Two	42/353 (11.9%)	13/353 (3.7%)	
Three	7/353 (2.0%)	4/353 (1.1%)	
Four	2/353 (0.6%)	0/353 (0%)	
Total number of PPOs	256	103	
Mean number of PPOs per participant (SD)	0.73 (1.3)	0.29 (0.9)	**<0.001^**
Mean number of PPOs per positively assessed participant* (SD)	1.41 (1.3)	1.36 (1.5)	0.789[#]

SD= standard deviation (cluster-adjusted). Bold p-value implies statistically significant change at the 0.05 level.
~ Cluster adjusted p-value (ACCHS cluster) determined using the . svy linearized : clogit Stata command (paired data).
^P-values (paired data) were derived from the cluster-adjusted confidence interval (ACCHS cluster) as this is equivalent to a paired t-test.
[#] Cluster adjusted p-value (ACCHS cluster) determined using the . svy linearized : logit Stata command (unpaired data).
*A participant with at least one PPO has been expressed as a positively assessed participant.
PPO= potential prescribing omission
AOU= assessment of underutilisation
IQR= interquartile range.

Table 5: Description of potential prescribing omissions (PPOs) as identified in categories A to K at baseline (first assessment after enrolment) and at follow-up assessment (end of the study) for participants who had an assessment of underutilization (AOU) of medications and who remained in study till the end (n=353).

Underuse category	Clinical criteria	Type of PPO	Number of PPO types at baseline (%)	Number of PPO types at follow-up (%)	Number of individual PPO's at baseline (%)	Number of individual PPO's at follow-up (%)	Number of patients with PPO at baseline (%)	Number of patients with PPO at follow-up (%)	P-value
A	**Patient with high calculated risk (>15%) of CVD**								
		Absence of bp-lowering therapy	3 /246 (1.2%)	4 /97 (4.1%)	3 /256 (1.2%)	4 /103 (3.9%)			
		Absence of lipid-lowering therapy	14 /246 (5.7%)	10 /97 (10.3%)	14 /256 (5.5%)	10 /103 (9.7%)			
		Absence of both bp-lowering & lipid- lowering therapy	0 /246 (0%)	2 /97 (2.1%)	0 /256 (0%)	4 /103 (3.9%)			
		Subtotal	**17 /246 (6.9%)**	**16 /97 (16.5%)**	**17 /256 (6.6%)**	**18 /103 (17.5%)**	**17/353 (4.8%)**	**16/353 (4.5%)**	0.850
B	**A patient in a clinically high- risk (>15%) category for CVD**								
		Absence of bp-lowering therapy	10 /246 (4.1%)	3 /97 (3.1%)	10 /256 (3.9%)	3 /103 (2.9%)			
		Absence of lipid-lowering therapy	11 /246 (4.5%)	5 /97 (5.2%)	11 /256 (4.3%)	5 /103 (4.9%)			
		Absence of both bp-lowering & lipid- lowering therapy	10 /246 (4.1%)	4 /97 (4.1%)	20 /256 (7.8%)	8 /103 (7.8%)			
		Subtotal	**31 /246 (12.6%)**	**12 /97 (12.4%)**	**41 /256 (16.0%)**	**16 /103 (15.5%)**	**31/353 (8.8%)**	**12/353 (3.4%)**	**0.002**
C	**A patient with an established diagnosis of CVD**								
		Low-dose aspirin (75-150mg)	9 /246 (3.7%)	2 /97 (2.1%)	9 /256 (3.5%)	2 /103 (1.9%)			
		Clopidogrel (75mg)	0 /246 (0%)	0 /97 (0%)	0 /256 (0%)	0 /103 (0%)			

Underuse category	Clinical criteria	Type of PPO	Number of PPO types at baseline (%)	Number of PPO types at follow-up (%)	Number of individual PPO's at baseline (%)	Number of individual PPO's at follow-up (%)	Number of patients with PPO at baseline (%)	Number of patients with PPO at follow-up (%)	P-value
		Subtotal	**9 /246 (3.7%)**	**2 /97 (2.1%)**	**9 /256 (3.5%)**	**2 /103 (1.9%)**	**9 /353 (2.6%)**	**2 /353 (0.6%)**	0.052
D*	**A patient with Type 2 diabetes and micro- or macro - albuminuria**								
		ACEI	28 /246 (11.4%)	13 /97 (13.4%)	28 /256 (10.9%)	13 /103 (12.6%)			
		ARB	2 /246 (0.8%)	0 /97 (0%)	2 /256 (0.8%)	0 /103 (0%)			
		Subtotal	**30 /246 (12.2%)**	**13 /97 (13.4%)**	**30 /256 (11.7%)**	**13 /103 (12.6%)**	**30/353 (8.5%)**	**13/353 (3.7%)**	**0.005**
E*	**A patient without diabetes who has CKD and macro-albuminuria**								
		ACEI	4 /246 (1.6%)	3 /97 (3.1%)	4 /256 (1.6%)	3 /103 (2.9%)			
		ARB	2 /246 (0.81%)	0 /97 (0%)	2 /256 (0.8%)	0 /103 (0%)			
		Subtotal	**6 /246 (2.4%)**	**3 /97 (3.1%)**	**6 /256 (2.3%)**	**3 /103 (2.9%)**	**6 /353 (1.7%)**	**3 /353 (0.9%)**	0.330
F	**A patient with heart failure with a reduced left ventricular ejection fraction**								
		ACEI	3 /246 (1.2%)	2 /97 (2.1%)	3 /256 (1.2%)	2 /103 (1.9%)			
		ARB	0 /246 (0%)	0 /97 (0%)	0 /256 (0%)	0 /103 (0%)			
		Subtotal	**3 /246 (1.2%)**	**2 /97 (2.1%)**	**3 /256 (1.2%)**	**2 /103 (1.9%)**	**3 /353 (0.9%)**	**2 /353 (0.6%)**	0.570
G	**A patient with T2DM who needs metformin**								
		metformin	17 /246 (6.9%)	5 /97 (5.2%)	17 /256 (6.6%)	5 /103 (4.9%)			
		Subtotal	**17 /246 (6.9%)**	**5 /97 (5.2%)**	**17 /256 (6.6%)**	**5 /103 (4.9%)**	**17/353 (4.8%)**	**5 /353 (1.4%)**	**0.012**

Underuse category	Clinical criteria	Type of PPO	Number of PPO types at baseline (%)	Number of PPO types at follow-up (%)	Number of individual PPO's at baseline (%)	Number of individual PPO's at follow-up (%)	Number of patients with PPO at baseline (%)	Number of patients with PPO at follow-up (%)	P-value
H	**A patient with T2DM who needs a second antihyperglycaemic drug**								
		Sulfonylurea	1 /246 (0.4%)	1 /97 (1.0%)	1 /256 (0.4%)	1 /103 (1.0%)			
		DPP-4 inhibitor	4 /246 (1.6%)	4 /97 (4.1%)	4 /256 (1.6%)	4 /103 (3.9%)			
		GLP-1 agonist	0 /246 (0%)	0 /97 (0%)	0 /256 (0%)	0 /103 (0%)			
		Subtotal	**5 /246 (2.0%)**	**5 /97 (5.2%)**	**5 /256 (2.0%)**	**5 /103 (4.9%)**	**5 /353 (1.4%)**	**5 /353 (1.4%)**	>0.999
I	**People for whom 23vPPV vaccine is indicated**								
		>=15-49 years (without chronic disease- as per NT Schedule)	2 /246 (0.8%)	1 /97 (1.0%)	2 /256 (0.8%)	1 /103 (1.0%)			
		>=15-49 years with chronic cardiac, lung, liver, or other chronic disease	18 /246 (7.3%)	3 /97 (3.1%)	18 /256 (7.0%)	3 /103 (2.9%)			
		>=15-49 years without chronic disease but is alcohol dependent	0 /246 (0%)	0 /97 (0%)	0 /256 (0%)	0 /103 (0%)			
		>=15-49 years without chronic disease but is a smoker	5 /246 (2.03%)	0 /97 (0%)	5 /256 (2.0%)	0 /103 (0%)			
		>=50 years	34 /246 (13.8%)	11 /97 (11.3%)	34 /256 (13.3%)	11 /103 (10.7%)			
		Subtotal	**59 /246 (24.0%)**	**15 /97 (15.5%)**	**59 /256 (23.1%)**	**15 /103 (14.6%)**	**59 /353 (16.7%)**	**15 /353 (4.3%)**	**<0.001**
J	**People with Acute Rheumatic Fever (ARF) or Rheumatic Heart Disease (RHD) who still require antibiotic prophylaxis**								

Underuse category	Clinical criteria	Type of PPO	Number of PPO types at baseline (%)	Number of PPO types at follow-up (%)	Number of individual PPO's at baseline (%)	Number of individual PPO's at follow-up (%)	Number of patients with PPO at baseline (%)	Number of patients with PPO at follow-up (%)	P-value
		Benzathine penicillin	0 /246 (0%)	0 /97 (0%)	0 /256 (0%)	0 /103 (0%)			
		Oral penicillin	0 /246 (0%)	0 /97 (0%)	0 /256 (0%)	0 /103 (0%)			
		Subtotal	**0 /246 (0%)**	**0 /97 (0%)**	**0 /256 (0%)**	**0 /103 (0%)**	**0 /357(0%)**	**0 /353 (0%)**	-
K	**Other**								
		Other	69 /246 (28.1%)	24 /97 (24.7%)	69 /256 (27.0%)	24 /103 (23.3%)			
		Subtotal	**69 /246 (28.1%)**	24 /97 (24.7%)	**69 /256 (27.0%)**	24 /103 (23.3%)	**65/353 (18.4%)**	**24/353 (6.8%)**	**<0.001**
		TOTAL	**246 /246 (100%)**	**97 /97 (100%)**	**256 /256 (100%)**	**103 /103 (100%)**	**181/353** (51.3%)**	**76/353** (21.5%)**	**<0.001**

Bold p-value implies statistically significant change at the 0.05 level. P-value is cluster adjusted (ACCHS cluster) determined using the . svy linearized : clogit Stata command (paired data).

PPO= potential prescribing omission; ACEI= Angiotensin-converting enzyme inhibitor; ARB= Angiotensin 2 receptor blocker; ARF= acute rheumatic fever; CKD= chronic kidney disease; CVD= cardiovascular disease; RHD= rheumatic heart disease; T2DM= Type 2 diabetes mellitus.

*Category D and E pertain to participants with or without existing cardiovascular disease.

**The total number of patients exceeds the total number with at least one PPO, as each patient may have had a PPO in one or more categories.

Table 6: MAI subset- Type of 'other' potential prescribing omissions identified by IPAC pharmacists from Medication Appropriateness Index assessments (n=69, Cat K PPOs, from 353 patients assessed for a PPO)

'Other' PPOs	Condition
Anticoagulant or anti-platelet	stroke, atrial fibrillation
antiemetic	dyspepsia
antihypertensive	uncontrolled hypertension
antipsychotic	psychosis
antiviral	hepatitis B
beta blocker	Ischaemic heart disease
biphosphonate, calcium, denosumab, etc	osteoporosis
bronchodilator, anti-inflammatory	asthma; COPD
glycerol trinitrate	angina
insulin, other oral hypoglycaemic	T2DM
iron supplement	anaemia
laxatives	iatrogenic constipation
lipid lowering	dyslipidaemia
pain reliever	chronic pain
urate lowering, anti-inflammatory	gout
vaccine	zoster, influenza
vitamin D	vitamin D deficiency

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Assessment of Home Medicines Review (HMR) and non-HMR in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC Project)

REPORT TO THE PHARMACEUTICAL SOCIETY OF AUSTRALIA FOR THE IPAC PROJECT

Final Report, February 2020.

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Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project.

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ABSTRACT

Objective
To assess the effect of integrated pharmacist interventions on utilisation of Home Medicine Reviews (HMR, MBS item 900) and medication reviews not fully meeting HMR criteria (non-HMR) in Aboriginal and Torres Strait Islander adults with chronic disease attending Aboriginal Community Controlled Health Services (ACCHSs) enrolled in the IPAC study, compared with usual care.

Design and participants
Consented participants enrolled in a non-randomised, prospective, pre and post quasi-experimental community-based, participatory, and pragmatic study that integrated a registered pharmacist within ACCHS in Qld, NT and Vic. The intervention comprised non-dispensing medicines-related services, collaborative and coordinated care, including the provision of medication management reviews. Deidentified participant data was electronically extracted from health records including claims for Medicare Benefits Schedule (MBS) item 900 (HMR). Pharmacists electronically logged HMR, non-HMRs and descriptive data. Medication related problems (MRPs) were defined mostly by Medication Appropriateness Index criteria.

Outcome measures
Number and proportion of participants with at least one HMR over a 12-month pre-intervention period representing usual care compared to post-intervention at the end of the study; number and proportion of non-HMRs; reasons for reviews and follow-up reviews, and their characteristics including the prevalence of MRP and proportion of participants with MRPs by type of review.

Results
Participants (n=1,456) from 18 ACCHSs involving 26 integrated pharmacists had a 3.9 times (p<0.001) significant increase in HMR access (based on MBS claims) compared with usual care whilst the number of HMRs (MBS claims) increased 4.1 times (p<0,001). There were 609 (41.8%) HMR, and 719 (49.4%) non-HMR recipients after a mean of 284 days (SD ±11.5) following study enrolment. HMR recipients had a mean age was 58.7 years (SD ±21.9), a mean of 8 prescribed medications each, and 89% had comorbidity. The vast majority of HMR and non-HMR recipients were Aboriginal and/or Torres Strait Islander. Almost all HMRs were undertaken by IPAC pharmacists. A HMR or non-HMR was most commonly indicated for participants taking 5 or more regular medications (78% and 66%, p=0.037) and/or suspected non-adherence (38% and 43%, p=0.364 respectively) The median time for completing a non-HMR was 1 hour 15 mins (30 mins less than an HMR). Of non-HMRs, 91% (n=689) were conducted within the ACCHS; whilst most recipients were from remote (19.8%) or very remote ACCHSs (21.4%); and had the non-HMR commonly completed for opportunistic reasons being at risk of forgoing a HMR [48.1% (n=364)]. Limited access to an accredited pharmacist (30.6%), and patient preference (14.1%) were also reasons for a non-HMR. Pharmacists delivered 1,548 follow-up assessments to HMR or non-HMR- recipients (median time to assess was 30 mins). Of HMR recipients, 87.9% (n=535) compared with 70.0% (n=503) of non-HMR recipients had at least one MRP (p=0.035). Non-HMR eligibility criteria, participant need for a medication review, pharmacist recommendations, and identified types of MRPs in recipients were similar to a HMR.

Conclusion
Within ACCHS, integrated pharmacists significantly increased access to medication management reviews (HMR and non-HMR), and follow-up to these reviews for Aboriginal and Torres Strait Islander adults with chronic disease. Pharmacists needed to assess only 5 participants for one to receive an HMR. Pharmacists integrated within ACCHSs are well placed to deliver medication management reviews to patients who experience barriers in accessing HMRs under current program rules, especially for patients who would otherwise forgo a medication review. Generalisability of the outcomes observed from the integrated pharmacist intervention to the broader ACCHS adult patient population with chronic disease who are at risk of developing medication related problems, is supported.

INTRODUCTION

In Australia, a Home Medicines Review (HMR) is a review of the patient's medications that aims to achieve safe, effective, and appropriate use of medicines by assisting healthcare providers to detect and address medicine-related problems that interfere with desired patient outcomes.[1] A general practitioner (GP) and an accredited pharmacist can be funded for a HMR under a fee-for-service arrangement from the Medicare Benefits Schedule (MBS)[2] and the 6th Community Pharmacy Agreement (6CPA).[3] The effectiveness of medication reviews (in all their forms) in reducing medication errors and medication-related problems, enhancing patient safety with regard to the use of medicines, improving medication adherence, reducing the number of prescribed medications, improving clinical biomarkers, and reducing hospitalisation, have been reported.[4 5 6 7]

Currently, registered pharmacists provide only limited clinical pharmacy services to Indigenous Australians due to several barriers.[8 9] These include prohibitive HMR business rules and processes that are not always possible or culturally acceptable.[10 11] Many Aboriginal health services provide few HMR referrals due to issues with the cultural responsiveness of pharmacists, and lack of relationships pharmacists have with these services.[12 13] Yet, when medication reviews are delivered in culturally appropriate settings (such as in Aboriginal health services) there is great potential to increase patients' medication knowledge, medication adherence and to improve chronic disease management.[14]

The Australian Government Department of Health, under the Pharmacy Trials Program (PTP, Tranche 2) funding as part of the Sixth Community Pharmacy Agreement (6CPA) sought to improve clinical outcomes for patients utilizing the full scope of pharmacist's role in delivering primary health care services. This Program supported a project to investigate the potential gains in health outcomes arising from integrated models of care within Aboriginal health settings- the *Integrating Pharmacists within Aboriginal Community Controlled Health Services* (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project. The project explored if integrating a registered pharmacist as part of the primary health care (PHC) team within ACCHSs (the intervention) led to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples with chronic diseases. Pharmacists integrated within ACCHSs delivered medication management reviews such as HMRs and another type

of comprehensive medication review that was conducted under circumstances that did not comply with the HMR program. These circumstances included reviews conducted outside the patient's home, or if the pharmacist conducting the review was not accredited to conduct a HMR. These comprehensive reviews were designated for the purposes of the study as 'non-HMRs'. Integration within ACCHSs meant that pharmacists had identified positions and core roles, shared access to clinical information systems, provided continuous clinical care to patients, received administrative and other supports from primary health care staff, and adhered to the governance, cultural, and clinical protocols within ACCHSs as part of their shared vision.

The IPAC project commenced in 2018 and recorded the number of participants in receipt of HMR and non-HMR services, reasons for referral, and the characteristics of these reviews including the prevalence of medication related problems (MRPs) by type of review. The aim was to investigate if the number of Aboriginal and Torres Strait Islander participants in receipt of HMRs increased after integrated pharmacist service provision within the ACCHS setting, compared to a 12-month usual care baseline period that preceded the intervention.

METHOD

The IPAC project was a pragmatic, community-based, participatory, non-randomised, prospective, pre and post quasi-experimental study (Trial Registration Number and Register: ACTRN12618002002268) that integrated a registered pharmacist within the ACCHS primary healthcare team for up to a 15-month period. ACCHS services (n=18) were recruited for the project across three jurisdictions: Victoria, Queensland and the Northern Territory (NT), and comprised 34% (18/53) of all ACCHSs in these jurisdictions. Patients recruited into the study were aged 18 years and over with a diagnosis of: cardiovascular disease (CVD), Type 2 diabetes mellitus (T2DM), chronic kidney disease (CKD), or other chronic conditions and at high risk of developing medication-related problems (e.g. polypharmacy).

The IPAC project methodology has been described in detail elsewhere,[15] and health services characteristics were summarized in a separate report.[16] Briefly, IPAC pharmacists delivered non-dispensing clinical medication-related services within ACCHSs through a coordinated, collaborative and integrated approach to improve the quality of care of patients (the

intervention). ACCHS sites were similar to other ACCHSs in their jurisdiction according to geographic location, and proportionate patient distribution by sex and Aboriginality [data not shown]. Six ACCHSs were eligible for remote area support from community pharmacy through the section 100 program. These services continued to receive this form of remote area support during the intervention phase of the IPAC study. The Section 100 program supports the quality assurance of medications dispensed from remote area Aboriginal health services[17] and does not involve the provision of HMR services. Five ACCHS sites participated in the Health Care Homes (HCH) program funded by the Australian Government designed to better coordinate the health care of patients with chronic disease,[18] with all located in the NT and predominantly in remote locations. The intervention phase of the IPAC study comprised the period from participant enrolment to the end of the study (31st October 2019).

As a pragmatic trial, pharmacists functioned within existing and usual primary health care service delivery systems and were trained to deliver ten core roles during the intervention phase. Pharmacists provided medication management reviews (to resolve identified medication -related problems and optimise prescribing quality), assessed adherence and medication appropriateness, provided medicines information and education and training, collaborated with healthcare teams, delivered preventive care, liaised with stakeholders, provided transitional care, and undertook a drug utilisation review. Their intervention targeted both consented patients (participants) and practices, with practice-specific activities directed to health professionals and systems within the service.

Patient-specific services included the conduct of medication management reviews. Two types of medication reviews were undertaken by pharmacists: a) Home Medicines Review (HMR, also known as Medicare item 900), and b) non-HMR which was a comprehensive review that did not fulfil the MBS HMR criteria, such as a review conducted outside the patient's home or by a non-accredited pharmacist.

Home Medicines Review

According to the MBS rules, an item 900 rebate can be claimed as a fee-for service when the patient's usual general practitioner (GP) obtains patient consent and requests a HMR from a

pharmacist. To be eligible for this service, the patient must have 'a chronic medical condition or a complex medication regimen, and not [have] their therapeutic goals met'.[19] For the HMR, the GP is required to refer the patient to a community pharmacy or an accredited pharmacist after which a discussion with the reviewing pharmacist must include the results of the review including suggested medication management strategies. The HMR must also include the development of a written medication management plan by the GP following discussion with the patient, which is then provided to a community pharmacy chosen by the patient.[20] Provided that all relevant program rules are met, a separate pharmacist service fee for the HMR can be remunerated under the 6CPA.

The MBS item for a HMR can be claimed once in each 12-month period except if the patient's condition or medication regimen has significantly changed. Thus, a HMR is not intended to be conducted as an ongoing annual review.[21] Based on these MBS rules, every IPAC participant was eligible for a HMR (item 900 claim) at least once during the project period if their therapeutic goals were not being met.

At the time of this study, regulatory requirements for GPs in relation to MBS Item 900 rebate required the pharmacist to visit the patient at home 'unless exceptional circumstances apply, or they are an Aboriginal or Torres Strait Islander patient'.[22] The patient must also consent for the pharmacist to visit the patient at home. At the same time, 6CPA Program Rules for pharmacists conducting HMRs required the service to be conducted in the patient's home unless prior written approval to conduct the HMR in an alternate location was granted by the Pharmacy Programs Administrator. Seeking approval required the accredited pharmacist to submit a variation request through the administrator at least 10 working days prior to the proposed date of the HMR Interview. The approval process also required patient details to be shared with the Australian Government, Department of Health.[23] This process posed a potential risk that there would be a loss of patient engagement especially in ACCHS settings where staff were often managing opportunistic healthcare delivery.[24] As such, the IPAC project introduced an alternative type of medication review which could be delivered by integrated pharmacists in a location of the patients' preference (such as the clinic) without the need for a home visit (a non-HMR).

Non-Home Medicines Review

For the purposes of the IPAC project, a non-HMR is a comprehensive medication review conducted by an IPAC pharmacist that could be undertaken outside the participant's home for those whose therapeutic goals were not being met, and was defined by eight mandatory criteria that included:

1. an interactive face-to-face or telehealth interview with the patient;
2. the collection of patient-specific data;
3. the compilation of a comprehensive medication profile;
4. education of the patient about their medications;
5. the assessment of the medication profile to identify medication-related problems;
6. prioritizing a list of medication-related problems;
7. recommendations made and documented in the ACCHS clinical information system; and
8. recommendations discussed with the prescriber.[25]

The non-HMR criteria were developed as a modification to the Pharmaceutical Society of Australia (PSA) criteria for the pharmacist provision of HMR services. IPAC pharmacists logging the completion of a non-HMR for this study were required to confirm the completion of all eight criteria. Consequently, all completed non-HMRs fulfilled all eight criteria. Non-HMRs were not billable by GPs under the MBS and did not incur a pharmacist fee under the 6 CPA.

A non-HMR was distinct from a HMR in that a non-HMR allowed for an opportunistic medication review by a pharmacist without needing a referral from the patient's GP; the non-HMR could be conducted within or outside the patient's home; and the absence of frequency restrictions for a non-HMR whereupon a patient may have a non-HMR following a HMR, or repeat non-HMRs as deemed clinically necessary. Unlike the HMR, the project protocol did not stipulate that the medication management plan arising from a non-HMR needed to be forwarded to the patient's usual or preferred community pharmacy, with this requirement being optional.

Follow-up to an HMR or a non-HMR

The project protocol required that an IPAC pharmacist should schedule a patient follow-up 3-6 months after the completion of an HMR or a non-HMR. Information regarding pharmacist's follow-up activity was collected for patients who had a HMR or a non-HMR. Pharmacists undertaking a follow-up activity were required to fulfil three criteria for each activity:

1. reinforce the HMR and non-HMR advice and recommendations provided by the pharmacist (and the GP, if appropriate);
2. assess the impact of any actions recommended from the HMR or non-HMR; and
3. determine if another HMR or non-HMR, education session or preventive intervention was needed.

Pharmacists logging the completion of participant follow-up for the IPAC study were required to confirm the assessment of all three criteria. Pharmacist follow-up activity up to an HMR or a non-HMR was not billable under the MBS and did not incur a pharmacist fee.

Medication-related problems

For every HMR or non-HMR during the intervention phase, pharmacists were required to report any MRPs identified. The prevalence of MRPs was not ascertained pre-intervention as this did not comprise usual care.

MRPs are commonly defined as 'an event or circumstance involving a patient's drug treatment that actually, or potentially interferes with the achievement of an optimal outcome', and can arise from medication inappropriateness as well as other factors.[26] Given the absence of an established consensus on which classification system for MRPs to use,[27 28 29] the research team derived a small list of MRPs adapted from some of the criteria in the Medication Appropriateness Index (MAI) that have also been used to assess drug-related problems,[30 31] supplemented by two additional problems commonly reported in other studies.[32 33]

The MRP criteria adapted from the MAI were to assess if: at least one medicine was not indicated, was ineffective for the condition, had a drug-drug interaction, and/or had a drug

to condition interaction; if there was an unnecessary duplication of drugs; the patient directions were incorrect; and/or the patient directions were impractical. The remaining MAI criteria that took account of the duration of therapy and the least expensive drug alternative, were not used to assess MRPs. The two additional MRP criteria included in the IPAC study explored if any medicine was associated with an adverse drug reaction, and if the medication dosage was subtherapeutic or if there was an overdosage. Pharmacists could also report 'other' MRPs not included in this list, or the complete absence of a MRP. This categorization of MRPs is consistent with the nine criteria used in a study involving the integration of pharmacists within general practice teams[34] except that MRP criteria for the underuse of medications, problems related to laboratory testing to monitor medications, nor subcategories of any of the criteria were included. Other more complex classification methods to assess MRPs were not used due to the time intensive nature of this activity and the lack of validation within the ACCHS context.[35] The IPAC study explored the underuse of medications in a separate analysis.[36]

The MAI criteria were familiar to pharmacists who were trained to use these criteria, and the tool was externally validated to assess the potential for medicine-related risks that outweigh the benefits to the patient.[37 38] In assessing for MRPs, pharmacists were not required to evaluate medication appropriateness nor to derive the MAI score, but merely to indicate if the criteria were met for any medication following the participants' medication review.

Study participants

A non-probability sampling method was used to recruit participants to the IPAC study where health service staff and pharmacists invited patients attending ACCHSs for their usual care. Patients were consented into the study by pharmacists or other health service staff according to the cultural protocols of the IPAC service. Once consented, pharmacists provided supportive clinical care as part of the primary healthcare team to meet the individual needs of the participant. All participating health service sites included participant access to a GP. The decision to provide any medication review to a participant was based on usual clinical criteria consistent with MBS rules, and was a decision made by the GP, with or without consultation with the IPAC pharmacist.

Pharmacists

The Pharmaceutical Society of Australia (PSA) recruited pharmacists to be integrated within ACCHSs, in partnership with the National Aboriginal Community Controlled Health Organization (NACCHO). IPAC pharmacists fulfilled the following eligibility criteria: registration with the Australian Health Practitioners Regulation Agency (AHPRA); more than 2 years' post-registration experience; and post-graduate clinical qualifications or demonstrated clinical experience. Accreditation to conduct an HMR was preferred, however it was not mandatory for IPAC pharmacists. Accreditation is conferred by a credentialing body in Australia (such as the Society of Hospital Pharmacists of Australia) and permits the pharmacist to conduct and claim payment for a HMR.[39] These criteria enabled the selection of pharmacists with skills aligned to the expected scope of practice for this project.

As a member of the health care team, all pharmacists had access to participants electronic medical records held at the ACCHS. Medications were accepted by pharmacists as 'prescribed' if they were included in the patient's current medication list within the records. Pharmacists were also able to check other sources of information to validate the current medication list such as correspondence from specialist clinicians, discussion with the individual patient, or other clinical staff.

Pharmacist accreditation for HMR

The HMR for IPAC patients could have been conducted by the accredited IPAC pharmacist or by an external pharmacist. In services where IPAC pharmacists were not accredited to conduct an HMR, the GP may have referred the HMR service to an external accredited pharmacist from a local community pharmacy. The IPAC pharmacist may have assisted the external pharmacist to conduct the HMR by facilitating the sharing of relevant patient information. If this activity involved the IPAC pharmacist assisting in the patient interview, this would have resulted in the external pharmacist not being remunerated for those HMR services without prior approval.[40] Thus, it was expected that this type of assistance from IPAC pharmacists to external pharmacists would be uncommon.

Pharmacists were required to record if a HMR conducted during the project period was completed by an IPAC or external pharmacist. If the HMR was conducted by an accredited IPAC pharmacist, the HMR was conducted either within IPAC hours or outside IPAC hours. If the HMR was conducted within IPAC hours, the IPAC pharmacist was not specifically or additionally remunerated for this activity with regard to the 6CPA fee. An algorithm for HMR and non-HMR completion within the IPAC project is included as Figure 1.

Data collection

De-identified participant data was collected from two existing clinical information systems (CIS) used by ACCHSs (Best Practice and Communicare) to manage patients' electronic health records and a bespoke online database (pharmacist logbook) to record information about pharmacist activity. Demographic, biomedical and health service utilization indices were extracted from CISs in de-identified form using an electronic tool called GRHANITE that required remote installation and regular extraction from IPAC sites for the term of the project.[41] Participant consent was recorded in the CIS by pharmacists. GRHANITE extracted data only from consented patients and copied it to a JCU databank employing internationally recognised point-to-point encryption (P2PE) mechanisms to protect data in transit.

The scope of the data extractions was agreed based on IPAC-specific data requirements and extract definitions for GRHANITE XML's (site interfaces) to ensure they were fit-for-purpose, such as for MBS item claims. All ACCHSs consented to the installation of GRHANITE and the de-identified data extractions required for the project. Each ACCHS successfully completed 'site acceptance testing' that confirmed the extraction of fit-for purpose data. The integrity of the data extraction process was monitored with weekly data uploads. XML interface maintenance ensured that any vendor software upgrades to the CIS were aligned with data extract definitions. The deidentified CIS participant identification numbers in the GRHANITE extractions linked with participant data recorded by pharmacists in the logbook.

The pharmacist logbook was a secure password protected online database, accessible from any device connected to the internet, with dual recording and reporting functionality. The electronic interface was developed to be intuitive and user-friendly to minimise the burden

of data entry and reporting. Pharmacists were trained to record details of HMR and non-HMR medication review assessments that they completed in the logbook. Pharmacists were required to document the clinical indications for a HMR and a non-HMR, the location where the non-HMR was conducted, the reasons for selecting a non-HMR over a HMR for the patient, and if an MBS rebate claim for item 900 was generated by the health service as well as reasons for not claiming. Pharmacists also recorded clinical diagnoses in the logbook based on what was documented in electronic health records or supplemented by discussion with clinicians. The logbook did not contain details regarding HMRs that were completed by non-IPAC (external) pharmacists for IPAC participants.

GRHANITE extracted relevant MBS claims data for each consented IPAC participant including MBS item 900 (HMR) for the 12-month period prior to participant enrolment into the study (representing usual care pre-intervention) and for the duration of the intervention until the end of the study set at 31st October 2019. The number of MBS claims for a HMR in the 12 months prior to participant enrolment was defined as 'baseline', whilst the number of claims from enrolment until the end of the study was defined as the intervention period or follow-up period. The frequency and characteristics of completed non-HMRs was recorded in the logbook by IPAC pharmacists.

Data analysis

All participants with less than 90 days between baseline and follow-up were removed from the analysis due to their short length of stay in the study. Health Care Homes (HCH) participants who were concomitantly enrolled in another program- the '*Community Pharmacy in Health Care Homes Trial* '[42] - were also removed from the analysis.

Participant characteristics and MBS claims data was extracted from the JCU SQL Server database using the Navicat 15 for SQL Server (PremiumSoft) database management tool, whilst HMR, non-HMR and MRP data was extracted from the pharmacist logbook as Microsoft Excel files, and subsequently analysed using a number of statistical tools including the SPSS Statistics Premium version 24 (IBM) statistical package, Stata/MP 13.0 (StataCorp LP), and Microsoft Office 2016 (Microsoft). Nominal variables are presented as absolute and relative frequencies. Depending on their distribution, continuous variables are presented as

mean and standard deviation (SD) or median and inter-quartile range (IQR), as indicated accordingly. The event rates of MBS item claims were calculated for pre and post intervention as the number of participants with claims (or the number of claims) per 100 person-years of observation. MRPs were classified according to explicit criteria and free-text responses documented in the pharmacist's logbook. Responses were coded and thematically analysed according to identified problems commonly reported in Australian studies.[43 44]

The study design of IPAC involved cluster sampling using ACCHSs as the primary sampling units. As a consequence, statistical analyses were cluster-adjusted for the design effect of ACCHSs. P-values for comparisons between baseline and end of the study for changes in nominal and continuous variables (unpaired data) were determined using logistic regression analyses that were cluster-adjusted for ACCHSs. P-values for comparisons between baseline and end of the study for changes in nominal variables (paired data) were determined using conditional logistic regression analyses that were cluster-adjusted for ACCHSs. P-values for changes in numerical variables for participants (paired data) were derived from the cluster-adjusted confidence interval (ACCHS cluster) of the differences as this is equivalent to a paired t-test. Statistical significance was assumed at the conventional 5% level.

Ethics approval

Ethics approval for the project was received from four ethics committees in the three jurisdictions including St Vincent's Hospital Melbourne (SVHM) Human Research Ethics Committee (HREC), Victoria (HREC/17/SVHM/280), James Cook University HREC (mutual recognition of SVHM HREC, approval HREC/H7348), Menzies School of Health Research (HREC/2018-3072) and the Central Australian HREC (HREC/CA-18-3085).

RESULTS

A total of 26 IPAC pharmacists participated in the intervention, and of these 20 (77%) were accredited to conduct HMRs. One pharmacist acquired accreditation during the study intervention. The total IPAC cohort comprised 1,456 enrolled participants who remained in the study until the end, from whom logbook and MBS item 900 claims data at baseline and follow-up was available (Figure 2).

During the intervention phase, 609 (41.8%) participants were recipients of at least one HMR, and 719 (49.4%) participants received at least one non-HMR (Table 1). Of these participants, 101 (8.2% of participants with ≥1 medication management review) had both an HMR and a non-HMR. The proportion of HMR and non-HMR recipients that had both assessments did not differ between them (P=0.676 from cluster-adjusted logistic regression; ACCHS cluster) and they were therefore retained in the analysis. Participants were followed-up for a mean of 284 days (SD± 11.5) following enrolment into the study (Table 2).

The characteristics of participants who received a HMR and a non-HMR during the study is shown in Table 1. The mean age of HMR recipients at baseline was 58.7 years (SD± 21.9). Participants did not differ according to the type of medication review they received with respect to age, sex, the geographical location of the ACCHS they attended, pensioner status, the number of prescribed medications, the number of doctors encounters prior to enrolment, self-reported medication adherence, self-assessed health status, the presence of co- or multimorbidity, nor in the proportion with a clinical diagnosis of type 2 diabetes mellitus (T2DM), hypertension, dyslipidaemia, chronic kidney disease (CKD), rheumatic heart disease or acute rheumatic fever, chronic obstructive pulmonary disease (COPD) or depressive disorders. Recipients of a HMR were just as likely to have had a previous HMR at baseline (12 months prior to study enrolment based on MBS item 900 claims) as recipients of a non-HMR (15.4% versus 7.5%, p=0.111, Table 1).

Almost all HMR recipients (96.4%) were Aboriginal and/or Torres Strait Islander, compared with 88.2% of those who received a non-HMR (p=0.001, Table 1). Although participants who had a non-HMR were more commonly attending ACCHSs in remote (19.8%) or very remote (21.4%) locations compared to those with an HMR (0.3- 3.8% respectively), this difference was not significant (p=0.178). However, non-HMR recipients were significantly more likely to be patients engaged with the HCH program than recipients of an HMR (17.0% versus 2.0%, p =0.039), which is consistent with the predominantly remote geographical location of IPAC ACCHSs participating in the HCH program.

HMR recipients were significantly more likely than non-HMR recipients to be eligible for Close the Gap (CTG) scripts which are only for non-remote Aboriginal and Torres Strait Islander persons (90.8% versus 60.6%, p=0.009), and to have established or existing cardiovascular disease (CVD) (37.3% versus 29.1%, p=0.006).

Completed HMRs (by MBS rebate claim for item 900)

At baseline, 10.0% (146/1456) of participants had received at least one HMR based on MBS item 900 claims data from CISs and this increased to 30.1% (438/1456) of participants by the end of the study. After intervention, 38.7 (95% CI 29.6-49.3] participants had received at least one HMR for every 100 person-years of observation. This was a significant 3.9 times increase in the number of participants with at least one HMR after the intervention compared with the rate of HMR completion from the preceding 12-months of usual care (p<0.001, Table 2). Similarly, the total number of completed HMRs (based on MBS claims) significantly increased by 4.1 times (p<0.001) post- intervention compared with HMR claims from usual care in the 12-month period preceding the intervention (Table 3).

There were 405 participants who changed from no HMR at baseline to having at least one HMR by the end of the study, indicating an absolute increase of 27.8% in participant access to HMRs (Table 4). However, adjusting for those who already had a HMR at baseline, but did not receive a subsequent HMR (n=113), the net increase in the number of participants who benefited from an HMR during the study was +292. This approach assumes that all 113 participants who had at least one baseline HMR without a subsequent HMR during the intervention period, were potential failures to follow-up. However, the majority of these participants were enrolled in the IPAC study for less than 12 months and may not have been eligible for a repeat HMR according to MBS rules, or may not have required a repeat HMR for clinical reasons. With this conservative approach, only 5 patients needed to be assessed by IPAC pharmacists to result in one additional participant with a completed HMR.

Description of HMRs

According to pharmacists' entries in the logbook, a total of 639 HMRs were conducted for 609 individual participants during the intervention (Table 5 and 6). This number exceeded the number of participants with completed HMRs based on the number of services claimed

for an MBS item 900 rebate (Table 2). The vast majority of participants had one HMR and 30 participants had two HMRs completed during the intervention period (Table 5). The most common reason given for conducting the HMR was the patient taking 5 or more regular medications (n=498, 77.9%), and suspected non-adherence to medications (n=241, 37.7%). HMRs were also completed for patients having difficulty managing their medicines (n=210, 32.9%), and patients attending a number of different doctors (148, 23.2%). Recent discharge from a facility/hospital (in the last 4 weeks) was cited as a reason for 77 (12.1%) of HMRs. More than one reason was often identified for conducting HMRs (Table 6).

Almost all HMRs were completed by the IPAC pharmacist (n=616, 96.4%) with the remaining reviews completed by an external pharmacist (n=23, 3.6%). Of those undertaken by the IPAC pharmacist (n=614), just over half of the HMRs were conducted within IPAC hours (n=324, 52.8%, Table 7). The median time taken for IPAC pharmacists to complete an HMR was 1 hour and 45 minutes (IQR= 45-150 mins).

Of the 23 HMRs conducted by an external pharmacist, IPAC pharmacists provided assistance through the sharing of clinical records or other information, and facilitated ACCHS staff involvement (n=20, 87.0% each) to contextualise and optimise the HMR (Table 8). The primary reason recorded by IPAC pharmacists for the HMR being referred to an external pharmacist was that the health service had an existing arrangement with an external independent pharmacist (n=19, 82.6%, Table 9)

Description of Non-HMRs

Of the participants who had non-HMRs, the vast majority (n=682, 94.9%) had one non-HMR and 36 participants had two non-HMRs during the intervention period (Table 5). A total of 757 non-HMR services were received by 719 individual participants (Table 6). The reasons for conducting a non-HMR were ranked similarly to HMRs for all listed criteria. Like HMRs, the most common reason for conducting the non-HMR was for patients taking 5 or more regular medications (n=497 reviews, 65.7%), and suspected non-adherence (n=328, 43.3%).

HMRs were significantly more likely to be completed than non-HMRs for reasons related to the 'patient taking 5 or more regular medications', 'patient taking more than 12 medicines

per day', 'patients having difficulty managing their own medicines', 'recent discharge from a facility/hospital (in the last 4 weeks)', and 'patients attending a number of different doctors' (all $p<0.05$, Table 6).

Reasons for a medication management review such as 'suspected non-adherence', 'significant changes to the patient's medication regimen in the last three months', 'patient on medication requiring therapeutic monitoring', 'symptoms suggestive of an adverse medicine reaction' and other reasons, did not significantly differ between HMRs and non-HMRs (Table 6). Like HMRs, often more than one reason was identified for conducting a non-HMR for the participant. The median time for completing a non-HMR as reported by IPAC pharmacists was one hour and 15 minutes (IQR=60-120 mins).

Location of non-HMR's

The usual location for conducting the non-HMR was within the health service (n=689, 91.0%, Table 10). In only 39 of 757 (5.2%) reviews was the non-HMR completed in the patient's home. Of the 2.9% 'other' locations for the review, most were conducted with the patient via a phone call, with two reviews being completed at dialysis or rehabilitation units. The reviews conducted over the phone may have included an interaction at the health service or at the patient's home prior to or following the phone call.

The most common reason for the health service, participant, or IPAC pharmacist choosing to conduct a non-HMR over an HMR was that the patient was 'at risk of forgoing an HMR' if it was not conducted opportunistically (n=364, 48.1%, Table 11). The next most common reason was 'no accredited pharmacist available' to conduct the review (n=232, 30.6%). Patient preference for the medication review to the conducted outside the patient's home was the third most common reason given for a non-HMR over a HMR (n=107, 14.1% of all non-HMRs). Reasons also commonly related to program rules such as criteria restricting when a repeat HMR was approved, and a cap on the number of HMRs that could be completed by an accredited pharmacist per month. For some non-HMRs, pharmacists reported that a review conducted in the home would be culturally inappropriate (3.3%), or travel to the patient's home posed a risk (2.9%).

HMR and non-HMR recommendations

Pharmacist recommendations following a HMR were most likely to suggest self-management and education advice to the patient (62.3% of HMRs, Table 12). The next most common recommendation was a change in the dose of any existing medication (45.4%), followed by cessation of any medicine (37.9%), advice to community pharmacy (31.3%), pathology testing (28.2%), addition of a new medicine/s (27.4%), and correction to the medication list in the CIS (26.9%). In 11.4% of HMRs, a recommendation was made for a dose-administration aid. IPAC pharmacists rarely recommended referrals to other healthcare providers.

Similarly, for non-HMRs, the most common recommendation was self-management and education advice to the patient (57.6% of all non-HMRs, Table 12). The type and frequency of recommendations for medication change were similar to an HMR. Advice to a community pharmacy featured in only 8.2% of non-HMR recommendations. There were more referrals for a follow-up to the non-HMR (7.4% of non-HMRs recommended a follow-up compared to 0.8% of HMRs), fewer recommendations for a dose-administration aid (6.5%) and no patients required patient registration for CTG scripts.

IPAC pharmacists reported that 61.5% (n=1,165) of all recommendations from HMRs were discussed with the prescriber and of these 66.4% (n=773) were accepted. For non-HMRs, 58.5% of all recommendations were discussed with the prescriber (n=1,052), and 55.5% of these were accepted (n=584, Table 12).

The reason why review recommendations were not discussed with the prescriber varied by type of review and included discussions that were pending for case conferences or appointments, the GP being unavailable, or because recommendations were documented in a report to the GP. For 19.1% of non-HMRs, the pharmacist felt a discussion with the GP was not necessary (Table 13).

Follow-up to a HMR or non-HMR

Pharmacists delivered 1,548 participant assessments as a follow-up to an HMR (n=839, 54.2%) or a non-HMR (n=709, 45.8%) during the intervention. The majority of these assessments

took place at the health service (n=1,126, 71.1%, Table 14). Other follow-up assessments were conducted during transportation of the patient, at the dialysis clinic, community pharmacy, women's group meetings, or by email. The median time to undertake the follow-up to an HMR or non-HMR was 30 minutes.

Of all follow-up assessments, 46.2% (n=715) were discussed with the prescriber. Pharmacists reported it was not necessary to discuss the recommendations of this assessment with the prescriber in 42.2% (n=654) of occasions (Table 15). For the remaining 179 (11.9%) occasions of follow-up to a HMR or non-HMR, pharmacist recommendations were not discussed with the prescriber because the recommendations were provided in a report (such as for a case conference), sent by email, were recorded in the CIS, or the prescriber was unavailable. Pharmacist recommendations were accepted by prescribers on 70.9% (n=506) of follow-up occasions of service but pharmacists were unsure if those from the remaining occasions of service were accepted.

Medication related problems

Of the 609 participants who had at least one HMR, 535 (87.9%) had at least one MRP. A total of 1,056 MRPs were identified by pharmacists from 639 HMRs (Table 16), or 1.65 MRPs per HMR. Some reviews revealed multiple types of MRPs. Of the listed explicit types, the most common MRP was *'at least one medicine was not indicated'* (n=176, 16.7% of all MRPs). Nearly one-third of participants (32.4%, n=174) had this type of MRP following an HMR (as a proportion of all participants identified with at least one MRP). Around one fifth of participants with an HMR (n=102) had *at least one medicine associated with an adverse drug reaction*. A wrong medication dosage, such as the dose being too high was evident in 10.8% (n=58) and 'subtherapeutic dosage' in 13.6% (n=73) of HMR recipients. Other MRPs were identified in nearly 50% of HMR recipients (n=251, Tables 16 and 17).

In comparison, of the 719 recipients of at least one non-HMR, 503 (70.0%) had at least one MRP – significantly lower than reported for those receiving an HMR (p=0.035, Table 16). However, if a problem was identified, the number of MRPs per recipient was similar between review types (1.9 and 2.0 MRPs/recipient for HMRs and non-HMRs respectively, Table 16).

The type of MRPs identified from participants did not significantly differ between HMR or non-HMR recipients for almost every type of MRP. As with HMRs, the most common MRP identified for non-HMR recipients was *'at least one medicine was not indicated'* (n=148, 29.4%, p=0.561). A difference in the proportion of participants with MRPs between the review-types was found only for medications where the dose was too high (10.8% of HMR versus 17.1% of non-HMR recipients, p=0.018), and when '*the patient directions were impractical*' (16.1% HMR, and 10.1% non-HMR recipients, p=0.032). The number of participants with 'other' MRPs also did not differ between recipients of the two review types (p=0.101).

Other MRPs described by pharmacists' (Table 17) included patient non-adherence to medications (25.6% of 'other MRPs' from HMRs versus 30% for non-HMRs), changes in medications or dosages (20-31%), documentation errors (9-16%), a requirement for pathology or other testing (11-24%), and a prescribing omission (9.9-9.2% respectively). In general, the type of 'other MRPs' was similar whether identified from an HMR or non-HMR, although proportionately more 'other' problems were identified with HMRs (Table 16).

DISCUSSION

This study was set in primary health care services that were ACCHSs and is the first to explore the impact of integrated pharmacists on access to medication management reviews (such as an HMR) for Aboriginal and Torres Strait Islander adult patients with chronic disease. At baseline, 10% of participants had received at least one HMR according to MBS claims recorded within the CISs of ACCHSs for the 12 months pre-intervention. After receiving integrated pharmacist services, there was a significant increase in the proportion of participants who received an HMR, increasing by 3.9 times after a median of 284 days enrolment in the study. Pharmacists needed to assess only 5 participants for one to receive a HMR.

Pharmacists logged a greater number of HMRs than was recorded through ACCHS claims for the MBS item 900 rebate. A rebate for MBS item 900 was claimed by IPAC sites for 74% (471/639) of HMRs undertaken by accredited pharmacists (a difference of +168 HMRs). The number of MBS claims underestimates the quantum of HMRs actually completed by

integrated pharmacists. This suggests that claims for the MBS item 900 rebate are underutilised following an HMR. Most of this difference may be explained by GP ineligibility to claim the rebate for rendered services if the patient did not return to the GP to consider the results of the medication management review. Patient attendance is necessary to generate the medication management plan that is required to log an MBS claim. The difference may also be explained if the MBS claim was still pending at the time of data extraction. The difficulty some ACCHSs have logging MBS claims for an HMR has been reported elsewhere, but to a greater extent than reported for the IPAC study.[45]

Based on pharmacist logged HMRs, almost all participants were Aboriginal and/or Torres Strait Islander and had substantial multimorbidity. Pharmacists completed HMRs for clinical reasons consistent with program rules, predominantly for patient's taking 5 or more regular medications,[46] as has similarly been reported in an analysis of HMR uptake in the NT.[47] As 77% of IPAC pharmacists were accredited to complete HMRs, the vast bulk were completed by them. An important reason for the ACCHS to refer an HMR to another pharmacist for completion was the presence of an existing arrangement with an external independent pharmacist, which was consistent with the IPAC HMR referral algorithm (Figure 1). The finding that 52.8% of all HMRs completed by IPAC pharmacists were conducted within project hours meant that the pharmacist fee (6CPA cost) was not claimed for 324 of the HMR services (Table 7).

Integrated pharmacists provided HMR as well as a non-HMR services, including follow-up assessments to both a HMR and non-HMR, due to national concerns and evidence that patients most in need of a HMR were missing out on this service.[48] A non-HMR was offered in recognition of the known barriers Aboriginal peoples and Torres Strait Islanders faced accessing a HMR, particularly challenges associated with reviews undertaken in the patient's home, and one-off services with no regular follow-up.[49] Participant eligibility for a non-HMR was based on the same criteria established for a HMR.

This study found that participants who had a non-HMR did not substantially differ in clinically meaningful ways from those who had a HMR. A few significant differences were identified but these can be explained by the geographical location of the ACCHSs attended

by participants. For example, HMR recipients were more likely to be CTG script eligible than non-HMR recipients. This is to be expected as HMR recipients were those attending ACCHSs in mostly non-remote locations, and only non-remote residents were CTG script eligible. More non-HMR recipients were engaged in the HCH program than HMR recipients for possibly similar reasons, as the HCH program particularly affected remote area IPAC services. A larger number of non-HMR recipients had attended remote-area ACCHSs than those who had a HMR. This observation may also reflect the reduced availability of HMR accredited pharmacists in remote and very remote locations.

Non-HMRs took a median of 30 mins less to complete than a HMR and there were no differences in the proportion of participants who had received a second HMR or non-HMR during the follow-up period (about 5% respectively). Also, the reasons for conducting a non-HMR were ranked in a similar order to HMRs indicating that both types of medication review targeted high-risk patients in need of support such as patient's taking 5 or more medications or those suspected of non-adherence. However, of all the reasons given for conducting the review, a proportionately greater number applied to HMRs than non-HMRs. However, this difference did not reach statistical significance for most of the reasons given for conducting the medication management review.

Offering a non-HMR service clearly enhanced participants' access to comprehensive medication management reviews. Importantly, pharmacists selected non-HMRs over a HMR for predominantly opportunistic reasons as participants were otherwise 'at risk of forgoing a HMR'. Moreover, delivering a non-HMR instead of a HMR service denied ACCHSs a financial gain through an MBS 900 claim, yet a larger number of non-HMRs were completed for participants during the intervention phase than HMRs. Most non-HMRs were conducted within the health service clinic (only 5% were in the participant's home) and the ease of providing this service may partly explain why more non-HMR services were provided to participants. Usually only one HMR is permitted per person per year,[50] but no such restriction was placed on non-HMRs. Yet, participants were just as likely to receive two HMRs as two non-HMRs during the intervention, making it unlikely that this program rule explained why a greater number of non-HMRs than HMRs were undertaken.

A lack of pharmacist accreditation to conduct HMRs as a reason for undertaking a non-HMR suggests the number of HMRs would be increased further if more integrated pharmacists were accredited. Patient preference for the review to be conducted outside the patient's home was a dominant reason for choosing a non-HMR, consistent with external findings.[51] Similarly, the intervention promoted pharmacist follow-up assessments to both a HMR and non-HMR with substantial numbers of both being completed mostly outside the participants' home. These aimed to reinforce the advice from the medication review (to patient and GP) and determine if other interventions were needed. Prescribers accepted most (70.9%) pharmacist recommendations from these follow-up assessments.

For most participants, the medication review identified at least one MRP, but HMR recipients were significantly more likely to have a MRP than those in receipt of a non-HMR. However, the type of MRPs identified from participants did not significantly differ between HMR or non-HMR recipients for most MRPs. The most common type of MRP for both types of review suggested medication overuse (≥1 medication was not indicated). Under-prescribing (an untreated indication for medication), was not listed in the explicit MRP criteria, but was identified by some pharmacists as 'other' MRPs. In a separate analysis, the prevalence of potential prescribing omissions was explored in a subset of IPAC participants and found to be common.[52] The broad range of MRPs identified by pharmacists in both types of medication review illustrates the complexity and difficulties associated with quality prescribing for patients attending ACCHSs.

Comparatively, integrated pharmacists increased HMR provision at much higher rates than reported from mainstream Australian health services. A population-based cohort study of adults aged 45 years or older in NSW, Australia showed that only 6.8% of patients with 5-9 medications received at least one HMR over 5 years of follow-up with a rate approximating 0.019 patients per person-year.[53] The number of IPAC participants with at least one HMR was at least 20 times higher than reported in this study, equating to 0.39 participants per person-year. Moreover, HMR access increased for Aboriginal peoples and Torres Strait Islander participants at high-risk of MRPs, who had a much higher prevalence of chronic disease at baseline than reported in other Australian studies aiming to quantify or improve

quality prescribing. These studies took place in both general practice and ACCHS settings with study subjects of similar age to the IPAC cohort.[54] [55]

Increased access to medication reviews was observed from within already high performing ACCHS settings, based on a range of other quality assurance indicators from this sector.[56] This is likely to have been mediated by the involvement of an Aboriginal Health Worker (AHW) working in partnership with the pharmacist within the ACCHS. In a qualitative analysis of the IPAC study, pharmacists described the critical role AHWs played to support pharmacist integration within ACCHSs and patient follow-up.[57] For example, pharmacists engaged in 1,082 team-based activities within ACCHS sites during the intervention phase and 23.3% (252/1082) of these activities involved an AHW. Nearly 50% (22/49) of stakeholder liaison plans developed by IPAC pharmacists were co-designed with AHWs to support ACCHS engagement with community pharmacy and hospitals [*Data is not included in this report*]. Others have also reported the vital role AHWs play to enhance Aboriginal people's access to a HMR because of their community knowledge and integration within the community.[58] [59]

Although the type of pharmacist recommendations to prescribers following a HMR or non-HMR did not substantially differ, only around 60% of recommendations were discussed with the prescriber. Pharmacists reported they did not need to discuss all recommendations with the prescriber, or the recommendations were communicated through other means, or the discussion with the prescriber had not yet taken place. This observation is similar to the proportion of pharmacist recommendations implemented following HMRs (52%) within a large ACCHS in the NT with an integrated pharmacist,[60] and in a general practice setting supported by an external pharmacist (53%).[61] With integrated pharmacists working in general practices, the prescriber acceptance rate following HMRs was 70%.[62] [63] In qualitative analysis for the IPAC project, prescribers reported a very high degree of confidence in, and were able to utilise pharmacist recommendations, but sometimes prescribers considered them unsuitable to the patient's context.[64] This highlights the importance of pharmacist integration within ACCHS settings given the complexity of factors like social circumstances and patient preference to influence review recommendations.

Pharmacist medication reviews are an important risk reduction strategy to identify medication errors, inappropriate medications, overuse of medications, and potential prescribing omissions and are most important in those patients who have chronic disease and experience a greater burden of disease due to social or health system factors. Medication reviews can improve prescribing quality,[65] reduce both underuse and overuse of medications,[66] support patients with medication adherence, chronic disease self-management, and their adoption of a healthy lifestyle.[67] However, pharmacists need to be skilled in identifying a range of MRPs including underuse, and to target high-value interventions specifically for the Aboriginal and Torres Strait Islander population.[68] A receptive clinical environment, trusting relationships with prescribers, and access to patients' medical records are key characteristics of integrated models of care with pharmacists within primary health care settings.[69] If increasing Aboriginal peoples and Torres Strait Islanders access to comprehensive medication management reviews is a priority, consideration should be given to adopting the IPAC project approach more broadly.

Limitations

Without a control group, it is possible that participant access to a HMR increased independently of the IPAC intervention. However, this outcome is highly unlikely. Firstly, usual practice would infer no change in the prevalence of HMR recipients during the study period. More broadly, the pattern of aggregated MBS 900 claims across all participating jurisdictions (for all people) has been remarkably constant in the 4 years preceding 2018 (pre-IPAC),[70] so it is unlikely that external and independent influences served to increase HMRs, and in such a way to specifically affect the participating ACCHSs. In another IPAC report, it was shown that ACCHS characteristics did not change in clinically meaningful ways[71] to independently explain the increase in HMR access. Secondly, in qualitative analysis, clinicians and participants reported that the intervention had increased their access to medication reviews.[72] Thirdly, pharmacists had completed a substantial number of non-HMRs and given that most pharmacists were HMR accredited, it is plausible that the number of HMRs would also increase. Finally, the significant quantum of change in HMR access occurred in a relatively short time period. Moreover, this increase occurred on a background of already relatively higher proportions of participants with an HMR at baseline than reported for all Australians.[73]

Another potential confounder to the relationship between the intervention and HMR access was the HCH program. However, all participants concurrently enrolled in the *Community Pharmacy in Health Care Homes* (HCH) Trial program (undertaken in the NT around the same time as the IPAC project[74]) were removed from the IPAC analysis (Figure 1). Of the few IPAC participants concurrently enrolled in the broader HCH program, they were not in receipt of additional community pharmacy support beyond usual care. They comprised only 2% of HMR recipients, meaning that the HCH program was highly unlikely to have increased access to HMRs independently of the IPAC project. Moreover, the IPAC pharmacist was integrated within those services operating concurrently as a HCH trial site, which implies that the HCH program could not have acted as a confounder independently of the pharmacist. Whilst 17% of non-HMR recipients were HCH enrolees, this program could not have influenced participant access to non-HMRs as these reviews were unique to the IPAC project.

Data reporting constraints may have explained why pharmacists did not report a higher proportion of medication management review recommendations being accepted by prescribers. The logbook did not permit pharmacists to update data that had already been entered. Pharmacists who did not know if the prescriber had accepted their recommendations could not adjust their report at a later date. This reason was also evident for a follow-up to a HMR or non-HMR (Table 15).

The total number of MBS claims for item 900 for all peoples in the NT increased 2.5 times in 2019 compared with numbers in 2017 (304 claims to 122 claims respectively) and was the highest ever reported according to annual claims data from the MBS.[75] This change possibly reflects increased IPAC participant access to HMRs throughout the intervention phase (July 2018- October 2019), and possibly 'all person' gains from the *Community Pharmacy in HCH* program in the NT.

Only a few participants had more than two HMRs or non-HMRs during the intervention phase of the IPAC study, so change in the prevalence of MRPs could not be ascertained. MRP assessment was also not part of usual care at baseline. The IPAC study defined MRPs

from MAI criteria supplemented by thematic coding of MRPs based on commonly reported problems, which although not as explicit as other methods,[76] is a similar approach to that used by other Australian studies.[77] Tools designed specifically to code MRPs to compare prevalence across different settings were not used due to being labour intensive and lack of validation within the ACCHS context. For this reason, it is invalid to compare the prevalence and type of MRPs reported for the IPAC project with other studies. Further studies could explore MRP prevalence by using a more expansive set of MRP criteria such as the 81 criteria recently developed for use with Aboriginal peoples that may predict hospitalisation risk.[78]

Generalisability of the observed outcomes is supported, arising from the integrated pharmacist intervention to the broader ACCHS adult patient population with chronic disease who are at risk of developing medication related problems. All study participants were accessing ACCHSs, a large number of these services participated, and the study design was pragmatic. HMR access for adult patients with chronic disease especially for those who are not accessing primary health care or lack access to culturally appropriate care, is likely to be much less than estimated in this study. Measures to increase Aboriginal and Torres Strait Islander peoples' access to comprehensive and culturally appropriate primary health care, is also an important priority if there are to be further gains in access to medication management reviews.

CONCLUSION

This large prospective study enrolled Aboriginal and Torres Strait Islander participants with chronic disease from ACCHSs in order to assess the impact of pharmacists on quality of care outcomes when integrated within primary health care. The intervention comprised non-dispensing medicines-related services, collaborative and coordinated care, including the provision of medication management reviews. Despite known barriers to Aboriginal peoples and Torres Strait Islanders accessing medication reviews, there were 3.9 times as many participants with at least one HMR following the intervention than was observed with usual care. Only 5 participants needed to be assessed by an integrated pharmacist for one to benefit from an HMR. A non-HMR service was accessed by 719 (49.4%) participants who met eligibility criteria for a review but had almost no prior access to an HMR. A non-HMR

was most often undertaken for opportunistic reasons for participants at high risk of forgoing a medication review. Non-HMR eligibility criteria, participant need for a medication review, pharmacist recommendations, and identified MRPs were similar to an HMR.

Comprehensive medication reviews are a key strategy to improve chronic disease outcomes, and interventions such as integrated pharmacists within ACCHSs that have greatly improved access to these reviews, are likely to have a real influence on improving health outcomes for Aboriginal and Torres Strait Islander patients. The magnitude of the increase in medication management reviews would, if the intervention was implemented within other ACCHSs, contribute significantly to Aboriginal and Torres Strait Islander morbidity reduction through the effect of such reviews on prescribing quality, reduced medication errors, and other reported benefits. Pharmacists integrated within ACCHSs are well placed to deliver comprehensive medication management reviews to patients who experience barriers in accessing HMRs under current program rules, especially for those who would otherwise forgo a medication management review.

Figure 1. Algorithm for the Home Medicines Review (HMR) and non-HMR undertaken by IPAC pharmacists.

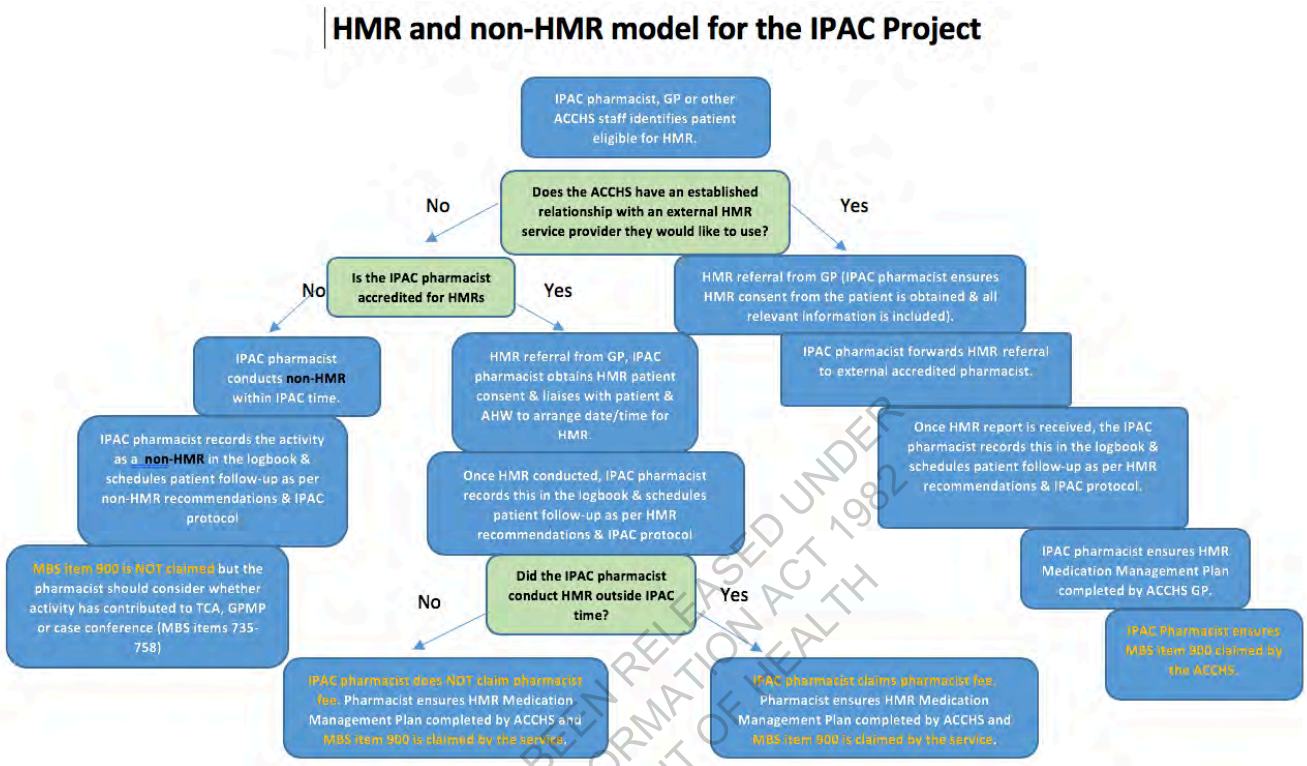
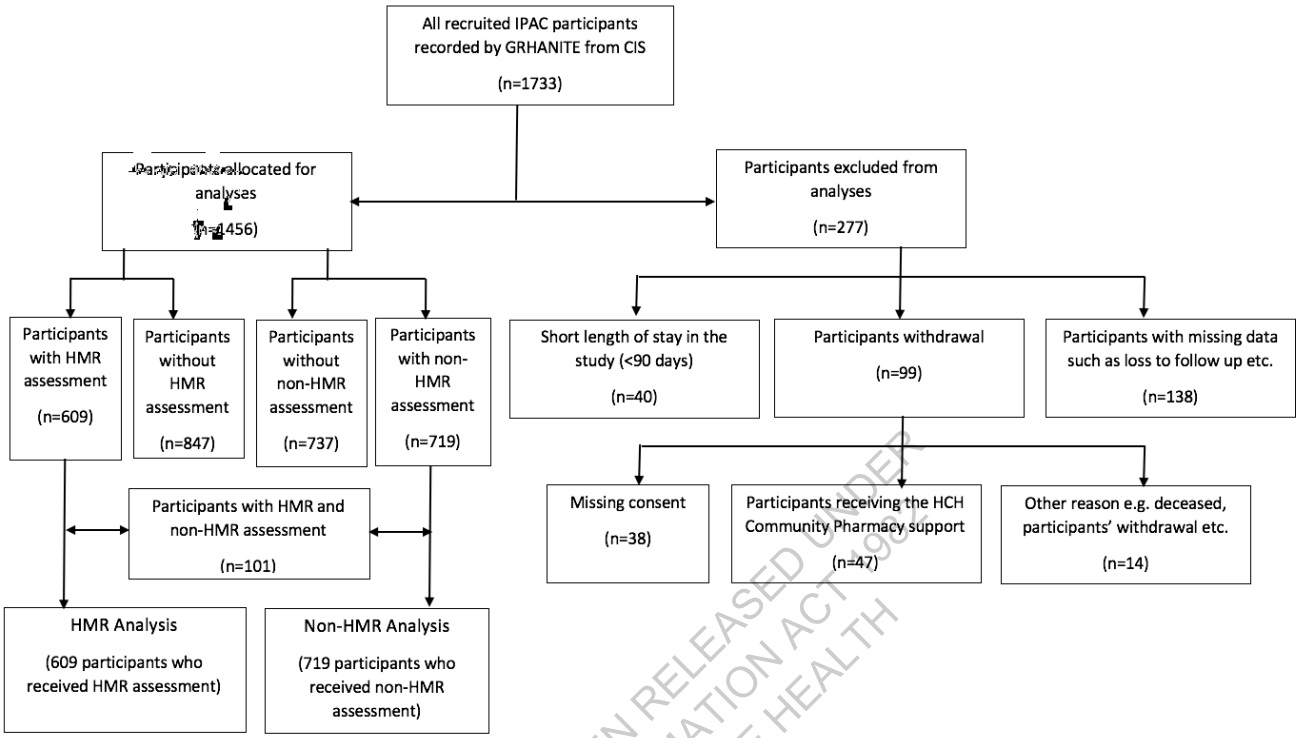


Figure 2. Participant flow diagram for medication management review analysis in the IPAC study



CIS= Clinical information systems
GRHANITE= Data extraction tool
HCH= Health Care Homes
HCH Community Pharmacy support= Community Pharmacy in Health Care Homes Trial Program

Table 1: Baseline characteristics of patients who received an HMR and/or a non-HMR.

Patient characteristics	HMR recipients (n=609)	Non-HMR recipients (n=719)	P-value
Location classification by ASGS-RA (2016)			
Major city (RA1)	19 /609 (3.1%)	15 /719 (2.1%)	
Inner regional (RA2)	149 /609 (24.5%)	259 /719 (36.0%)	
Outer regional (RA3)	416 /609 (68.3%)	149 /719 (20.7%)	0.178
Remote (RA4)	2 /609 (0.3%)	142 /719 (19.8%)	
Very remote (RA5)	23 /609 (3.8%)	154 /719 (21.4%)	
Mean age at baseline (SD) [years]	*n=607*	*n=718*	
	58.7 (21.9)	57.5 (30.0)	0.413
Sex (n,%)			
Male	237 /607 (39.0%)	281 /718 (39.1%)	0.974
Female	370 /607 (61.0%)	437 /718 (60.9%)	
Ethnicity (n,%)			
Aboriginal and/or Torres Strait Islander	584 /606 (96.4%)	632 /717 (88.2%)	**0.001**
Non-Indigenous	22 /606 (3.6%)	85 /717 (11.9%)	
Pensioner/concessional (n, %)	554 /607 (91.3%)	549 /718 (76.5%)	0.065
CTG scripts eligible (n,%)	551 /607 (90.8%)	435 /718 (60.6%)	**0.009**
Patient engaged in Health Care Home program (n, %)	12 /609 (2.0%)	122 /719 (17.0%)	**0.039**
Number of medications[#] [a]	*n=507*	*n=579*	
Mean (SD)	8.0 (7.2)	7.0 (13.7)	0.141
Median (IQR)	8 (6-10)	7 (4-9)	
Prior medication review (MBS item 900) [b] (n,%)	94 /609 (15.4%)	54 /719 (7.5%)	0.111
Doctors' encounters prior to enrolment (per 12 months)[c]	*n=574*	*n=663*	
Mean (SD)	8.5 (15.6)	7.3 (18.0)	0.214
Median (IQR)	7 (3-11)	6 (3-10)	
Mean number of medication 'adherent days' (SD)[d]	*n=507*	*n=579*	
	6.4 (1.8)	6.0 (6.7)	0.193
Self-assessed health status score (SF1): [#] [e] (n,%)			
Excellent	26 /434 (6.0%)	14 /540 (2.6%)	
Very good	64 /434 (14.8%)	71 /540 (13.2%)	
Good	201 /434 (46.3%)	209 /540 (38.7%)	0.082
Fair	101 /434 (23.3%)	175 /540 (32.4%)	
Poor	26 /434 (6.0%)	62 /540 (11.5%)	
Very poor	16 /434 (3.7%)	9 /540 (1.7%)	
Recorded clinical diagnoses: [#] (n,%)			

Type 2 diabetes mellitus	386/609 (63.4%)	438/719 (60.9%)	0.622
Hypertension	406/609 (66.7%)	455/719 (63.3)	0.643
Dyslipidaemia	312/609 (51.2%)	366/719 (50.9%)	0.967
Patients with established or existing CVD[f]	227/609 (37.3%)	209/719 (29.1%)	**0.006**
Chronic kidney disease	246/609 (40.4%)	289/719 (40.2%)	0.976
Patients with a diagnosis of rheumatic heart disease (RHD) or Acute rheumatic fever (ARF)	14/609 (2.3%)	22/719 (3.1%)	0.572
Chronic obstructive pulmonary disease (COPD)	52/609 (8.5%)	62/719 (8.6%)	0.966
Depressive disorder	33/609 (5.4%)	44/719 (6.1%)	0.792
Patients with comorbidity (1 or more chronic diseases)	542/609 (89.0%)	634/719 (88.2%)	0.822
Patients with multi-morbidity (2 or more chronic diseases)	491/609 (80.6%)	557/719 (77.5%)	0.571

Bold= statistically significant at the 0.05 level. P-value is cluster adjusted (ACCHS cluster) that was determined using the . svy linearized : logit Stata command (data not paired).
SD = standard deviation -cluster-adjusted (ACCHS cluster)
IQR = inter-quartile range
[#] Sourced from the pharmacist's logbook.
[a] Denominator was sourced from logbook data entered by pharmacists when reporting medication adherence.
[b] Prior MBS claim was measured for the 12-month period prior to participant enrolment.
[c] Medicare GP consultation claim items: vocational registration: 3, 23, 36, 44. Non-vocational registration: 52, 53, 54, 57.
[d] A self-reported single-item question ('*How many days in the last week have you taken this medication?'*) exploring the extent of non-adherence, assessed as a mean score for all medications. An 'adherent day' was defined as not missing any doses of prescribed medicines on that day. Pharmacists recorded the number of adherent days for each medication the patient was taking.
[e] Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'
[f] CVD= cardiovascular disease: It refers to any of the following: coronary heart disease, cerebrovascular disease, and peripheral vascular disease.

Table 2: Total number of participants with a completed HMR (at least one MBS item 900 rebate claim) during the study period (n=1456).

	Baseline	Intervention period	p-value*
Number of participants with a completed HMR:			
None	1310/1456 (89.97%)	1018/1456 (69.9%)	
One	143/1456 (9.8%)	409/1456 (28.1%)	p<0.001
Two	3/1456 (0.2%)	26 (1.8%)	
More than two	0/1456 (0%)	3/1456 (0.2%)	
Total number of participants with at least one completed HMR	146/1456 (10.0%)	438/1456 (30.1%)	p<0.001
Total person-days of observation**	531 440	413 723	p<0.001
Number of participants with at least one completed HMR per 100 person-years [95% CI]*	10.0 [5.2-18.0]	38.7 [29.6-49.3]	p<0.001
Rate ratio of participants with at least one completed HMR per 100 person-years	1	3.86	

HMR= Home Medicines Review. A completed HMR represents a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from GRHANITE data extraction from clinical information systems.
Baseline represents the period 12-months prior to the participant enrolment in the IPAC study.
The intervention period represents the period from patient enrolment to the end of the study.
End of the study: 31st October 2019
* Cluster adjusted p-value for ACCHS. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means).
**Baseline represents 365 days of observation for each of 1456 patients (or 1456 person-years). Over the intervention period, the total number of days of participant observation is equivalent to 1133.5 person-years.

Table 3: Total number of MBS item 900 rebate claims (a completed HMR) during the study period (n=1,456).

	Baseline	Intervention period	p-value*
Total number of completed HMRs	149	471	
Number of completed HMRs claims per patient	0.10	0.32	<0.001
Total person-days of observation**	531 440	413 723	<0.001
Total number of completed HMRs per 100 person-years [95% CI]*	10.2 [5.5 - 18.0]	41.6 [32.2 – 52.3]	<0.001
Rate ratio of completed HMRs per 100 person-years	1	4.07	

HMR= Home Medicines Review. A completed HMR represents a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from GRHANITE data extraction from clinical information systems.
Baseline represents the period 12-months prior to the participant enrolment in the IPAC study.
The intervention period represents the period from patient enrolment to the end of the study.
End of the study: 31st October 2019
*Cluster adjusted p-value for ACCHS and patients. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means).
**Baseline represents 365 days of observation for each of 1456 patients (or 1456 person-years). Over the intervention period, the total number of days of participant observation is equivalent to 1133.5 person-years.

Table 4. Comparison of the number of participants who had at least one completed HMR (MBS item 900 rebate claim) at baseline compared to the end of the study

		Patients with HMR at BASELINE		
		Patient with HMR item 900 claimed (yes)	Patient without HMR claimed (no)	Total
Patients with HMR AT THE END OF THE STUDY	Patient with HMR claimed (yes)	33	405	438
	Patient without HMR claimed (no)	113	905	1018
Total		146	1310	1456

HMR= Home Medicines Review (MBS item 900), as sourced from GRHANITE data extraction from clinical information systems.
MBS= Medicare Benefits Schedule

Table 5. Number of Home Medicines Review (HMR) or non-HMRs recipients from 1,456 enrolled participants following intervention.

Number of HMRs or non-HMRs received per participant	Number of individual participants with HMR N=609 (n,%)	Number of individual participants with non-HMR N=719 (n,%)
1	579 (95.1%)	682 (94.9%)
2	30 (4.9%)	36 (5.0%)
3	0 (0%)	1 (0.1%)

Table 6. Number of Home Medicines Review (HMR) and non-HMR completed for participants during the intervention period as reported by IPAC pharmacists, and the reasons given for conducting the HMR.

Reason for conducting an HMR or non-HMR	Number of HMRs N=639 N (%)	Number of non-HMR's N=757, N (%)	p-value
Patient is taking 5 or more regular medications	498 (77.9%)	497 (65.7%)	**0.037**
Suspected non-adherence	241 (37.7%)	328 (43.3%)	0.364
Patient having difficulty managing their own medicines because of literacy or language difficulties, dexterity problems or impaired sight, confusion/dementia or other cognitive difficulties	210 (32.9%)	147 (19.4%)	**0.005**
Patient attending a number of different doctors, both general practitioners and specialists	148 (23.2%)	82 (10.8%)	**0.011**
Significant changes to the patient's medication regimen in the last three months	128 (20.0%)	87 (11.5%)	0.105
Other **	92 (14.4%)	65 (8.6%)	0.069
Patient taking more than 12 medicines per day	77 (12.1%)	47 (6.2%)	**0.020**
Recent discharge from a facility / hospital (in the last four weeks)	77 (12.1%)	49 (6.5%)	**0.014**
Patient on medication requiring therapeutic monitoring	48 (7.5%)	38 (5.0%)	0.093
Symptoms suggestive of an adverse medicine reaction	45 (7.0%)	47 (6.2%)	0.604
Medication with a narrow therapeutic index	44 (6.9%)	45 (5.9%)	0.734
Patient inability to manage drug related devices	30 (4.7%)	20 (2.6%)	0.075

Bold= statistically significant at the 0.05 level. P-value was cluster adjusted (ACCHS cluster) that was determined using the . svy linearized : logit Stata command (data not paired).
Source: Pharmacists Logbook
HMR= Home Medicines Review
Non-HMR= a comprehensive medication management review that was not an HMR.
* Multiple reasons were identified for some reviews.
** Other reasons for conducting **an HMR** included sub-optimal response to medicines, uncontrolled conditions, patients requiring further education and support, and changes in medications or health care providers.
** Other reasons for conducting **a non-HMR** included patients requiring further education and support, deteriorating test results (in particular HbA1c), being pre-diabetic, IPAC pharmacist had concerns regarding medications and there had been changes in medications or health care providers.

Table 7. The number of Home Medicines Review (HMR) conducted by the IPAC pharmacist or external pharmacist during the intervention.

When the HMR was conducted, and by whom:	Number of *HMRs* (N=639)
IPAC pharmacist (n, %)	616 (96.4%)
External pharmacist (n, %)	23 (3.6%)
IPAC pharmacist (n=614)*:	
HMR conducted within IPAC hours	324 (52.8%)
HMR conducted outside IPAC project hours	290 (47.2%)

Source: Logbook
HMR= Home Medicines Review
*Data missing for two HMRs.

Table 8. Assistance provided by the IPAC pharmacists to an external pharmacist for the Home Medicines Review (HMR).

Assistance provided for the HMR*	Number of *HMRs* conducted by an external pharmacist (N=23) N (%)
Sharing clinical records and information	20 (87.0%)
Facilitating ACCHS staff involvement	20 (87.0%)
Transport support	2 (8.7%)
Other **	3 (13.0%)

Source: Logbook
HMR= Home Medicines Review
ACCHS= Aboriginal community-controlled health service
* Multiple types of assistance may have been provided on each occasion.
** Other included no assistance provided by the IPAC pharmacist.

Table 9. Reasons for referring the Home Medicines Review (HMR) to an external pharmacist. *

Reasons	**Number of *HMRs* (N=23) N (%)**
The ACCHS has an existing arrangement with an external independent pharmacist	19 (82.6%)
The ACCHS has an existing arrangement with community pharmacy	4 (17.4%)
Patient preference	0 (0%)
No time for the IPAC pharmacist to do the HMR	0 (0%)
The IPAC pharmacist has reached their maximal cap of 20 HMRs/month	0 (0%)
Other	0 (0%)

Source: Logbook
HMR= Home Medicines Review
ACCHS= Aboriginal community-controlled health service
*As reported by IPAC pharmacists.

Table 10: The location where IPAC pharmacists conducted the non-Home Medicines Review (non-HMR).

Locations	Number of non-HMRs (N=757) N (%)
Clinic	689 (91.0%)
The patient's home	39 (5.2%)
Community venue	6 (0.8%)
A house that was not the patient's home	1 (0.1%)
Other*	22 (2.9%)

Source: Logbook
HMR= Home Medicines Review
Non-HMR= a medication management review that was not an HMR.
* Other non-HMRs were conducted via phone call (with or without an interaction at the clinic) and in renal dialysis or rehabilitation units.

Table 11. Reasons for choosing a non-Home Medicines Review (non-HMR) over a HMR as reported by IPAC pharmacists.

Reasons for choosing a non-HMR over an HMR *	Number of reviews (N=757) N (%)
The patient is at risk of forgoing a HMR if it is not conducted opportunistically (e.g. unlikely to keep an appointment)	364 (48.1%)
No accredited pharmacist available	232 (30.6%)
Patient preference (eg does not want a HMR conducted in their home)	107 (14.1%)
The patient does not meet the criteria for a repeat HMR within 24 months	86 (11.4%)
Sub-optimal response to treatment	55 (7.3%)
An accredited pharmacist is available but the maximal capping of 20 HMRs/month has been reached	36 (4.8%)
An HMR is not appropriate for other reasons**	28 (3.7%)
Conducting a home visit is culturally inappropriate	25 (3.3%)
The patient lives far away or travel poses a risk due to distance or unsafe and difficult road conditions	22 (2.9%)
The patient has no fixed address	9 (1.2%)
There is a language communication barrier in the home setting (i.e. No-one at home to help translate)	2 (0.3%)
There is a need for visual or learning resources that are not accessible in a home visit situation.	2 (0.3%)

Source: Logbook
HMR= Home Medicines Review
Non-HMR= a medication management review that was not an HMR.
* More than one reason was identified for choice of review.
** Other reasons were predominantly not meeting HMR guidelines (no referral from GP, or low number of medications), opportunistic presentation by patient or a HMR not able to be done at home due to social issues or working.

Table 12: Pharmacist recommendations arising from Home Medicines Review (HMR) and non-HMR to prescribers.

Recommendations*	HMR (N=639 reviews)			Non-HMR (N=753 reviews)		
	Number of pharmacist recommendations (n, % of reviews)	Number of recommendations discussed with the prescriber (n,%)	Number of recommendations discussed and accepted by prescribers** (n,%)	Number of pharmacist recommendations (n, % of reviews)	Number of recommendations discussed with prescriber (n,%)	Number of recommendations discussed and accepted by prescribers** (n,%)
Referral for:						
An HMR	0	0	0	18 (2.4%)	14 (77.8%)	13 (92.9%)
A follow-up to an HMR	5 (0.8%)	4 (80.0%)	3 (75.0%)	3 (0.4%)	1 (33.3%)	0
A non-HMR	1 (0.2%)	1 (100.0%)	0	0	0	0
A follow-up to the non-HMR	0	0	0	56 (7.4%)	22 (39.3%)	6 (27.3%)
Allied health	9 (1.4%)	0	0	17 (2.3%)	9 (52.9%)	3 (33.3%)
A specialist	9 (1.4%)	6 (66.7%)	2 (33.3%)	12 (1.6%)	8 (66.7%)	7 (87.5%)
Case conference	3 (0.5%)	2 (66.7%)	1 (50.0%)	1 (0.1%)	0	0
Social services	1 (0.2%	0	0	1 (0.1%)	1 (100.0%)	1 (100.0%)
Internally (eg AHW)	3 (0.5%)	0	0	2 (0.3%)	0	0
Other type of referral	1 (0.2%)	0	0	3 (0.4%)	2 (66.7%)	1 (50.0%)
Cessation of any medicine	242 (37.9%)	160 (66.1%)	104 (65.0%)	196 (26.0%)	120 (61.2%)	63 (52.5%)
Change in the dose of any existing medicine	290 (45.4%)	170 (58.6%)	112 (65.9%)	265 (35.2%)	163 (61.5%)	91 (55.8%)
Addition of a new medicine/s	175 (27.4%)	106 (60.6%)	55 (51.9%)	168 (22.3%)	111 (66.1%)	46 (41.4%)
Change of one or more medicines to a different medicine	122 (19.1%)	80 (65.6%)	48 (60.0%)	129 (17.1%)	88 (68.2%)	49 (55.7%)
Correction to the medication list in the CIS	172 (26.9%)	90 (52.3%)	70 (77.8%)	130 (17.3%)	54 (41.5%)	39 (72.2%)
A dose-administration aid	73 (11.4%)	63 (86.3%)	49 (77.8%)	49 (6.5%)	38 (77.6%)	20 (52.6%)
Patient registration for CTG scripts	6 (0.9%)	5 (83.3%)	3 (60.0%)	0	0	0
Self-management and education advice to the patient	398 (62.3%)	229 (57.5%)	160 (69.9%)	434 (57.6%)	228 (52.5%)	128 (56.1%)
Advice to community pharmacy	200 (31.3%)	114 (57.0%)	83 (72.8%)	62 (8.2%)	41 (66.1%)	23 (56.1%)
Reporting an adverse drug reaction	3 (0.5%)	2 (66.7%)	1 (50.0%)	10 (1.3%)	3 (30.0%)	0
Pathology testing	180 (28.2%)	128 (71.1%)	81 (63.3%)	241 (32.0%)	149 (61.8%)	94 (63.1%)
Total number of recommendations	**1893 (100%)**	**1165 (61.5%)**	**773 (66.4%)**	**1797 (100%)**	**1052 (58.5%)**	**584 (55.5%)**

Source: Logbook

*More than one recommendation to prescribers may have been made by the pharmacist. If pharmacists reported that the recommendations were discussed with the prescriber, it was assumed that all the recommendations were discussed. Some pharmacist recommendations did not require discussion with the prescriber. Examples of recommendations that may not have required discussion with the prescriber included referring the patient to an AHW, and self-management and education advice to the patient.

** The denominator for proportions is the number of recommendations discussed with the prescriber.

HMR= Home Medicines Review

Non-HMR= a medication management review that was not an HMR.

AHW= Aboriginal Health Worker or Practitioner.

CIS= Clinical Information System.

CTG= Close the Gap prescriptions (for Aboriginal peoples and Torres Strait Islanders) that waive or reduce the Pharmaceutical Benefits Scheme (PBS) patient contribution (co-payment).

Prescriber = general practitioner.

Table 13: Number of Home Medicines Review (HMR) and non-HMR that involved pharmacist discussion with the prescriber.

Pharmacist recommendations discussed with prescriber:	HMR		Non-HMR	
a) Yes	**372**	**60.2%**	**408**	**54.2%**
b) No				
Reasons:				
Patient not returned or did not attend appointment	12	9.8%	0	0.0%
Patient appointment made	23	18.9%	39	19.4%
Case conference planned	0	0.0%	61	30.3%
GP not available or not contacted yet	51	41.8%	17	8.5%
Recommendations documented in the report or emailed or not yet reviewed	34	27.9%	78	38.8%
Recommendations not urgent, follow-up is opportunistic	2	1.6%	4	2.0%
Unable to make recommendations as the patient is non-compliant	0	0.0%	2	1.0%
Data missing	99	44.8%	0	0.0%
Subtotal	**221**	**35.8%**	**201**	**26.7%**
c) Not necessary	**25**	**4.0%**	**144**	**19.1%**
Data missing	21	3.3%	0	0.00%
Total	**639**	**100%**	**753**	**100%**

HMR= Home Medicines Review
Non-HMR= a medication management review that was not an HMR.
GP= general practitioner

Table 14. The locations where IPAC pharmacists conducted participant follow-up to a Home Medicines Review (HMR) or non-HMR.

Location of the follow-up assessment	Number of assessments (N=1,548) N (%)
Clinic	1,102 (71.2%)
Phone call	227 (14.7%)
The patient's home	180 (11.6%)
Community venue	23 (1.5%)
A house that was not the patient's home	8 (0.5%)
Other *	8 (0.5%)

Source: Logbook
HMR= Home Medicines Review
Non-HMR= a medication management review that was not an HMR.

* Other follow-up assessments were conducted during transportation of the patient, at the dialysis clinic, community pharmacy, women's group meetings, or by email.

Table 15: Pharmacist assessments arising from a patient follow-up to a Home Medicines Review (HMR) or non-HMR (n=1548) and recommendations to prescribers.

Recommendations discussed with the prescriber	Number of assessments (n=1548) N (%)	Recommendations accepted N (%)
Yes	715 (46.2%)	
Were recommendations accepted? *		
Yes		506 (70.9%)
No		7 (1.0%)
Unsure		201 (28.2%)
No	179 (11.6%)	-
Not necessary**	654 (42.2%)	-

Source: Logbook
HMR= Home Medicines Review
Non-HMR= a medication management review that was not an HMR.
*Missing one assessment.
**Reasons were not collected.

Table 16: The number and type of Medication Related Problems (MRP) identified by IPAC pharmacists, by the type of medication management review.

Medication related problem (MRP) *	HMR (n=639, participants n=609)		non-HMR (n=757, participants n=719)		
	Number of MRPs N (%)	Number of participants with each MRP N (%)#	Number of MRPs N (%)	Number of participants with each MRP N (%)#	P-value
1) At least one medicine:					
a) was not indicated	176 (16.7%)	174 /537 (32.4%)	150 (15.0%)	148 /503 (29.4%)	0.561
b) had the wrong dosage:					
i. overdosage	59 (5.6%)	58 /537 (10.8%)	86 (8.6%)	86 /503 (17.1%)	**0.018**
ii. subtherapeutic dosage	74 (7.0%)	73 /537 (13.6%)	103 (10.3%)	101 /503 (20.1%)	0.296
c) was ineffective for the condition	75 (7.1%)	73 /537 (13.6%)	88 (8.8%)	87 /503 (17.3%)	0.290
d) was associated with an adverse drug reaction	103 (9.8%)	102 /537 (19.0%)	99 (9.9%)	98 /503 (19.5%)	0.903
e) had a 'drug to drug' interaction	57 (5.4%)	57 /537 (10.6%)	82 (8.2%)	81 /503 (16.1%)	0.394
f) had a 'drug to condition' interaction	52 (4.9%)	52 /537 (9.7%)	81 (8.1%)	80 /503 (15.9%)	0.181
2) There was an unnecessary duplication of drugs	59 (5.6%)	59 /537 (11.0%)	47 (4.7%)	46 /503 (9.2%)	0.640
3) The patient directions were incorrect	49 (4.6%)	49 /537 (9.1%)	37 (3.7%)	37 /503 (7.4%)	0.579
4) The patient directions were impractical	90 (8.5%)	86 /537 (16.0%)	53 (5.3%)	51 /503 (10.1%)	**0.032**
5) Other **	262 (24.8%)	251 /537 (46.7%)	174 (17.4%)	168 /503 (33.4%)	0.101
Total number of MRP's	**1,056 (100.0%)**	-	**1,000 (100.0%)**	-	**-**
No MRP's		74/609 (12.2%)		216/719 (30.0%)	**0.035**
Total number of participants *with at least one* MRP (as listed above, except for 'none')	-	**535/609 (87.85%)**	-	**503/719 (69.96%)**	**0.035**
Number of MRP per HMR/non-HMR recipient (with at least one MRP)	1.92	-	2.02	-	

Source: Logbook. **Bold= statistically significant at the 0.05 level.** P-value is cluster adjusted (ACCHS cluster) for comparison of the number of participants and determined using the . svy linearized : logit Stata command (data not paired).
HMR= Home Medicines Review
MRP= Medication related problem.
Non-HMR= medication review that was not an HMR.
* Some reviews have more than one MRP.
** Other MRPs are summarised in Table 17.
#Proportions are derived using the denominator for the total number of patients with at least one MRP.

Table 17: The number and type of 'other' Medication Related Problems (MRP) identified by IPAC pharmacists, by the type of medication management review.

Other types of MRPs identified by pharmacists	HMRs*		Non-HMRs*	
	Number	% of total 'Other MRPs' *N=262*	Number	% of total 'Other MRPs' *N=174*
Patient not adherent or ceased medications	67	25.6	53	30.5
Medications or dosage changed	53	20.2	54	31.0
Documentation or CIS incorrect	42	16.0	15	8.6
Patient needs education	30	11.5	21	12.1
Monitoring required (appointments, tests, pathology testing)	28	10.7	41	23.6
Prescribing omission	26	9.9	16	9.2
Changed medication regime (combined pills or times)	20	7.6	10	5.7
DAA packing errors, dispensing errors or changes required	18	6.9	10	5.7
Patient needs a new prescription because they 'run out'	17	6.5	2	1.1
Patient requires DAA or has issues with DAAs (eg. opening sachets)	10	3.8	2	1.1
Adverse effects	9	3.4	8	4.6
Referrals required to allied health	9	3.4	7	4.0
Medication not indicated	7	2.7	1	0.6
Patient issues not reported or not addressed yet	6	2.3	0	0
Patients medications at home need to be removed	5	1.9	0	0
No supply or no stock of medicine**	3	1.1	0	0
Patient needs or missed specialist appointments	2	0.8	5	2.9
Patient is 'doctor shopping'	2	0.8	0	0
Miscellaneous	4	1.5	5	2.9
Total	**358**	-	**250**	-

Source: Logbook
DAA= dose administration aid
HMR= Home Medicines Review
MRP= Medication related problem.
Non-HMR= medication review that was not an HMR.
CIS= clinical information system
* Some reviews had more than one type of MRP.
** No supply or stock may pertain to supply of medications from community pharmacy or from remote-area Aboriginal health services.

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Assessment of change in medication adherence and self-assessed health status in Aboriginal and Torres Strait Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal Community -Controlled Health Services (IPAC project)

REPORT TO THE PHARMACEUTICAL SOCIETY OF AUSTRALIA FOR THE IPAC PROJECT

Final Report, May 2020.

Prepared by: Couzos S, Smith D, Buttner P, Biros E. College of Medicine and Dentistry, James Cook University, on behalf of the IPAC Project Team.

Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project.

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ABSTRACT

Objective: To assess the impact of integrated pharmacist interventions on self-reported medication adherence and self-assessed health status in Aboriginal and Torres Strait Islander adults with chronic disease attending Aboriginal Community Controlled Health Services (ACCHSs) enrolled in the IPAC study, compared with usual care (pre-intervention), and to develop and validate the performance of a self-reported adherence tool in this context.

Design and participants: The study was a non-randomised, prospective, pre and post quasi-experimental community-based, participatory, and pragmatic trial that integrated a registered pharmacist within ACCHS in Queensland, the Northern Territory or Victoria. The intervention comprised non-dispensing medicines-related services, collaborative and coordinated care, including the provision of medication management reviews. Participants were usual patients of the ACCHSs aged 18 years or older with a chronic disease. Participants consented to receive the intervention and were followed for up to 15 months. In order to enable assessment of barriers to medication adherence in the context of the IPAC study, the NACCHO Medication Adherence Response Scale (NMARS) was newly developed and validated following standard principles of psychometric testing.

Methods: The NMARS tool was developed within a formal conceptual framework and was then refined by an expert panel, pre-tested with Aboriginal consumers, and pilot tested involving IPAC participants. Content and construct validity of NMARS was assessed. Reliability was evaluated with Cronbach's alpha, inter-item, and item-test correlation. Dimensionality was assessed by principal component analysis (PCA). Semi-structured interviews with IPAC pharmacists were conducted to collect feedback about NMARS practicality and suitability.

For comparison of adherence pre- and post-intervention, de-identified participant data were electronically extracted from health records and pharmacist logbook. Main outcome measures included participant scores using a self-reported adherence assessment with a single-item question (SIQ), the adherence assessment according to the NMARS tool, and the self-assessed health status derived from the first question (SF1) of the Short Form (SF)-36 health related quality of life instrument. Adherence testing scores were dichotomised to "adherence" and "non-adherence", and the 6-point SF1 ordinal results were dichotomised to "very good to excellent" health status versus lesser categories. Changes in binary outcome measures were calculated and are presented with cluster-adjusted (ACCHS) 95% confidence intervals. Statistical comparisons of changes in the three outcome measures were conducted using cluster-adjusted (ACCHS) conditional fixed-effect logistic regression analyses for paired data. The effect of participant, health service, and intervention characteristics on differences of outcome measures were examined, including the influence of Home Medicines Review and other comprehensive medication management reviews, using cluster-adjusted (ACCHS and participant clusters) logistic regression analyses.

Results: NMARS content and construct validation procedures affirmed acceptable validity for the newly developed tool. Cronbach's alpha was 0.66 indicating the upper limit for validity and acceptable internal consistency for the purpose of the study. PCA analysis supported unidimensionality of the tool. Pharmacists reported the NMARS and SIQ tools were useful to assess participant adherence.

Participants with paired SIQ and NMARS data (n= 1,103) and paired SF1 data (n=975) were enrolled from 18 ACCHSs involving 26 integrated pharmacists with a median of 213 (IQR: 134-303) and 201 (IQR: 126-279) days between assessments, respectively. Almost all participants were Aboriginal and/or Torres Strait Islander with a mean age at baseline of 58 (SD 29.8) years. At baseline, 70.8% (781/1103) of participants were adherent according to SIQ (scores 6 or 7), 73.3% (808/1103) were adherent according to NMARS (scores 8 to 11), and 18% (175/975) had 'excellent to very good' health status according to SF1. There was a 12.8% (142/1103) and 10.3% (114/1103) net absolute increase in the number of participants adherent to medications at the end of the study compared with baseline ($p<0.001$), using NMARs and SIQ measures respectively, and a 23.9% (233/975) net absolute increase in the number of participants with improved self-assessed health status ($p<0.001$).

Conclusion:

Integrated pharmacists embedded into usual care within ACCHSs in a range of geographical settings, significantly improved the medication adherence of Aboriginal and Torres Strait islander adults with chronic disease, as well as their self-assessed health status. The NMARS tool was a valid and reliable research tool when used to evaluate the extent of medication adherence and reasons for medication non-adherence in the context of this study.

INTRODUCTION

Many Aboriginal peoples and Torres Strait Islanders are unable to access medicines to the same degree as non-Indigenous Australians. Even with a nearly three times higher burden of chronic disease, Indigenous Australians were only able to access 41 cents in every dollar of Pharmaceutical Benefits Scheme (PBS) expenditure in 2013-14.[1] This suggests that Indigenous Australians are missing out on the medicines they need, which may partly explain their much higher hospitalization rates.[2] Strategies to enhance Aboriginal peoples and Torres Strait Islanders medication adherence is a national priority as it is for all Australians. It has been estimated that medication non-adherence adds a $7 billion annual cost burden on the Australian healthcare system due to increased clinic visits, hospitalization, and productivity losses to the nation.[3]

Medication adherence describes the extent to which a patient can take or is able to access medicines as agreed with their prescriber. A range of factors influence adherence including patient characteristics, condition-related, therapeutic, socioeconomic, and healthcare team or system factors as outlined by the World Health Organisation (WHO).[4] It has been suggested that considerable barriers to adherence exist for Aboriginal peoples and Torres Strait Islanders across all these factors,[5] thereby requiring a whole of health system response to tackle them.

One strategy has been to integrate pharmacists within primary health care multidisciplinary teams so that patients and teams can receive better medication management support, direct care from a pharmacist, and a more coordinated experience of care. This strategy is intended to compliment and extend the services provided as usual care by community pharmacists. Increasingly, studies are reporting that the addition of pharmacists to healthcare teams enhances quality prescribing,[6] biomedical outcomes,[7] [8] and reduces hospitalisation.[9] [10] Co-location of pharmacists within general practice appears to enable greater communication, collaboration and relationship building among health professionals.[11] However, the impact of integrated pharmacists on health outcomes for patients with chronic disease has never been evaluated in Aboriginal health settings.

The Australian Government Department of Health, under the Pharmacy Trials Program (PTP, Tranche 2) funding as part of the Sixth Community Pharmacy Agreement (6CPA) sought to improve clinical outcomes for patients utilizing the full scope of pharmacists' practice in

delivering primary health care services. This Program supported a project to investigate the potential gains in health outcomes arising from integrated models of care within Aboriginal health settings- the *Integrating Pharmacists within Aboriginal Community Controlled Health Services* (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project. The project explored if integrating a registered non-dispensing pharmacist as part of the primary health care (PHC) team within ACCHSs (the intervention) led to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples with chronic diseases, when compared with prior (usual) care. Integration within ACCHSs meant that pharmacists had identified positions and core roles, shared access to clinical information systems, provided continuous clinical care to patients, received administrative and other supports from primary health care staff, and adhered to the governance, cultural, and clinical protocols within ACCHSs as part of their shared vision.

If integrated pharmacists support patients to better address all the WHO dimensions of medication adherence,[12] this may play a significant role in improving patient outcomes as 'drugs don't work in patients who don't take them'.[13] In order to evaluate the impact of this intervention, valid and reliable measures of medication adherence were needed. Self-reported measures of medication adherence have particular value because of the ease of data collection but also because they can inform on both the extent of adherence as well as reasons for non-adherence.[14] Health measurement scales exploring health beliefs and behavioural impediments to adherence can be used to infer and predict medication adherence and may facilitate better patient-provider partnerships to enhance therapeutic outcomes.[15] However, all measures of medication adherence, including direct and objective measures of utilisation, have limitations. There are more than 40 different self-reported adherence scales available, many of which explore behaviour, barriers to medication adherence, and beliefs about taking medicines.[16] A systematic review evaluated studies that reported medication adherence *outcomes* involving the Australian Aboriginal and Torres Strait Islander population and found that few studies explained how they measured adherence. Studies that reported methods used either an unvalidated single question about missing medicines, or pill counts with small-sized cohorts.[17] No study used a self-reported measurement scale specifically applicable to Aboriginal and/or Torres Strait Islander participants to infer medication adherence.

The IPAC evaluators examined existing internationally recognised self-reported measures of medication adherence but considered them unsuitable for use in the Aboriginal and Torres

Strait Islander context. Use of existing instruments would have also required their modification and revalidation for the purpose of the evaluation to ensure that what is inferred by the test is actually correct. Cronbach indicated that what is validated is not the test itself, but the proposed interpretation of the test[18] and "the use to which the instrument is put".[19] Revalidation aims to reproduce the psychometric properties of the test shown with the original population when it is applied to a different population.[20] [21] Many instruments use inappropriate language, are culturally insensitive, or are onerous for patients to answer and pharmacists to administer. Furthermore, they require patients to have a high reading level, and those with Likert scales can be confusing. For example, the 8-item *Morisky Medication Adherence Scale (MMAS)*[22] requires a reader's age of 13-15 years, but scales aimed for those whose educational levels are unknown should not exceed reading skills of a 12-year-old (Appendix 1).[23] As many scales are disease-specific this also makes them unsuitable for use in generalist settings.[24]

Consequently, the IPAC project used a self-reported indirect method to assess the extent of medication adherence using a single-item question (SIQ): '*How many days in the last week have you taken this medication?*' This question was used to estimate the proportion of days with the correct number of doses taken, which is a frequent summary statistic used for reporting medication adherence.[25] This single question and its variations have been used in the Kanyini study involving Aboriginal and Torres Strait Islander peoples in Australia[26] and internationally. [27] [28] [29] Even though self-report adherence measures have significant limitations, one study of medication non-adherence measured objectively by gaps in prescription fills was significantly associated with self-reported non-adherence that was defined as at least 'two days missed' when taking medicines over the past week.[30] In order to obtain a more comprehensive assessment of adherence-related behaviour, a specific tool exploring the reasons for non-adherence was developed and evaluated for the IPAC project and used by pharmacists together with the SIQ to inform beliefs and behaviour about taking medications and evaluate change in adherence-related behaviour.

The IPAC project hypothesized that pharmacists integrated within ACCHSs may assist Aboriginal and Torres Strait Islander patients with chronic disease to overcome barriers associated with taking medicines. In order to test this hypothesis, changes in medication adherence measures over time were explored. The influence of such change on participant self-assessed health status was assessed as measures of self-assessed health status can

predict mortality and morbidity in people with chronic disease.[31 32] The medication adherence tools were validated as measures of adherent-related behaviour and feedback from pharmacists was additionally sourced regarding the usefulness of these tools. This report describes the medication adherence and self-assessed health status outcomes for participants enrolled in the IPAC trial as well as development, validation, and pharmacists' perceptions of the adherence tools.

METHOD

Study Design

The IPAC project was a pragmatic, community-based, participatory, non-randomised, prospective, pre and post quasi-experimental study (Trial Registration Number and Register: ACTRN12618002002268) that integrated a registered pharmacist within the ACCHS primary healthcare team for up to a 15-month period. A total of 26 registered pharmacists were recruited to participate in the project, providing 12.3 full-time equivalent pharmacist services for the duration of the study within ACCHS services (n=18). These ACCHSs were recruited for the project across three jurisdictions: Victoria, Queensland and the Northern Territory (NT), and comprised 34% (18/53) of all ACCHSs in these jurisdictions.

The IPAC project methodology has been described in detail elsewhere,[33] including the characteristics of participating health services.[34] Briefly, IPAC pharmacists delivered non-dispensing clinical medication-related services within ACCHSs through a coordinated, collaborative and integrated approach to improve the quality of care of patients (the intervention). The intervention phase of the IPAC study comprised the period from participant enrolment to the end of the study (31st October 2019).

Study participants

Patients were eligible to participate in the study if they were aged 18 years and over with a diagnosis of cardiovascular disease (CVD), Type 2 diabetes mellitus (T2DM), chronic kidney disease (CKD), or other chronic conditions and at high risk of developing medication-related problems (e.g. polypharmacy). Patients attending ACCHSs for their usual care who met the study inclusion criteria were recruited as participants by health service staff and pharmacists. A non-probabilistic sampling method was adopted to reflect the pragmatic study design where all patients who had the chronic disease conditions were invited to participate without setting criteria for compliance or other restrictions.[35] Patients were consented into the study by pharmacists or other health service staff according to the cultural protocols of the ACCHS.[36] Once consented, pharmacists provided supportive clinical care as part of the primary healthcare team to meet the individual needs of the participant. All participating health service sites included participant access to a general practitioner.

Study sites

ACCHSs deliver culturally appropriate comprehensive primary health care services to predominantly Indigenous Australians and were selected as IPAC services using an expression of interest process, supported by criteria to ensure geographical diversity. The majority of ACCHSs (n=13 of 18) were located in outer regional and remote locations of Australia, and in regions of relative greater disadvantage for Indigenous Australians than other locations based on the Indigenous Relative Socioeconomic Outcomes (IRSEO) index.[37] Participating ACCHS sites were similar to other ACCHSs in their jurisdiction according to geographic location, and proportionate patient distribution by sex and Aboriginality [data not shown].

Integrated pharmacist interventions

As a pragmatic trial, pharmacists functioned within existing and usual primary health care service delivery systems and were trained to deliver ten core roles during the intervention phase. Pharmacists provided medication management reviews (to resolve identified medication -related problems and optimise prescribing quality), assessed adherence and medication appropriateness, provided medicines information and education and training, collaborated with healthcare teams, delivered preventive care, liaised with stakeholders such as community pharmacy, provided transitional care, and undertook a drug utilisation review to support quality improvement within the ACCHS. Medication management reviews comprised either a Home Medicines Review (HMR) or a non-HMR which was defined as a comprehensive medication management review comprising some or all of the elements of a HMR, but not fulfilling all relevant HMR criteria stipulated by the Medicare Benefits Schedule (MBS).

The pharmacist intervention targeted both consented patients (participants) and practices, with practice-specific activities directed to health professionals and systems within the service. All pharmacists had access to participants' electronic medical records held at the ACCHS in order to function as a member of the health care team.

Pharmacists

The Pharmaceutical Society of Australia (PSA) recruited pharmacists to be integrated within ACCHSs by contracting with community pharmacy or directly with pharmacists in partnership with the National Aboriginal Community Controlled Health Organization (NACCHO). IPAC pharmacists fulfilled the following eligibility criteria: registration with the Australian Health

Practitioners Regulation Agency (AHPRA); more than 2 years' post-registration experience; and post-graduate clinical qualifications or demonstrated clinical experience. Accreditation to conduct an HMR was preferred, however it was not mandatory. These criteria enabled the selection of pharmacists with skills aligned to the expected scope of practice for this project.

Data collection

De-identified participant data was collected from two existing clinical information systems (CIS) used by ACCHSs (Best Practice and Communicare) to manage patients' electronic health records and a bespoke online database (pharmacist logbook) that was used by integrated pharmacists to record participant responses to adherence measures and SF1 assessments. Demographic indices (such as age, sex, ethnicity, pensioner status, number of medications and doctors encounters, prior medication review) were extracted from CISs in de-identified form using an electronic tool called GRHANITE. This tool required remote installation and regular extraction from IPAC sites for the term of the project.[38] Participant consent was recorded in the CIS by pharmacists. GRHANITE extracted data only from consented patients and copied it to a JCU databank employing internationally recognised point-to-point encryption (P2PE) mechanisms to protect data in transit. The participant identification numbers in the GRHANITE extractions were linked with deidentified participant data recorded by pharmacists in the logbook. The pharmacist logbook was a secure password protected online database, accessible from any device connected to the internet, with dual recording and reporting functionality. The electronic interface was developed to be intuitive and user-friendly to minimise the burden of data entry and reporting by pharmacists.

The participants' primary place of residence was not collected for privacy reasons, and so the location of the health service that was attended by the participant was used instead. Participant data on clinical diagnoses, and if they were engaged in a separate initiative known as the Health Care Homes (HCH) program, was also sourced from the logbook. All IPAC services concurrently participating in the HCH program which was designed to better coordinate the health care of patients with chronic disease[39] were located in the NT and predominantly in remote locations. Some participants were also enrolled in an expanded Community Pharmacy in HCH Trial program which provided additional pharmacy support, but these were later excluded from the analysis.

Outcome measures

Change in adherence-related behaviour assessed using the single item question (SIQ): '*How many days in the last week have you taken this medication?*' was asked for each medication the participant was taking. Pharmacists were trained to express the score as a proportion of the number of days the participant took the correct doses of the medication as prescribed in the preceding week. For example, if the patient took half the doses prescribed for the preceding week, this would be expressed as 50% of the days in the previous 7 days. An 'adherent day' was defined as not missing any doses of prescribed medicines on that day.[40] The mean number of adherent days (score) in the preceding week ranged from 0-7 days, and was based on the mean score for all medications taken by the participant as SIQ responses were assessed for each medicine the participant was taking. This informed the proportion of days with the correct number of doses taken. If the mean number of adherent days for participants was at least 6 of 7 days, this approximated medication adherence for at least 80% of the days indicated, which is a commonly accepted cut-point defining adherence.[41]

An 11-item patient survey tool was developed for the IPAC project to assess the participants' reasons for non-adherence, and was designated the NACCHO Medication Adherence Response Scale (NMARS). The process of development and validation of NMARS is described below. Participant responses to the NMARS were also recorded in the logbook and coded in the participants CIS for data linkage. Pharmacists were not required to calculate adherence test scores. With NMARS, the evaluators derived the total score by summing individual participant scores from each question (item) after applying reverse coding for two items. Out of 11 questions, on an a priori basis, two questions (3 and 5, Table 1) explored a positive trait (knowing how to take medicines; feeling that medicines are good for health) that were reverse scored, whilst the remainder explored negative traits (various difficulties with taking medicine). This yielded a medication adherence score from 0-11, with higher scores representing fewer barriers and therefore better medication adherence. None of the items in the NMARS were negatively worded as such questions are known to be problematic with understanding and interpretation.[42] Adherence and non-adherence cut-scores for the NMARS were set to match the SIQ participant adherence response frequencies as the SIQ had been used as a measure of adherence in other studies. Single-item question scoring was dichotomized to define adherence (a score 6-7 when averaged for all medicines), or non-adherence (a score 0-5).

Self-assessed health status was determined using the first question of the Short Form (SF)-36 health-related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?'.* An extra response option – 'very poor' – was added (as in the SF-8 survey) to reduce the potential for respondents to overstate their health status.[43] Responses to this single-item (SF-1) question have been shown to correlate well with multi-item tools measuring the same construct,[44 45] and are used in the National Aboriginal and Torres Strait Islander Social Survey.[46] Given the SF-1 question is an acceptable method for assessing health-related quality of life, it was used in the IPAC study to minimise survey fatigue[47] for both participants and pharmacists, in accordance with the pragmatic study design.[48 49]

Timing and process of data collection

Pharmacists underwent prior training (on and off-site) in cultural orientation and were trained to ask and elicit participant answers to the questions from the two medication adherence instruments and self-assessed health status so that data collection was standardized. The pharmacist conducted the assessment as a single instrument, and were unaware that they were using two methods to ascertain adherence. Participant responses were predominantly sourced by pharmacists, with occasional collection from other healthcare staff trained by the pharmacist where appropriate (such as Aboriginal Health Workers). Pharmacists were trained to record activity details into the logbook including participant assessment results. These assessments were completed predominantly within the first three months after participant recruitment into the study (baseline), and again prior to the end of the study.

Covariates to change in adherence and self- assessed health status

Changes in NMARS, SIQ and SF1 responses that could be attributable to a range of baseline participant, health service, and intervention-related characteristics (defined as covariates) were examined. The participant-related covariates included: mean age at baseline; median length of time in the study (and/or length of time between adherence measures); sex; the median number of medications; and baseline SF1 response. Health service-related characteristics included the IRSEO score of the health service location. Intervention-related characteristics investigated the influence of a HMR and non-HMR type of medication management reviews, as well as MBS rebates for item 10987 and 10997 (participant follow-

up including for medication adherence that is undertaken by a practice nurse or Aboriginal and Torres Strait Islander Health Practitioner).

Data analysis

All participants with less than 90 days of follow-up were removed from the analysis due to their short length of stay in the study (n=90). Health Care Homes (HCH) participants who were also concomitantly enrolled in another program known as the 'Community Pharmacy in Health Care Homes Trial'[50] were also removed from the analysis (n=47) due to the potential for confounding from the additional support given to individuals in this program. The remaining HCH participants were retained in the analysis. Participants with missing adherence and SF1 data to enable paired data analyses (baseline compared with follow-up) were excluded from the analysis.

Participant characteristics and biomedical indices data was extracted from the JCU SQL Server database using the Navicat 15 for SQL Server (PremiumSoft) database management tool or from the pharmacist logbook as Microsoft Excel files. All data was subsequently analysed using a number of statistical programs including the SPSS Statistics Premium version 24 (IBM) statistical package, Stata/MP 13.0 (StataCorp LP), and Microsoft Excel 2016 (Microsoft). Categorical variables are presented as absolute and relative frequencies. Depending on their distribution, numerical variables are presented as mean and standard deviation (SD) or median and interquartile range (IQR) as indicated accordingly. Statistical analyses were cluster-adjusted as the study design involved cluster sampling using ACCHSs as the primary sampling units.

For the outcome measures NMARS, SIQ, and SF1, the first assessment within the first 90 days was defined as baseline, whilst the last assessment prior to the end of the study was defined as the follow-up assessment. Change in SF1 assessment from baseline was defined as 'improved' or 'worsened'. The original six SF1 categories were converted to binary outcomes so that 'yes pertained to 'excellent, very good' ratings and 'no' pertained to 'good, fair, poor, very poor' ratings. 'Improved' was defined as a change from 'no' to 'yes' and 'worsened' was defined as the reverse change when baseline and follow-up assessments were compared. Responses to the SIQ tool which originally ranged from 0 to 7, were categorised into scores 0 to 5 as "non-adherence" and 6 or 7 as "adherence" (consistent with the commonly accepted cut-point defining adherence) and improvement or worsening was similarly defined as changes between these categories when baseline and follow-up assessments were compared.

Responses to the NMARS tool which originally ranged from 0 to 11, were categorised into scores 0 to 7 as "non-adherence" and 8 to 11 as "adherence" (to match the cut-scores for the SIQ) and improvement or worsening was similarly defined as changes between these categories when baseline and follow-up assessments were compared. Changes in categorised outcome measures were calculated and are presented with cluster-adjusted (ACCHS) 95% confidence intervals. Statistical comparisons of changes in the three outcome measures were conducted using cluster-adjusted (ACCHS) conditional fixed-effect logistic regression analyses for paired data (svy: clogit command of Stata).

The most recent HbA1c value in the 12 months prior to enrolment for participants with T2DM was defined as baseline. For all other biomedical indices the mean baseline values from participants during the preceding 12 -month period prior to trial enrolment was used. The effects of participant, health service, and intervention characteristics on the changes in the three outcome measures were examined using cluster-adjusted (ACCHS and participant clusters) logistic regression analyses (svy: logit command of Stata). Statistical significance was defined at the conventional 5% level. Statistical methods used to assess reliability and validity of the adherence measures used are described below.

Ethics approval

Ethics approval for the project was received from four ethics committees in the three jurisdictions including St Vincent's Hospital Melbourne (SVHM) Human Research Ethics Committee (HREC), Victoria (HREC/17/SVHM/280), James Cook University HREC (mutual recognition of SVHM HREC, approval HREC/H7348), Menzies School of Health Research (HREC/2018-3072) and the Central Australian HREC (HREC/CA-18-3085).

Development and validation of adherence measure NMARS

Development of the NMARS and conceptual framework

Existing international self-reported measures of medication adherence were reviewed to identify those relevant to the Aboriginal and Torres Strait Islander context (SEAMS[51], MMAS-4/8[52], ASK-12,[53] ARMS,[54] RAMS,[55] and BMQ[56]); including a systematic review that explored the reasons for medication non-adherence involving Indigenous Australians.[57] From this review, an initial 16-item scale was derived to explore the reasons for medication non-adherence (Appendix 2). The items were categorised into distinct domains based on the Theoretical Domains Framework that summarises 33 theories of the determinants of human behaviour

(including the Health Belief Model).[58] This conceptual framework offered an explicit theoretical basis for NMARS items for face and content validity, covering issues known to affect the adherence-related behaviour of Aboriginal peoples and Torres Strait Islanders. This tool could then be used to guide pharmacist interventions to influence participant behaviour. The NMARS items aimed to explore the following reasons for medication non-adherence:

- forgetting to take doses
- stopping medicines once feeling better
- sharing or swapping medicines
- beliefs about not needing to take medicines
- travelling away from home or the community
- issues with obtaining medicines whilst away from home
- having other priorities such as sociocultural obligations
- inadequate safe storage of medicines at home
- cost of medicines
- complex dosing schedules.[59]

The items were phrased to be consistent with behaviour change theories such as the Health Belief Model (HBM), which is a psychological framework to predict health behaviour and inform motivational interviewing.[60] Used with participants, NMARS items aimed to explore perceived benefits arising from medication adherence, perceived barriers such as difficulty taking medicines; and perceptions of the severity of outcomes from non-adherence. Success factors for adherence included a belief in the necessity for medication and trust that the medication would be of benefit to health; that the prescription could be paid for and filled; and that there was self-efficacy (confidence in one's ability to take medications, and the capacity for self-management including in situations like travel and responding to social obligations towards the sharing of medicines), knowledge, and cognitive ability. In this way, the items aimed to inform on adherence related behaviour and differentiate people who took their medicines as agreed (adherent) from those who didn't (non-adherent).

As patients tend to overreport adherence to avoid disapproval from their healthcare providers (social desireability bias),[61] questions were phrased to generate a 'yes' response as recommended by other scale developers.[62] For example, non-adherent patients could find it challenging to answer 'no' to the following question: 'did you remember to take your medicines?' Rather, asking a non-adherent patient: 'did you forget to take any of your

medicines yesterday'? would generate a 'yes' which may reduce underreporting of adherence.[63]

NMARS responses were set as categorical and dichotomous (yes/no) to best suit low English literacy and time-restricted clinical research settings such as the IPAC project. Likert scales were not developed to grade answers to questions as they are potentially problematic for populations with low literacy in English such as in ACCHS and remote settings[64] [65] and considerably lengthen the time to administer the survey. Visual analogue scales were not used as the scale was scored by pharmacists and was not administered by participants themselves.

Face and content validity of NMARS

The content validity of the NMARS tool was evaluated iteratively after adaptation of an existing clinical sensibility tool[66] from which a scale-specific content validity index (S-CVI) was derived (Appendix 3A). An item-specific content validity index (I-CVI, Appendix 3B) was derived and adapted from other sources.[67] [68] The project team (n=9), comprising of medical researchers, pharmacists, and Aboriginal and Torres Strait Islander academics, initially completed this testing, which led to revision and reduction of the scale from 16 to 11-items by consensus after clinical sensibility testing.

Further testing of the 11-item NMARS was conducted with:

i) a broader 15-member multidisciplinary expert panel comprising pharmacists, Aboriginal and Torres Strait Islander academics, and public health physicians;

ii) 15 members of the North Queensland Aboriginal community (pre-testing).

Expert panel members were asked to rate each item within the NMARS with regard to relevance and clarity(Appendix 3B). An item was considered *relevant* if it explored the 'extent' of medication adherence and 'reasons for non-adherence'. The item had *clarity* if it was unambiguous, easy to use, and Aboriginal and Torres Strait Islander patients were likely to understand it. The S-CVI and I-CVI were reported as the proportion of agreement by experts for the scale as a whole and for each item in the scale. An I-CVI and S-CVI of > 79% meant the item was appropriate, 70% -79% meant it needed revision, and < 70% meant it needed elimination.[69] Revisions were made to the items based on results and feedback and the NMARS tool was subsequently endorsed by the JCU Evaluation Team on 1 May 2018.

Question properties of NMARS

Reading level

The reading level of the NMARS was assessed with the online *Readability Consensus Calculator* using the Flesch Reading Ease Scale and other scales.[70] Results were confirmed using the reading level calculator (Flesch Reading Ease Scale) in Microsoft Word. The scale was assessed for ambiguous and incomprehensible terms using the online *Question and Understanding Aid (QUAID)* tool.[71] The tool identified potential problems that respondents might have in comprehending the meaning of questions on questionnaires.[72]

Floor and ceiling effects

Floor and ceiling effects were assessed by mapping adherence test response frequencies. A ceiling or floor effect for individual items was evident if more than 80% of participants achieved the best score for a single item.[73]

Pre-testing (Aboriginal and Torres Strait Islander consumer group)

To assess if the NMARS items were easy to understand, the revised scale was pre-tested (single round) with 15 members of a North Queensland Aboriginal community. Members of the community were recruited and interviewed in several locations including: local shopping centres, hardware stores, and in five private residences. An Aboriginal academic (Chair of the Aboriginal and Torres Strait Islander Peoples Strategic Committee, College of Medicine and Dentistry, James Cook University) conducted the interviews from 23rd -27th April 2018. The NMARS was administered verbally, mostly to individuals, and the answers were recorded. Interviewees were also asked to comment on the clarity of each question. Interviewees were provided with a $25 voucher for their time. The perspectives of the Aboriginal academic who conducted the interviews were also noted.

Pilot testing of adherence measures NMARS and SIQ

Pilot study data was used to initially evaluate the adherence tests and the practicality of administration. Pharmacists entered deidentified participant responses to the two tests of adherence (NMARS and SIQ) into the logbook in real-time. This pilot used baseline data from the first 150 participants recruited into the IPAC study (8 August–12 October 2018).

Construct validity of NMARS tool

Assessing construct validity means to assess a scale's ability to perform as expected. In order to validate the SIQ as a proxy criterion and comparator to the NMARS for construct validity testing, the correlations between SIQ responses and certain biomedical indices at baseline were evaluated. The baseline clinical indices that were explored included systolic and diastolic blood pressure (BP), total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), triglycerides (TG), and glycated haemoglobin (HbA1c) in participants with type 2 diabetes mellitus (T2DM). The aim of this analysis was to assess if associations between biomedical indices and SIQ scores were in line with clinical expectations. Spearman rank correlation coefficients together with 95% confidence intervals are presented.

If the NMARS identified medication adherence to the same extent as the SIQ and the two tools were highly correlated, this would provide supportive evidence for convergent validity which is a type of construct validity testing for instruments assessing the same or similar constructs.[74] In this respect, the NMARS was tested for construct validity by assessing for:

a) the convergence of participant responses with a comparative tool (the SIQ),
b) associations between adherence scores and the number of medications per participant,
c) known-group comparisons, and
d) if self-reported adherence scores were associated with self-assessed health status (SF1).

Details for these assessments are described below.

a) Convergent validity of NMARS

To support convergent validity testing,[75] the degree of overall agreement (%) between the SIQ and NMARS was assessed after using the SIQ definition of adherence to set the cut-off scores for adherence from participant responses to the NMARS.

Using NMARS and SIQ responses, the prevalence of adherence at baseline was compared between participant subgroups to assess if the two tools produced similar adherence to non-adherence ratios. The subgroups comprised participants stratified by a mean systolic blood pressure (SBP) < or ≥140 mmHg; a clinical diagnosis of chronic kidney disease and a mean baseline albumin-creatinine ratio of < or ≥ 30mg/g; and a baseline HbA1c of < or ≥ 6.5% in participants with T2DM.

b) Correlation between adherence and number of medications

Further construct validity testing of both NMARS and SIQ adherence tools examined if there was a logical correlation between medication adherence scores and the number of medications prescribed for participants. Spearman's correlation coefficients and 95% confidence intervals were calculated and scatterplots depict the associations. In the pilot study (results not shown), there was better adherence as the number of medications prescribed for participants increased. A positive correlation was therefore proposed between better adherence and polypharmacy. Usually, participants taking many medications are expected to have less adherence than those taking fewer medications, although this relationship is context specific and more complex than it appears,[76] particularly as this effect can be modulated by devices such as dose-administration aids (DAA).[77]

c) Known-group comparisons

Testing for known-groups validity using both NMARS and SIQ scores was undertaken by exploring tool performance in participant groups that logically should have different (or no difference in) adherence-related behaviour from each other. This was to assess whether the hypothesized association with adherence was reflected in the expected direction of the adherence scores of the groups. Based on international studies, we did not expect differences in medication adherence between those with elevated or normal BMI [78 79] or between male and female participants at baseline.[80 81 82] Participant scores for NMARS and SIQ were therefore examined with regard to i) dichotomized BMI (≥25 kg/m^2 and <25 kg/m^2), and ii) sex.

d) Correlation between adherence tools and SF1

Construct validity was also assessed by comparing SIQ and NMARS responses at baseline and at the end of the study with another tool for self-assessed health status (the SF1) to examine if these instruments showed associations in the expected direction.[83] Spearman's correlation coefficients were calculated and presented with 95% confidence intervals. Analysis was based on responses that were z-transformed to compare scales with similar ranges.

Reliability testing of NMARS tool

a) Internal reliability

As a measure of the internal reliability of derived test scores, Cronbach's alpha was computed for the NMARS tool. An alpha value of 0.7-0.9 was considered acceptable for group comparisons.[84] The effect of NMARS item deletion on Cronbach's alpha was also explored. If the effect of item deletion was to increase the alpha value by >10%, this would potentially warrant item deletion from the scale.[85]

b) Inter-item correlation

An inter-item correlation matrix was also examined for the NMARS by calculating respective Pearson's correlation coefficients. Correlation coefficients inform the degree to which scores on one item relate to scores on each other item in a scale.[86] An average inter-item correlation in the range of 0.15 to 0.50 was considered ideal,[87] suggesting the items are assessing a common construct. Inter-item correlations less than 0.15 suggest distinctive traits or states are being explored (noting that this may be desirable for validity). High correlations suggest items may be overly redundant or repetitive and fail to capture the degree of variance in the construct.

c) Item-test (item-total) correlation

Similarly, item-test correlation (an index of item validity) by calculating respective Pearson's correlation coefficients, was undertaken between each NMARS item and the overall total scale score, using the same ideal coefficient reference range as for inter-item correlation. A higher coefficient reflects a higher degree of correlation between the item and the total scale score as an indicator of internal consistency.

Dimensionality

Principal Component Analysis (PCA) was undertaken to ascertain if the NMARS tool was unidimensional. In PCA, if the scale is unidimensional, the items should be highly loaded with only one principal component (factor). Factor loadings for each item was based on yes-no participant responses. We adopted the standard where the eigenvalue of the first factor should account for at least 20% of the variance in the scale items, although there are widely varying standards to define 'considerable' loading onto the first factor.[88] Item loadings of at least 0.4 were considered acceptable and representative of a relevant contribution of the item to a factor.[89] Although the optimal subject-to-item ratio to undertake PCA is unable to be

specified, we accepted a ratio of at least 10:1,[90] which was satisfied given the size of the study.

Pharmacist feedback on the use of adherence tools

Pharmacist feedback on the adherence tools was sourced through semi-structured interviews conducted with IPAC pharmacists between June and August 2019. The interviews took place after pharmacists had completed at least 6 months of their placement within ACCHSs using an interview proforma developed by the qualitative evaluation team based on the project protocol. Consent was sourced at the time of pharmacist recruitment into the project. IPAC pharmacists were invited to participate via email and provided with a list of potential interview times. Interviews were undertaken by Zoom or telephone by two members of the qualitative evaluation team and digitally recorded, transcribed verbatim through the program TRINT and imported to the qualitative management software package, NVivo 12 [62] to facilitate data management and qualitative analysis. Interviews were part of a broader qualitiative evaluation of the IPAC project that has been reported elsewhere.[91]

RESULTS

Of 1,733 patients who consented to participate in the study, the IPAC cohort included in the analysis after initial exclusions comprised 1,456 enrolled participants who remained in the study until the end (Figure 1 and 2). Initial participant exclusions were for those with insufficient data for analysis (n=138), or if study enrolment was less than 90 days (n=40). Participants were also withdrawn from the study (n=99) if evidence of consent was missing (n=38), if there was concomitant enrolment in the HCH community pharmacy support program (n=47), or for other reasons (n=14).

Paired data for medication adherence assessments was available from 75.8% (n=1,103) of participants. The remainder (n= 353) had either missing baseline or follow-up adherence assessments. For participants included in the adherence analysis, the median length of stay in the study from enrolment was 266 (IQR 210-325) days. The median time interval between adherence assessments was 213 (IQR: 134-303) days. Paired data for SF1 assessments was available from 70.0% (n=975) of participants (Figure 2). For participants included in the SF1 analysis, the median length of stay in the study from enrolment was 281 (IQR 218-336) days. The median time interval between SF1 assessments was 201 (IQR: 126-279) days.

Participants

The characteristics of participants with paired medication adherence assessments are shown in Table 2 (n=1103). The mean age of participants was 58 (SD 29.8) years, 61.6% were female, the vast majority (93.2%) were Aboriginal and/or Torres Strait Islander, 84.4% were eligible for social support (pensioner or other concession card holders), and 88.3% had one or more chronic diseases, requiring a mean of 7.3 (SD 13.3) medications each. Most participants (73.8%) attended health services located in inner and outer regional locations, and most of the remainder (23.5%) attended remote or very remotely located health services. Very few participants (2.7%) attended health services located in urban centres.

At baseline, nearly 18% (175/975) of participants with paired medication adherence assessments who also had a SF1 result, had 'excellent to very good' self-assessed health status. At baseline, the mean number of days that participants were deemed to be adherent to medications (SIQ score) was 6.1 (SD 6.6) of the previous 7 days. Only 10.5% of participants had a HMR in the 12 months prior to their enrolment in the project.

The characteristics of participants with paired SF1 assessments is shown in Table 3 (n=975), and were very similar to those with paired medication adherence assessments.

Change in medication adherence

The changes to participant medication adherence after follow-up are shown in Tables 4 and 5 according to NMARS and SIQ, respectively. By the end of the study, there was a significant increase in the number of participants who were adherent to medications compared with baseline, which was evident using both tests of adherence. According to the NMARS, there was a 12.8% (142/1103) net increase in the number of participants adherent to medications at the end of the study compared with baseline (p<0.001). This was derived from the number of participants who improved their adherence (changed from not adhering (score <8) to adhering (score of 8-11) during follow-up) and subtracting those whose adherence worsened (changed from adhering to not adhering during follow-up). There were 204 (18.5%, 95%CI 15.4%-22.1%) participants who improved, whilst 62 (5.6%, 95%CI 3.5%-9.0%) had worse adherence, leaving 142 participants with a net improvement in medication adherence. According to the SIQ, there was also a significant net 10.3% (114/1103) increase in the number of participants who were adherent to their medications at follow-up compared with baseline (p<0.001).

Based on the measure of adherence using the NMARS, participants with poorer self-assessed health status at baseline were more likely to improve their adherence to medications than those whose self-assessed health status was superior (p=0.01). According to the SIQ test, whether a participant rated their health as excellent or poor at baseline, made no difference to adherence outcomes at follow-up (p=0.56). The relatively larger shifts in adherence detected by the NMARS test compared with the SIQ test in those with poorer self-assessed health status may explain these differences (Table 4).

Whilst both HMR and non-HMR recipients significantly improved their medication adherence, HMR recipients had a greater net improvement in adherence at follow-up than non-HMR recipients although this difference was not statistically significant using NMARS (p=0.06).
This difference was significant using the SIQ adherence test, showing that HMR recipients were more likely to improve their medication adherence than non-HMR recipients at follow-up compared with baseline (p<0.001, Table 5).

According to the SIQ, participants younger than 58 years of age were significantly more likely to improve their medication adherence than those 58 years or older (p=0.002, Table 5), whereas this association was not identified using the NMARS (p=0.46, Table 4). None of the other covariates appeared to differentially influence the medication adherence of participants as measured using the NMARS or SIQ, with all participant subgroups showing improved adherence from baseline estimates.

Change in self-assessed health status

Change in the SF1 measure for participants after follow-up is shown in Table 6 and Figure 3. By the end of the study, there was a significant increase in the number of participants whose self-assessed health status improved when compared with baseline (n=233/975, 23.9%, p<0.001).

Irrespective of the type of covariate examined, self-assessed health status improved upon follow-up. Participants who were already adherent at baseline according to the SIQ (n=783) were more likely to improve their SF1 rating at follow-up, than participants who were non-adherent at baseline (n=192, p= 0.007, Table 6). Participants who were prescribed 7 or more medications at baseline (≥ median medication, n=554), were also more likely to improve their SF1 rating upon follow-up than those prescribed fewer medications at baseline (n=421, p=0.013, Table 6).

Validation of adherence measure NMARS

Conceptual framework for the NMARS (face validity) and content validity

An outline of the conceptual framework for NMARS is shown in Table 7. There were conceptual differences between the NMARS and other comparative self-reported medication adherence tools. However, any similarities between the items in the tools may have been a function of the limited number of ways in which to ask about a specific problem - a known problem with the development of new health measurement scales.[92]

Expert panel testing of the NMARS revealed an I-CVI of 80% or above for all questions on relevance (Table 8), and for 9 of the 11 questions for clarity. Two survey questions (Questions 6 and 10) needed revision to enhance clarity (I-CVI=73%, Table 9). These two questions contained wording thought to be contentious such as “scared” and taking medicines in the way “you have been told” and were reworded. Other feedback included recommendations to

reorder the questions and to broaden the question about the cost of medicines. In response to feedback, wording was made more consistent (such as use of the word 'medicines', and 'sometimes'), and clearer (such as replacing 'fewer' with 'less'). Expert panel content validity testing of the revised scale as a whole demonstrated a mean S-CVI of 77% of overall agreement between respondents (95%CI 63.6 - 89.7%, Table 10), which was considered acceptable.

Question properties of NMARS tool

Reading level

The NMARS reading level was assessed to be 'easy to read' and suitable for a 10-11-year-old reading age (Flesch Reading Ease Scale score of 81.5, where a higher score indicates easier reading on a scale of 0-100). In comparison, the 8-item Morisky Medication Adherence Scale[93] was assessed to be of standard/average readability, suitable for 13-15-year olds (Flesch Reading Ease Scale score of 66.6).

Ambiguity

QUAID testing of each item in the NMARS demonstrated few problems with wording, syntax, or semantics. Items containing the term 'sometimes' were identified as having frequency ambiguity. Question 9 had 'quantification ambiguity' with the inclusion of words such as 'much' or 'more' as well as 'working memory overload' that "requires the respondent to hold too much information in mind at the same time". The question was modified after pilot testing to just one 'or' item eliminating the 'working memory overload' result on QUAID. This change did not affect internal consistency in the pilot study as tested with Cronbach's alpha. Fidelity to the conceptual framework was maintained given that 'running out' of medicines is consistent with 'missing out' on taking the medicine. The quantifying terms such as 'much' and 'more' were retained because they were familiar to respondents involved in the pre-test, and the scale needed a reference to frequency and quantity despite the imprecision in language.

The word 'sometimes' was not removed from the NMARS despite frequency ambiguity as its inclusion was thought to make the question less accusatory and more relatable to Aboriginal and Torres Strait Islander participants ensuring validity within the study context. 'Sometimes' running out of medicine, was interpreted to mean the same as 'any recent occurrence' of running out of medicine, with the reference time period for recall being deliberately

unspecified. Rather, the construct aimed to elicit the perception of 'running out' of medicines, not a quantitative estimate of the frequency of this event. As the experience of 'running out' of medicines changes over time (ceases altogether, or becomes apparent), it was assumed that a respondent's perception of 'running' out of medicine would also change. It was also noted that the MMAS-8 scale[94] also included the word 'sometimes'.

Pre-testing of NMARS tool

Of the 15 Aboriginal community members interviewed to pre-test the NMARS, 9 were female (60%), 8 were aged 35-50 years (53%) whilst the remainder were over 50 years. Seven interviewees (47%) had some form of employment and the remainder were either retired or unemployed. The majority of the interviews were conducted one-on-one, including with one couple.

All interviewees were able to answer each question, and no interviewee asked to have the question repeated. Each question was rated as 'very clear'. Interviewees felt the questions stimulated discussion, were unthreatening and made them willing to share information. The interviewer reported: *"I was really quite surprised with their willingness to voice…to air their thought processes around their medication taking"*. The questions highlighted issues that interviewees wanted to talk about. The couple sometimes discussed the questions between each other. There was no sense that the questions encouraged dishonesty as interviewees were comfortable sharing their true feelings. The interviewer reported: *"I thought the answers were really honest, and the replies were genuine".* The interviewer indicated that respondents believed this was the first time anyone, other than the doctor, had asked them about their medications and they felt this showed that someone cared about them.

Broadening the question about the cost of medicines as a barrier to 'get more' medicines was justified as *"the cost [of medicines for interviewees] was not an issue like it was in the past".* This question was modified after content validity testing by the expert panel. The modified question (Q9) asked: *"do you sometimes run out of medicines because it costs too much or it is hard to get more?"*

Pilot testing of NMARS tool

Pilot testing of the NMARS with 150 participants did not lead to any other changes to the scale. Reliability by Cronbach's alpha was 0.66 with less than 10% reduction following item

deletion, so no item was deleted. In view of the minimal change to the scale arising from QUAID testing and no change to the theoretical construct, pilot-testing data was merged with IPAC participant data as a whole as has been recommended elsewhere.[95]

NMARS and SIQ response frequencies

Item-specific response frequencies to the NMARS at baseline are shown in Table 11. Items 3, 5, 6, and 10 had ceiling effects (scores clustered towards the best possible score) indicating that participants expressed little variation in knowledge about taking their medications, the necessity for medications, and behaviour about rationing or sharing medicines, so that responses were directed towards adherence.

Construct validity of NMARS tool

SIQ correlations with biomedical indices at baseline

Of participants with T2DM, 65% (441/677) had baseline HbA1c results that were assessed for correlation with the baseline SIQ number of adherent days. Participants with a higher HbA1c at baseline tended to have poorer medication adherence according to the SIQ (Spearman's correlation coefficient= -0.20, p <0.001, Table 12). Participants with higher baseline measures for TC, TG and LDL-C also had significantly poorer medication adherence with Spearman's correlation coefficients of -0.15 (p=0.0006), -0.09 (p=0.026), and -0.12 (p=0.012) respectively (Table 12,). No statistically significant correlation was found between the baseline level of HDL-C, SBP and DBP with regard to SIQ adherence score (data not shown). Overall, these results support acceptable construct validity of the SIQ as a comparator to the NMARS test.

Convergent validity of the NMARS tool

The SIQ cut-off score for adherence (score of 6-7) indicated that 781 of 1103 (70.8%) of participants were adherent to their medications at baseline. An NMARS cut-off score for adherence that matched this prevalence was a score of ≥8, and this applied to 808 of 1103 (73.3%) participants. Based on a dichotomous distribution of scores (adherent and non-adherent), the participant response frequencies for the NMARS and SIQ assessments are shown in Table 13. There was 79.6% overall agreement between SIQ and NMARS participant responses in the classification of adherence and non-adherence (196 +682/1103).

Both NMARS and SIQ adherence tests showed a consistent 30:70 proportionate split in non-adherence to adherence for every participant subgroup considered (Table 14). In other words,

more than two thirds of participants were designated as adherent to their medications at baseline irrespective of their clinical condition (such as whether participants were hypertensive or normotensive), and this was evident using both adherence tests.

Correlation between adherence and number of medications

A positive and significant linear correlation between higher SIQ scores and the number of medications per participant at baseline is shown in Figure 4 (Spearman's correlation coefficient = 0.24, 95% CI 0.18-0.30, p<0.0001). Similarly, higher NMARS scores positively correlated with a higher number of medications per participant at baseline (Spearman's correlation coefficient = 0.15, 95%CI 0.09- 0.21, p< 0.0001, Figure 5). This means that at baseline, the more medications prescribed for participants, the more likely they were to be adherent to their medications, and this was evident with both tests of adherence.

Known-group comparisons

Neither the NMARS nor the SIQ tool identified a difference in adherence category by participant sex or by BMI, which is consistent with our hypothesis (Table 15). Both adherence tests performed similarly in identifying the adherence pattern of participants according to their sex or BMI. Participants with BMI up to 24.9 kg/m^2 were just as adherent as participants with BMI ≥25 kg/m^2. Similarly, female participants were just as adherent to their medications as males, using both the SIQ and NMARS. The largest difference noted was 4.5% between the sexes for adherence according to SIQ.

Correlation between adherence tools and SF1

Baseline and follow-up SF1 responses positively correlated with both baseline and follow-up SIQ and NMARS responses. Spearman's correlation coefficients ranged from +0.12 to +0.28 showing weak to moderate positive correlations; all associations were statistically significant (p≤ 0.0001). NMARS responses correlated more strongly with SF1 compared to SIQ responses (Table 16). This analysis shows that both adherence tools exhibited a logical relationship between adherence and self-assessed health status, in that participants with better adherence tended to rate their health status higher.

Reliability of NMARS adherence measurement

Cronbach's alpha computed for all participant responses to the NMARS was 0.66 providing acceptable evidence for internal consistency (reliability) for the purpose of the IPAC study.

Item deletion minimally reduced Cronbach's alpha (Table 17) and any increase in Cronbach's alpha from item deletion was considerably less than 10%.

Item-test correlation

Item-test correlation showed a similar degree of correlation between the score for each item and the total scale score computed from the other items in the set, with the exception of items 3, 5, 6 and 10 (Table 17), as there was little variability in answers to these items due to the ceiling effects (Table 11).

Inter-item correlation

All items demonstrated statistically significant correlations with at least one or other items ($p < 0.05$, Table 18). Most items had a Pearson's correlation coefficient of at least 0.15 with another item (up to 0.43) which is consistent with the ideal range and suggests the items are largely measuring the same construct. The exceptions were items 3, 5, 6 and 10 with inter-item correlation coefficients <0.15. Overall, the NMARS had a low to moderate item homogeneity, which means it has a broad coverage of the adherence construct without redundancy and repetition, as all inter-item correlations were <0.75.[96]

Most items correlated negatively with items 3 and 5 supporting reverse scoring of these items. Item 5 correlated negatively with items 1, 7 and 8. Item 5 asks: '*do you feel that taking your medicines will be good for your health?*'. Health belief theory suggests that a perceived benefit of medicines should be linked with better adherence behaviour, so a 'yes' answer to item 5 would be expected to negatively correlate with a 'yes' answer to item 1 that asks 'did you forget to take any of your medicines yesterday?' or item 7 that asks: *'do you sometimes stop taking your medicines because you think you are ok?'.* The same reasoning applies for item 8 that asks "*do you sometimes stop taking your medicine because you think it might make you sick?*'. Item 3 asked '*do you know when and how to take your medicines?*' which correlated negatively with items 4, 7 and 11, but there was negligible correlation with the other items. Item 10 showed correlation only with item 2.

Items 3 and 5 lacked correlation with each other. This result is best explained by the lack of variability in the traits measured by these items, including with items 6 and 10, because of ceiling effects (Table 11).

Dimensionality

Principal component analysis for NMARS

Principal component analysis showed that 30.3% of the variance in the 11 items was accounted for in the first factor, with an eigenvalue that was 2.4 times that of the next factor with a clear inflection point as shown in the scree plot (Table 19 and Figure 6). This supports scale unidimensionality (measurement of a single attribute) based on a recommendation that the first factor should account for at least 20% of the variance.[97]

Analysis of NMARS items indicate that most items loaded on the dominant first factor (Table 20) although none of the items loaded to at least a value of 0.4 on any factors. Items 3, 5, 6 and 10 did not load well on factor 1 or other factors, again likely reflecting the lack of variability in participant responses to these items. Item 9 also loaded on other factors suggesting that concerns about running out of medicines may also reflect other traits as well as forgetfulness and health beliefs explored by the NMARS. For all other items, the percentage of variance explained by the second and third factors was too small to conclude that they represented meaningful separate attributes in the construct of adherence.

Pharmacist feedback on the use of adherence tools

Integrated pharmacists (n=24) were interviewed regarding the use of the NMARS and SIQ,[98] and most found the tools useful for the purpose of assessing participant adherence. In particular, pharmacists repeatedly described the NMARS as a conversation starter about taking medicines, that also acted as a prompt to discuss adherence barriers that might not have otherwise been raised. Just over half of the pharmacists reported that the NMARS questions were generally easily understood by participants but that some further explanation or clarification may have been required for some of the questions depending on the individual. Many pharmacists adapted the delivery of the questions into a conversational style, whilst reassuring the participant that there were 'no right or wrong' answers.

Some of the NMARS questions were difficult to understand for participants with very little English, particularly as some questions differed in subtle ways. For example, participants remarked on the similarity of items 3 and 4. One pharmacist reported that item 7 which asked: 'do you sometimes stop taking your medicines because you think you're okay?' was difficult for patients to understand. The main concern was that the question appeared to suggest that stopping medicine was 'the correct' answer. One pharmacist noted that whilst

item 1 referred to forgetfulness, the issue for some participants was intentional rather than unintentional nonadherence. With regard to the SIQ, a few participants had difficulty remembering the number of days that they had taken all doses of their medications over the previous 7 days.

Pharmacists felt that participants were not necessarily honest with their answers the first time they completed the NMARS. Two-thirds of the pharmacists felt that participant responses were more honest at follow-up encounters than baseline due to the enhanced rapport in the therapeutic relationship. Pharmacists also reported that participants had told them that their adherence had much improved since the initial survey encounter, with some participants admitting that they had not been entirely honest with their answers at that time.

Some pharmacists noted that little had been done in the past to address the issue of medication adherence with patients at their health service. Participants had told pharmacists that staff had previously not taken the time to explain their medications to them. Subsequently, improvements in medication adherence were attributed to enhanced participant education, changes in prescribed medications, and simplification of medication regimens as recommended by pharmacists.

DISCUSSION

Integrated pharmacist interventions led to significant increases in self-reported medication adherence and improvements in self-assessed health status of Aboriginal and Torres Strait Islander adults with chronic disease enrolled in the IPAC study. These changes were evident over a median interval between assessments of just over 6 and a half months, using both measurement tools for adherence and the SF1 measure. Participants comprised patients attending ACCHSs with at least one chronic disease, where nearly 90% also had comorbidity (≥1 chronic medical conditions); and the average age of the cohort was 58 (SD 29.8) years.

A statistically significant net improvement in adherence and self-assessed health status was observed for all participants, irrespective of the number of medications prescribed at baseline. Self-assessed health status also improved to a significantly greater extent in participants prescribed more medications at baseline (≥7), or those already adherent at baseline, than those prescribed fewer medications or less adherent at baseline. This is consistent with the positive correlation identified at baseline between the number of prescribed medications per participant and the extent of self-reported adherence to these medications.

A statistically significant net improvement in self-assessed health status was observed for all participants, irrespective of whether they were HMR or non-HMR recipients. In contrast, medication adherence improved in HMR recipients to a greater extent than non-HMR recipients, shown with both tests of adherence, although this was only significant with the SIQ test. Elsewhere it was shown that demographic and clinical characteristics of HMR and non-HMR recipients did not meaningfully differ,[99] although a greater proportion of non-HMR recipients attended remote and very remote health services than HMR recipents.[100] This suggests that the lesser improvement in adherence in non-HMR recipients may have been influenced by remoteness factors rather than the type of medication management review being conducted. It was observed that relative to the the median IRSEO score, the location of health services (level of Indigenous socioeconomic disadvantage) by IRSEO score made no difference to improvements to either participant adherence or self-assessed health status.

Change in medication adherence was assessed in this study using the SIQ and a new 11-item tool (NMARS) tested for validity and internal reliability. The NMARS was developed as a patient survey for use with Aboriginal and Torres Strait Islander peoples in culturally

appropriate comprehensive primary healthcare settings, to enable valid inferences to be drawn about medication adherence given the lack of other validated measures suitable for this context. The NMARS was used together with the SIQ to offer direct and indirect self-reported measures of adherence. The SIQ quantified self-reported measures of adherence over a 7-day recall period (direct), whilst the NMARS predominantly explored the reasons for non-adherence and/or behavioral barriers to adherence (indirect). Each item in the NMARS represented unique, but additive factors that contributed to an overall assessment of adherent behaviour acting as 'causal' indicators in a composite variable of adherence, rather than 'effect' indicators.[101] The conceptual framework for the NMARS outlined the relevance of each item to Aboriginal and Torres Strait Islander peoples focussing on perceived benefits of medicines, the necessity for and knowledge of medicines, self-efficacy, trust in health services, the perception of illness as a threat, the rationing and sharing of medicines, and the effect of cost and other difficulties accessing medicines.

There were four NMARS items that demonstrated participant response ceiling effects (items 3, 5, 6, 10), where the best score was achieved by more than 80% of participants. At baseline, nearly 92% of participants reported having a good understanding of when and how to take their medicines (item 3), 89% agreed on the necessity of medications for health (item 5), less than 10% were rationing their medicines (item 6), with fewer than 2% giving away or sharing medicines to the extent of running out (item 10). The latter finding contrasts with a qualitative analysis of Aboriginal health practitioner perspectives that medication sharing within Victorian Aboriginal communities was widespread and was an expression of community caring.[102] With the exception of these four items, all items demonstrated acceptable inter-item correlation. As the NMARS was assessing distinctive traits or states associated with medication nonadherence as causal indicators of the construct, it was not necessary for every item to correlate with each other provided they are causally related to the construct.[103] In the NMARS, one trait (or state) associated with non-adherent behaviour did not imply that another would also be present in the same participant. Thus, the lack of inter-item and item-total correlation in the four aforementioned items may be because these items were measuring a different trait/state from other items, or the lack of variability in participant responses to these items is a more likely explanation. The negative inter-item correlation for items 3 and 5 affirmed reverse scoring for these items. For example, a perception that medicines may cause harm (Q8) was negatively correlated with views that medicines are good

for health (Q5), which is consistent with other behaviour assessment scales used to measure change in medication adherence.[104]

Items 6 and 10 in the NMARS also provided empirical evidence that relatively few Aboriginal and Torres Strait Islander participants with chronic disease rationed or shared their medicines with others to the point of insufficient supply. This may be a common but underrecognised practice in any population because these questions are rarely asked of patients.[105] Nevertheless, up to 10% of patients attending ACCHSs may be sharing or rationing medications, and recognising this can help to address this behaviour or to mitigate it by prescribing medications that are less likely to be affected by delayed or missed doses despite imperfect adherence.[106]

The SIQ measured the extent of adherence with adherence defined as a participant taking all of the prescribed medication doses at least 6 of 7 (~80%) of the days indicated. Based on the SIQ, the prevalence of medication adherence for the IPAC cohort as a whole was 71% at baseline. This represents a similar level of adherence to that reported in a systematic review of studies that found two-thirds of Indigenous Australians were adherent to medications[107] which is also similar to that reported for other populations indicating adherence up to 79%.[108] This result and the positive correlation between SIQ scores and higher baseline biomedical indices supported the selection of the SIQ as a comparator to the NMARS given the absence of any other comparative gold standard method of assessing medication adherence in the context of the IPAC study. An NMARS score of 8-11 was set to distinguish adherent patients from non-adherent patients as effectively as the SIQ based on overall participant response frequencies with 79.6% agreement between the tests.

Construct validity for both the SIQ and the NMARS was evident given similar estimates of adherence (approximately two-thirds of participants) irrespective of differences in their baseline blood pressure, HbA1c, or degree of albuminuria in the presence of chronic kidney disease. It was also postulated that the tools should identify a similar prevalance of medication adherent behaviour using known-group comparisons such as participant sex or BMI, and this was shown for both tests. Sex was selected as a trait to test the contruct validity of SIQ and NMARS given that most studies show no association between sex and medication adherence. Systematic reviews and overviews indicate little evidence for sex as a predictor of adherent behaviour,[109 110 111 112] although male gender has been reported to have both a positive and

negative effect on adherence.[113] Similarly, obesity and overweight was selected as a characteristic that would not be associated with adherence scores, as systematic reviews of patient-related and condition-related factors influencing medication adherence rarely include obesity as a risk factor influencing adherence one way or the other.[114 115]

Construct validity was also supported given that medication adherence was greater for IPAC participants who took more medications - a positive correlation that was shown at baseline for both tests of adherence. Although decreased adherence is usually expected with polypharmacy,[116 117] many studies have reported no relationship between the number of medicines taken and adherence,[118] whilst others have reported increased adherence.[119] This suggests the nature of the relationship between the number of prescribed medications and adherence is complex, as some patients with chronic disease co-morbidities may be more adherent than those with fewer comorbidities, and patients with some types of chronic disease may be more adherent than others.[120] Meanwhile, the use of dose administration aids (DAA) in patients with appropriate polypharmacy has been shown to enhance medication adherence.[121 122 123] Improved adherence in those with serious disease and polypharmacy may also be explained by an increased motivation to take medications and better access to supports than others.[124] Moreover, patients taking more medications tend to have stronger beliefs about the necessity to take medications which predicts better adherence.[125 126] Serious illness warranting treatment with multiple medications may also trigger an adaptive behavioural response towards better adherence.[127] Indeed, in a qualitatitive analysis for the IPAC study, all but one of the integrated pharmacists estimated that between 33% to 100% of participants were using DAA's at the start of the study.[128] The observed positive correlation between adherence and the number of medications in our cohort is therefore likely to be real, which validates the construct of the NMARS to identify behaviour reflective of non-adherence.

As the IPAC project progressed, DAA use by participants improved,[129] and the primary reason given for contact between the integrated pharmacist and community pharmacy was for DAA preparation and supply on behalf of the study participants.[130] Community pharmacists also reported that integrated pharmacists facilitated patients from the ACCHS receiving DAA's.[131] Improved DAA use as well as other supports provided by integrated pharmacists such as medication management reviews,[132] improvements to prescribing quality,[133 134] education and increased liaison with community pharmacy and other healthcare providers for the transitional care of patients,[135 136] are factors that are most likely to explain the significant

increase in adherence reported by this study.

As participants were supported to optimise medication adherence, improvements to clinical endpoints were expected. As reported elsewhere, IPAC participants had significant improvements to blood pressure, lipids, and glycaemic control (in participants with T2DM), as well as a reduction in the rate of eGFR decline.[137] Given that improved adherence to antihypertensive medication is associated with higher odds of blood pressure control,[138] and good adherence is associated with lower mortality for a range of conditions,[139] improving the medication adherence of Aboriginal peoples and Torres Strait Islanders is an important intervention to optimise the care of those with chronic disease.

A significantly greater proportion of participants rated their health as excellent or very good by the end of the study than at baseline according to the SF1. Other Australian studies involving non-Indigenous Australians have also used a five-point SF1 with patients to self-rate health status and found a better health rating after patients had received support from chronic disease self management programs, but no change in medication adherence.[140] A large US study involving mostly unemployed adults (mean age of 60 years) with cardiovascular disease showed that adherence to medications was associated with better self-rated health status and that non-adherence to medications was associated with socioeconomic stressors.[141] In this study, the positive correlation between medication adherence (tested using the self-reported ARMS-7 instrument) and self-rated health (tested using a 10-item patient reported tool) was similar to that observed in the IPAC study with a Spearmans rho of + 0.21.[142] The IPAC study finding that improved adherence can somewhat predict improvement in self-assessed health status further reinforces the value of efforts to overcome the barriers that Aboriginal peoples and Torres Strait Islanders face when taking medications.

The NMARS demonstrated adequate face, content, and construct validity, with readability suitable for the population for whom it was intended, using validation methods consistent with international standards.[143] [144] Testing also affirmed adequate internal consistency (reliability), and unidimensionality meaning the scale measured a single construct that was reflective of non-adherent behaviour. The NMARS offered a composite measure of a range of participant traits (or 'states' if behaviour is transient) to inform efforts to modify nonadherent behaviour, even when the behaviour was not directly observable by pharmacists.[145] The NMARS tool standardised assessment of commonly held beliefs about taking medicines

opening up conversations between pharmacists and participants about adherent-related behaviour. Opening up discussion about adherence with patients is vital as educational and behavioural interventions to enhance medication adherence have been repeatedly shown in systematic reviews to be most effective.[146] [147] Participant responses to the NMARS items assisted pharmacists to assess and tailor personalised strategies as these are more likely to improve and support good medication-taking behaviour.[148]

A strength of this study is the large sample of Aboriginal and Torres Strait Islander patients with existing chronic disease that were surveyed for adherence-related behaviour and perceptions of their health status, repeatedly over time. Two self-report methods of adherence were assessed, unlike most previous studies that adopted one method.[149] All participants were recipients of pharmacist services integrated within primary health care settings and followed-up prospectively. They were usual patients accessing ACCHSs, were general patients, a large number of ACCHSs participated in the study, and the study design was pragmatic being consistent with usual care. Furthermore, pharmacists acting as healthcare providers within the ACCHSs collected the self-reports from participants (rather than research personnel) which is consistent with usual care. Improvements in self-assessed health and medication adherence would therefore be generalisable to the broader ACCHS adult patient population with chronic disease if they received support from pharmacists integrated within these health services.

Limitations

A limitation of this study is that adherence measures relied on self-reported adherence rather than objective measures of medication adherence such as independent community pharmacy dispensing records, pill counts, or daily medication diaries. Subjective measures such as self-reports tend to overestimate adherence due to social desirability bias which is a known limitation.[150] Whilst all methods of adherence assessment (including objective measures) have drawbacks, [151] self-reporting is known to be a reasonably accurate measure of adherence,[152] providing additional information about the reasons for non-adherence that objective measures cannot provide,[153] is more practical,[154] and is the most common method used in research and clinical settings.[155] [156] In order to improve the accuracy of adherence assessment, the use of more than one measure is often recommended,[157] [158] however, pre-existing measures of self-reported adherence validated in our context were not available for the present study. This may be a limitation or a strength, as the use of more complex self-

report tools could have been further problematic as pharmacists found some participants had difficulty understanding some NMARS questions. A seven day recall of medication taking was also problematic for participants when using the SIQ, and there is a suggestion from other studies that a 3 or 4-day recall may be just as effective in eliciting adherence from self-reports.[159]

Criterion-based validity assessments of NMARS could not be conducted in the absence of a relevant gold-standard criterion that had been validated to assess self-reported medication adherence in this target population. Discriminant validity testing could not be conducted in the absence of participant test results from an unrelated but comparable test construct. Further, test-retest reliability (assessing for intra and inter-observer reliability) was not undertaken due to the pragmatic study design. According to international standards, assessing test-retest reliability is not essential with patient experience measurement scales.[160]

Without an external and randomised control group, it is possible that participant medication adherence as measured using the SIQ and NMARS improved independently of the IPAC intervention. Whilst participants tended to overreport adherence due to social desirabaility bias at baseline, this settled to more honest representations of adherence towards the end of the study, as reported by pharmacists. This would have the effect of minimising or even reversing the observed change in adherence from baseline. Moreover, qualitative analysis of accounts from participants, integrated pharmacists, and community pharmacists revealed a universal belief that participant adherence to medications had been improved during the course of the study.

Other indirect influences on participant behaviour or self-assessed health status may have also independently increased participant adherence to medications, such as quality improvement in service activity as a whole. This possible influence was investigated through repeated health system assessments of participating ACCHSs. ACCHS characteristics and service activity during the course of the study did not change in ways that were independent of integrated pharmacists that may otherwise explain the increase in participant adherence to medications.[161]

The influence of other potentially confounding programs on participant behaviour was

removed from the analysis. This included those participants concurrently enrolled in the *Community Pharmacy in Health Care Homes* Trial program that was undertaken around the same time as the IPAC project.[162] The few IPAC participants concurrently enrolled in the broader HCH program were not in receipt of additional community pharmacy support beyond that available through usual care. Moreover, the IPAC pharmacist was integrated within the services operating as a HCH trial site, meaning that the HCH program could not have acted as a confounder independently of the pharmacist to influence participant behaviour.

Interviewer bias may have influenced the adherence scores reported by pharmacists when using both SIQ and NMARS which is a study limitation that applies to the use of any instrument testing self-report.[163] However, pharmacists were not expected to calculate a composite score from the use of the tools, although they could interpret the pattern of item responses at an individual level to tailor the supports they provided to participants.

This study provided evidence to support the interpretability of NMARS scores but did not assess for responsiveness (longitudinal validity) which is another type of construct validity testing to measure change in adherence scores over time to assess if they mirror a change in scores from another criterion.[164] This type of validation is not considered essential for research tools exploring patient reported outcome measures,[165] and was not essential to the primary objective of the IPAC study.

Consumer focus groups were not used to derive scale items for the NMARS as a recent systematic review of barriers faced by Indigenous Australians had been published.[166] Rather, Aboriginal informants participated in feasibility and clarity testing, shaping the wording of the NMARS questions whilst not changing the intent. One-on-one interviews with informants rather than group discussions were conducted by an academic who was a member of the Aboriginal community, even though group discussions are sometimes recommended.[167] In the Aboriginal context, people may feel more comfortable expressing honest views with a member of their own community than an outsider. Complex Indigenous family relational and group dynamics may be a source of strength or weakness in group discussions.[168]

A Cronbach's alpha value of 0.7-0.9 is usually considered acceptable for group comparisons[169] although an alpha below 0.7 is acceptable in certain contexts.[170] [171] The low degree of variance for four questions in the NMARS may explain an alpha of 0.66 and low inter-item correlations

for these items in our cohort. Whilst the reliability of a measure is linked to the characteristics of the population to which it is applied,[172] precision could have been enhanced by the addition of more scale items, but this would have increased test length. Ordinal rating scales were avoided in favour of dichotomous response choices which reduced information about behaviour variance, but this was a trade-off to minimise respondent burden.[173] [174]

CONCLUSION

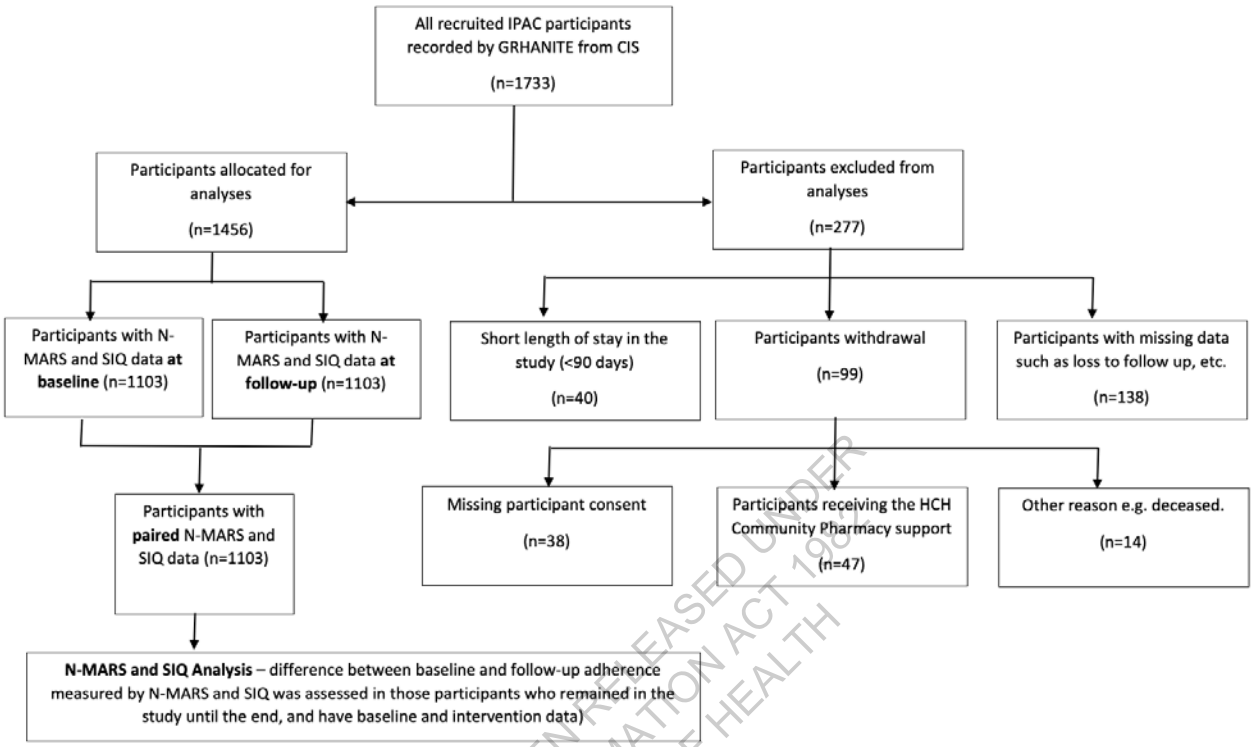
This is the first study to investigate the impact of integrated pharmacist interventions on medication adherence and self-assessed health status with regard to Aboriginal and Torres Strait Islander participants with chronic disease. The intervention comprised non-dispensing medicines-related services, collaborative and coordinated care, including the provision of medication management reviews by pharmacists integrated within Aboriginal community-controlled health services. Medication adherence was assessed using two self-reported tools shown to be valid, reliable, and suitable for the context of this study. The tools measured the extent of adherence as well as informed on common behavioural determinants of medication adherence relevant to the Aboriginal and Torres Strait islander adult population at all participant literacy levels irrespective of their medical condition. The study findings show that integrated pharmacists embedded into usual care in a range of geographical settings, significantly improved the medication adherence of Aboriginal and Torres Strait islander adults with chronic disease, as well as their self-assessed health status.

Table 1. The NMARS used with participants in the IPAC study.

Question	N-MARS patient survey	Scoring
Q1	Did you forget to take any of your medicines yesterday? **Yes/No**	Yes= 0
		No=1
Q2	Is it hard for you to remember to take your medicines? **Yes/No**	Yes= 0
		No=1
Q3	Do you know when, and how, to take your medicines? **Yes/No**	Yes= 1 (reverse scored)
		No=0
Q4	Is it hard for you to take your medicines in the right way, like the doctor, nurse, or AHW said? **Yes/No**	Yes= 0
		No=1
Q5	Do you feel that taking your medicines will be good for your health? **Yes/No**	Yes= 1 (reverse scored)
		No=0
Q6	Do you sometimes take less medicine to make the medicine last longer? **Yes/No**	Yes= 0
		No=1
Q7	Do you sometimes stop taking your medicines because you think you are ok? **Yes/No**	Yes= 0
		No=1
Q8	Do you sometimes stop taking your medicine because you think it might make you sick? **Yes/No**	Yes= 0
		No=1
Q9	Do you sometimes 'run out' of medicines because it costs too much, or it is hard to get more? **Yes/No**	Yes= 0
		No=1
Q10	Do you sometimes run out of medicines because you give them away or share them with other people? **Yes/No**	Yes= 0
		No=1
Q11	Do you go without your medicines when you are away from home? **Yes/No**	Yes= 0
		No=1

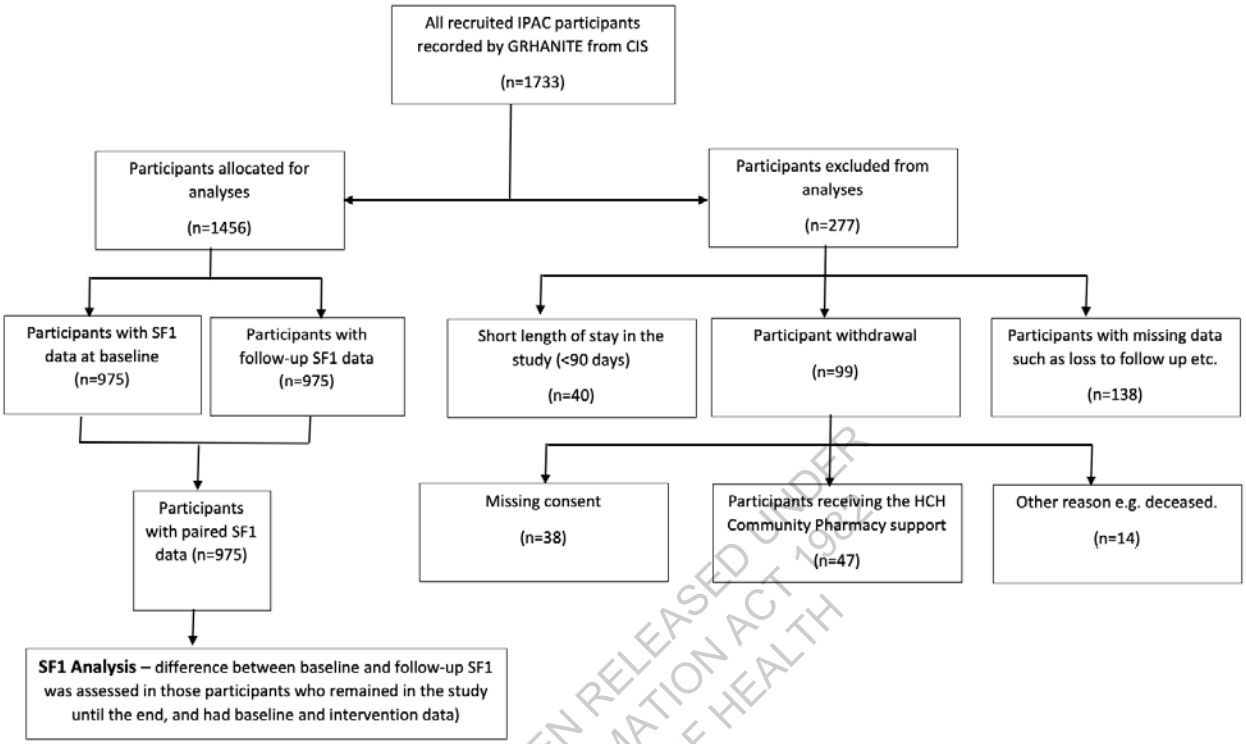
NMARS= NACCHO Medication Adherence Response Scale (11-item) for the assessment of the reasons for medication non-adherence, generating a score defining adherence from 8 to 11. Questions 3 and 5 were reverse scored.

Figure 1. Participant flow diagram for medication adherence assessment analysis in the IPAC study cohort



CIS= Clinical information systems
GRHANITE= Data extraction tool
NMARS= NACCHO Medication Adherence Response Scale (11-item) for the assessment of the reasons for medication non-adherence, generating a score defining adherence from 8 to 11.
SIQ= A self-reported single-item question ('How many days in the last week have you taken this medication?') exploring the extent of non-adherence, assessed as a mean score for all medications. An 'adherent day' was defined as not missing any doses of prescribed medicines on that day. Pharmacists recorded the number of adherent days for each medication the patient was taking, generating a score defining adherence from 6 to 7.

Figure 2. Participant flow diagram for self-assessed health status assessment (SF1) analysis in the IPAC study cohort.



CIS= Clinical information systems
GRHANITE= Data extraction tool
SF1= Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: 'In general, would you say your health is excellent, very good, good, fair, poor, or very poor?'

Table 2. Baseline characteristics of IPAC participants with paired self-reported medication adherence assessments (N-MARS and SIQ, n=1103).

Participant characteristics	IPAC participants (n=1103)
Location classification by ASGS-RA (2016)	
Major city (RA1)	30/1103 (2.7%)
Inner regional (RA2)	317/1103 (28.7%)
Outer regional (RA3)	497/1103 (45.1%)
Remote (RA4)	110/1103 (10.0%)
Very remote (RA5)	149/1103 (13.5%)
Mean age at baseline (SD) [years]	*n=1100*
	58 (29.8)
Sex (n,%)	
Female	677/1100 (61.6%)
Male	423/1100 (38.4%)
Ethnicity (n,%)	
Aboriginal and/or Torres Strait Islander	1024/1099 (93.2%)
Non-Indigenous	75/1099 (6.8%)
Pensioner/concessional (n, %)	928/1100 (84.4%)
CTG scripts eligible (n,%)	819/1100 (74.5%)
Patient engaged in Health Care Home program (n, %)[a]	114/1103 (10.3%)
Number of medications[# b]	*n=1103*
Mean (SD)	7.3 (13.3)
Median (IQR)	7 (5-9)
Prior medication review (MBS item 900) [c] (n,%)	116/1103 (10.5%)
Doctors' encounters prior to enrolment (per 12 months) [d]	*n=1037*
Mean (SD)	7.8 (19.3)
Median (IQR)	6 (3-10)
Mean number of medication 'adherent days' (SD)[e]	*n=1103*
	6.1 (6.6)
Self-assessed health status score (SF1) (n,%) [# f]	
Excellent	42/975 (4.3%)
Very good	133/975 (13.6%)
Good	414/975 (42.5%)
Fair	276/975 (28.3%)
Poor	89/975 (9.1%)
Very poor	21/975 (2.2%)
Recorded clinical diagnoses (n,%): [#]	
T2DM	677/1103 (61.4%)
Hypertension	706/1103 (64.0%)

Dyslipidaemia	557/1103 (50.5%)
Patients with established or existing CVD[g]	365/1103 (33.1%)
Chronic kidney disease	439/1103 (39.8%)
Patients with a diagnosis of rheumatic heart disease (RHD) or Acute rheumatic fever (ARF)	34/1103 (3.1%)
Chronic obstructive pulmonary disease (COPD)	94/1103 (8.5%)
Depressive disorder	61/1103 (5.5%)
Patients with comorbidity (1 or more chronic diseases)	974/1103 (88.3%)
Patients with multi-morbidity (2 or more chronic diseases)	866/1103 (78.5%)

SD = cluster-adjusted standard deviation (ACCHS cluster);IQR = inter-quartile range;
CTG= Close the Gap prescriptions (for Aboriginal peoples and Torres Strait Islanders) to waive or reduce the Pharmaceutical Benefits Scheme (PBS) patient contribution (co-payment).
CVD= cardiovascular disease.
MBS= Medicare Benefits Schedule.
# Sourced from the pharmacist's logbook.

[a] Health Care Homes (HCH) program funded by the Australian Government designed to better coordinate the health care of patients with chronic disease
[b] Denominator was sourced from logbook data entered by pharmacists with regard to the medication adherence of participants.
[c] Prior MBS item 900 claim measured for the 12-month period prior to participant enrolment. This rebate pertains to a Home Medicines Review (HMR).
[d] Medicare GP consultation claim items: vocational registration: 3, 23, 36, 44. Non-vocational registration: 52, 53, 54, 57.
[e] A self-reported single-item question ('*How many days in the last week have you taken this medication?*') exploring the extent of non-adherence, assessed as a mean score for all medications. An 'adherent day' was defined as not missing any doses of prescribed medicines on that day. Pharmacists recorded the number of adherent days for each medication the patient was taking.
[f] Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'
[g] CVD= cardiovascular disease: It refers to any of the following: coronary heart disease, cerebrovascular disease, and peripheral vascular disease.

Table 3. Baseline characteristics of IPAC participants with paired self-assessed health status assessments (SF1, n=975).

Participant characteristics	IPAC participants (n=975)
Location classification by ASGS-RA (2016)	
Major city (RA1)	26/975 (2.7%)
Inner regional (RA2)	280/975 (28.7%)
Outer regional (RA3)	410/975 (42.1%)
Remote (RA4)	110/975 (11.3%)
Very remote (RA5)	149/975 (15.3%)
Mean age at baseline (SD) [years]	*n= 975*
	57.9 (28.1)
Sex (n,%)	
Female	606/972 (62.4%)
Male	366/972 (37.7%)
Ethnicity (n,%)	
Aboriginal and/or Torres Strait Islander	899/971 (92.6%)
Non-Indigenous	72/971 (7.4%)
Pensioner/concessional (n, %)	813/972 (83.6%)
CTG scripts eligible (n,%)	696/972 (71.6%)
Patient engaged in Health Care Home program (n, %)[a]	114/975 (11.7%)
Number of medications[# b]	*n= 975*
Mean (SD)	7.2 (12.2)
Median (IQR)	7 (5-9)
Prior medication review (MBS item 900) [c] (n,%)	96/975 (9.9%)
Doctors' encounters prior to enrolment (per 12 months) [d]	*n= 912*
Mean (SD)	7.6 (17.2)
Median (IQR)	6 (3-10)
Mean number of medication 'adherent days' (SD)[e]	*n= 975*
	6.1 (5.9)
Self-assessed health status score (SF1) (n,%) [# f]	
Excellent	42/975 (4.3%)
Very good	133/975 (13.6%)
Good	414/975 (42.5%)
Fair	276/975 (28.3%)
Poor	89/975 (9.1%)
Very poor	21/975 (2.2%)
Recorded clinical diagnoses (n,%): [#]	
T2DM	590/975 (60.5%)
Hypertension	624/975 (64.0%)
Dyslipidaemia	493/975 (50.6%)
Patients with established or existing CVD[g]	324/975 (33.2%)

Chronic kidney disease	398/975 (40.8%)
Patients with a diagnosis of rheumatic heart disease (RHD) or Acute rheumatic fever (ARF)	31/975 (3.2%)
Chronic obstructive pulmonary disease (COPD)	86/975 (8.8%)
Depressive disorder	59/975 (6.1%)
Patients with comorbidity (1 or more chronic diseases)	868/975 (89.0%)
Patients with multi-morbidity (2 or more chronic diseases)	772/975 (79.2%)

SD = cluster-adjusted standard deviation (ACCHS cluster);IQR = inter-quartile range;
CTG= Close the Gap prescriptions (for Aboriginal peoples and Torres Strait Islanders) to waive or reduce the Pharmaceutical Benefits Scheme (PBS) patient contribution (co-payment).
CVD= cardiovascular disease.
MBS= Medicare Benefits Schedule.
# Sourced from the pharmacist's logbook.

[a] Health Care Homes (HCH) program funded by the Australian Government designed to better coordinate the health care of patients with chronic disease
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[d] Medicare GP consultation claim items: vocational registration: 3, 23, 36, 44. Non-vocational registration: 52, 53, 54, 57.
[e] A self-reported single-item question ('*How many days in the last week have you taken this medication?*') exploring the extent of non-adherence, assessed as a mean score for all medications. An 'adherent day' was defined as not missing any doses of prescribed medicines on that day. Pharmacists recorded the number of adherent days for each medication the patient was taking.
[f] Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'
[g] CVD= cardiovascular disease: It refers to any of the following: coronary heart disease, cerebrovascular disease, and peripheral vascular disease.

Table 4. Effect of the intervention on participant medication adherence (n=1103) according to N-MARS score stratified by selected participant, ACCHS and intervention characteristics, and adjusted for health service cluster.

IPAC participants with paired data forN-MARS (n=1103)	Number (%) of IPAC participants who adhered to their medications according to N-MARS (score 8 to 11)				P-value
	Number of participants adhering at baseline (%)	Number of participants adhering at final observation (%)	Number of participants who changed from not adhering to adhering during follow-up (%); 95% CI	Number of participants who changed from adhering to not adhering during follow-up (%); 95% CI	
	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	**<0.001^**
	808/1103 (73.3%)	950/1103 (86.1%)	204/1103 (18.5%); 15.4 to 22.1	62/1103 (5.6%); 3.5 to 9.0	
Participant-related characteristics					
Median age at baseline =58 years	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	
<Median (n=520)	337/520 (64.8%)	407/520 (78.3%)	113/520 (21.7%); 17.9 to 26.1	43/520 (8.3%); 5.1 to 13.1	0.46^^
≥Median (n=583)	471/583 (80.8%)	543/583 (93.1%)	91/583 (15.6%); 11.5 to 20.8	19/583 (3.3%); 1.8 to 5.8	
Median length of stay in the study =294 days (IQR 230-359)	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	
<Median (n=551)	397/551 (72.1%)	467/551 (84.8%)	100/551 (18.2%); 14.4 to 22.7	30/551 (5.4%); 2.7 to 10.8	0.58^^
≥Median (n=552)	411/552 (74.5%)	483/552 (87.5%)	104/552 (18.8%); 14.1 to 24.7	32/552 (5.8%); 3.9 to 8.6	
Sex	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	
Female (n=677)	489/677 (72.2%)	581/677 (85.8%)	132/677 (19.5%); 15.8 to 23.8	40/677 (5.9%); 3.2 to 10.8	0.52^^
Male (n=423)	317/423 (74.9%)	367/423 (86.8%)	71/423 (16.8%); 13.0 to 21.5	21/423 (5.0%); 3.4 to 7.3	
Median number of medications =7	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	
<Median (n=474)	320/474 (67.5%)	371/474 (78.3%)	91/474 (19.2%); 14.9 to 24.3	40/474 (8.4%); 4.9 to 14.2	0.27^^
≥Median (n=629)	488/629 (77.6%)	579/629 (92.1%)	113/629 (18.0%); 14.2 to 22.4	22/629 (3.5%); 1.8 to 6.6	
Self -assessed health status score at baseline (SF1)	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	**0.01^^**
'Good, Fair, Poor, Very Poor' (n=800)	562/800 (70.3%)	677/800 (84.6%)	159/800 (19.9%); 16.5 to 23.7	44/800 (5.5%); 2.8 to 10.5	

'Excellent' or 'very good' (n=175)	149/175 (85.1%)	155/175 (88.6%)	17/175 (9.7%); 5.8 to 15.9	11/175 (6.3%); 2.9 to 13.1	
ACCHS-related characteristics					
Median IRSEO score =50	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	
< 60 (n=548)	419/548 (76.5%)	500/548 (91.2%)	102/548 (18.6%); 14.6 to 23.5	21/548 (3.8%); 3.0 to 4.9	0.31^^
>= 60 (n=555)	389/555 (70.1%)	450/555 (81.1%)	102/555 (18.4%); 14.0 to 23.8	41/555 (7.39%); 4.1 to 12.9	
Intervention-related characteristics					
Participants who had a HMR compared to participants who had a non-HMR	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	0.06^^
Non-HMR (n=483)	347/483 (71.8%)	393/483 (81.4%)	81/483 (16.8%); 12.8 to 21.7	35/483 (7.3%); 3.7 to 13.6	
HMR (n=411)	294/411 (71.5%)	371/411 (90.3%)	90/411 (21.9%); 17.3 to 27.3	13/411 (3.2%); 1.7 to 5.7	
Participants who received an MBS service for item 10987 or 10997 during the follow-up period	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	0.17^^
No (n=552)	403/552 (73.0%)	478/552 (86.6%)	105/552 (19.0%); 15.5 to 23.2	30/552 (5.4%); 2.7 to 10.5	
Yes (n=551)	405/551 (73.5%)	472/551 (85.7%)	99/551 (18.0%); 14.6 to 21.8	32/551 (5.8%); 3.8 to 8.8	

95% CI= cluster adjusted 95% confidence intervals (ACCHS cluster). SD= cluster adjusted standard deviation (ACCHS cluster). Bold p-values imply statistically significant change at the 0.05 level.
^P-value= cluster adjusted p-value (ACCHS cluster) that were determined using the . svy linearized : clogit Stata command with adherence results as the outcome measure.
^^P-value= cluster adjusted p-value (ACCHS and participant cluster) that were determined using the . svy linearized : logit Stata command with adherence results as the outcome measure.
Health service= Aboriginal community-controlled health service (ACCHS)
HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
IRSEO= Indigenous Relative Socioeconomic Outcomes index. The IRSEO reflects relative advantage or disadvantage at the Indigenous Area level, where a score of one (1) represents the most advantaged area and a score of 100 represents the most disadvantaged area.[175]
MBS= Medicare Benefits Schedule. MBS items 10987 and 10997 provide a rebate for a service by a practice nurse or an Aboriginal and Torres Strait Islander Health Practitioner (e.g. staff within ACCHSs) that includes a follow-up the assessment of the medication adherence of an Indigenous patient.
NMARS= NACCHO Medication Adherence Response Scale (11-item) for the assessment of the reasons for medication non-adherence, generating a score defining adherence from 8 to 11.
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
SF1= Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'

Table 5. Effect of the intervention on participant medication adherence (n=1103) according to SIQ score, stratified by selected participant, ACCHS and intervention characteristics, and adjusted for health service cluster.

IPAC participants with paired data for Q1a (n=1103)	Number (%) of IPAC participants who adhered to their medications according to SIQ (score 6 to 7)				P-value
	Number of participants adhering at baseline (%)	Number of participants adhering at final observation (%)	Number of participants who changed from not adhering to adhering during follow-up (%); 95% CI	Number of participants who changed from adhering to not adhering during follow-up (%); 95% CI	
	N (%)	N (%)	N (%);95% CI	N (%); 95% CI	**<0.001^**
	781/1103 (70.8%)	895/1103 (81.1%)	194/1103 (17.6%); 14.4 to 21.3	80/1103 (7.3%); 5.6 to 9.3	
Participant- related characteristics					
Median age at baseline =58 years	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	**0.002^^**
<Median (n=520)	312/520 (60.0%)	383/520 (73.7%)	114/520 (21.9%); 18.1 to 26.3	43/520 (8.3%); 6.5 to 10.5	
≥Median (n=583)	469/583 (80.5%)	512/583 (87.8%)	80/583 (13.7%); 9.6 to 19.3	37/583 (6.4%); 4.3 to 9.3	
Median length of stay in the study =294 days (IQR 230-359)	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	0.97^^
<Median (n=551)	377/551 (68.4%)	438/551 (79.5%)	101/551 (18.3%); 14.4 to 23.0	40/551 (7.3%); 4.9 to 10.5	
≥Median (n=552)	404/552 (73.2%)	457/552 (82.8%)	93/552 (16.9%); 12.2 to 22.7	40/552 (7.3%); 5.3 to 9.9	
Sex	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	0.27^^
Female (n=677)	467/677 (69.0%)	546/677 (80.7%)	125/677 (18.5%); 14.5 to 23.3	46/677 (6.8%); 4.6 to 9.9	
Male (n=423)	311/423 (73.5%)	346/423 (81.8%)	69/423 (16.3%); 13.4 to 19.7	34/423 (8.0%); 5.8 to 11.1	
Median number of medications =7	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	>0.99^^
<Median (n=474)	287/474 (60.6%)	336/474 (70.9%)	97/474 (20.5%); 16.8 to 24.8	48/474 (10.1%); 8.4 to 12.2	
≥Median (n=629)	494/629 (78.5%)	559/629 (88.9%)	97/629 (15.4%); 12.0 to 19.5	32/629 (5.1%); 2.9 to 8.7	
Self -assessed health status score at baseline (SF1)	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	0.56^^

'Good, Fair, Poor, Very Poor' (n=800)	548/800 (68.5%)	635/800 (79.4%)	145/800 (18.1%); 14.3 to 22.8	58/800 (7.3%); 5.0 to 10.3	
'Excellent' or 'very good' (n=175)	132/175 (75.4%)	148/175 (84.6%)	29/175 (16.6%); 11.6 to 23.2	13/175 (7.4%); 5.0 to 11.0	
ACCHS-related characteristics					
Median IRSEO score =50	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	0.13^^
< 60 (n=548)	413/548 (75.4%)	467/548 (85.2%)	90/548 (16.4%); 12.0 to 22.1	36/548 (6.6%); 5.0 to 8.6	
>= 60 (n=555)	368/555 (66.3%)	428/555 (77.1%)	104/555 (18.7%); 14.2 to 24.3	44/555 (7.9%); 5.5 to 11.3	
Intervention-related characteristics					
Participants who had a HMR compared to participants who had a non-HMR	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	**<0.001**^^
Non-HMR (n=483)	337/483 (69.8%)	370/483 (76.6%)	74/483 (15.3%); 10.3 to 22.3	41/483 (8.5%); 6.5 to 11.5	
HMR (n=411)	294/411 (71.5%)	357/411 (86.9%)	83/411 (20.2%); 16.2 to 24.9	20/411 (4.9%); 2.9 to 8.1	
Participants who received an MBS service for item 10987 or 10997 during the follow-up period	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	0.15^^
No (n=552)	396/552 (71.7%)	459/552 (83.2%)	104/552 (18.8%); 15.4 to 23.2	41/552 (7.4%); 5.6 to 9.7	
Yes (n=551)	385/551 (69.9%)	436/551 (79.1%)	90/551 (16.3%); 12.9 to 20.4	39/551 (7.1%); 5.0 to 10.0	

95% CI= cluster adjusted 95% confidence intervals (ACCHS cluster). SD= cluster adjusted standard deviation (ACCHS cluster). Bold p-values imply statistically significant change at the 0.05 level.
^P-value= cluster adjusted p-value (ACCHS cluster) that were determined using the . svy linearized : clogit Stata command with adherence results as the outcome measure.
^^P-value= cluster adjusted p-value (ACCHS and participant cluster) that were determined using the . svy linearized : logit Stata command with adherence results as the outcome measure.
Health service= Aboriginal community-controlled health service (ACCHS)
HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
IRSEO= Indigenous Relative Socioeconomic Outcomes index. The IRSEO reflects relative advantage or disadvantage at the Indigenous Area level, where a score of one (1) represents the most advantaged area and a score of 100 represents the most disadvantaged area.[176]
MBS= Medicare Benefits Schedule. MBS items 10987 and 10997 provide a rebate for a service by a practice nurse or an Aboriginal and Torres Strait Islander Health Practitioner (e.g. staff within ACCHSs) that includes a follow-up the assessment of the medication adherence of an Indigenous patient.
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
SF1= Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'
SIQ= A self-reported single-item question ('How many days in the last week have you taken this medication?') exploring the extent of non-adherence, assessed as a mean score for all medications. An 'adherent day' was defined as not missing any doses of prescribed medicines on that day. Pharmacists recorded the number of adherent days for each medication the patient was taking. A score of 6-7 was defined as adherence.

Table 6. Effect of the intervention on self-assessed health status (n=975) according to SF1 assessment, stratified by selected participant, ACCHS and intervention characteristics, and adjusted for health service cluster.

IPAC participants with paired data for SF1 (n=975)	SF1 score				P-value
	Number of participants with SF 1 "very good" or "excellent" at initial assessment (%)	Number of participants with SF 1 "very good" or "excellent" at final assessment (%)	Number of participants with improved SF1 assessment* (%); 95% CI	Number of participants with worsened SF1 assessment* (%); 95% CI	
	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	**<0.001^**
	175/975 (18.0%)	303/975 (31.1%)	406/975 (41.6%); 34.6 to 49.1	173/975 (17.7%); 14.2 to 22.0	
Participant -related characteristics					
Median age at baseline =59 years	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	
<Median (n=466)	71/466 (15.2%)	122/466 (26.2%)	187/466 (40.1%); 32.4 to 48.4	86/466 (18.5%); 14.1 to 23.8	0.21^^
≥Median (n=509)	104/509 (20.4%)	181/509 (35.6%)	219/509 (43.0%); 35.8 to 50.6	87/509 (17.1%); 13.4 to 21.6	
Median length of stay in the study =281 days (IQR 218-336)	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	
<Median (n=486)	86/486 (17.7%)	137/486 (28.2%)	188/486 (38.7%); 29.1 to 49.2	92/486 (18.9%); 14.9 to 23.8	0.08^^
≥Median (n=489)	89/489 (18.2%)	166/489 (34.0%)	218/489 (44.6%); 38.7 to 50.6	81/489 (16.6%); 12.7 to 21.3	
Sex	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	
Female (n=606)	105/606 (17.3%)	180/606 (29.7%)	246/606 (40.6%); 33.9 to 47.6	110/606 (18.2%); 14.9 to 22.0	0.47^^
Male (n=366)	70/366 (19.1%)	122/366 (33.3%)	159/366 (43.4%); 33.8 to 53.6	63/366 (17.2%); 12.8 to 22.8	
Adherent (*baseline*)	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	
No: *SIQ score 0-5* (n=192)	27/192 (14.1%)	30/192 (15.6%)	62/192 (32.3%); 23.5 to 42.6	44/192 (22.9%); 16.7 to 30.5	**0.007^^**
Yes: *SIQ score 6-7* (n=783)	148/783 (18.9%)	273/783 (34.9%)	344/783 (43.9%); 37.1 to 51.0	129/783 (16.5%); 13.1 to 20.5	
Median number of medications =7	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	**0.013^^**
<Median (n=421)	83/421 (19.7%)	126/421 (29.9%)	163/421 (38.7%); 31.6 to 46.3	75/421 (17.8%); 13.4 to 23.3	

≥Median (n=554)	92/554 (16.6%)	177/554 (31.95%)	243/554 (43.9%); 36.5 to 51.5	98/554 (17.7%); 13.8 to 22.4	
ACCHS- related cgaracteristics					
Median IRSEO score =61	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	
< 60 (n=485)	105/485 (21.7%)	146/485 (30.1%)	197/485 (40.6%); 35.4 to 46.0	104/485 (21.4%); 16.8 to27.0	0.61^^
>= 60 (n=490)	70/490 (14.3%)	157/490 (32.0%)	209/490 (42.7%); 30.1 to 56.2	69/490 (14.1%); 11.7 to 16.8	
Intervention-related characteristics					
Participant who had a HMR compared to participant who had a non-HMR	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	0.34^^
Non-HMR (n=458)	65/458 (14.2%)	117/458 (25.6%)	176/458 (38.4%); 29.4 to 48.3	67/458 (14.6%); 11.6 to 18.21	
HMR (n=352)	70/352 (19.9%)	126/352 (35.8%)	161/352 (45.7%); 33.7 to 58.3	71/352 (20.2%); 12.7 to 30.6	
Patients who received an MBS service for item 10987 or 10997 during the follow-up period	N (%)	N (%)	N (%); 95% CI	N (%); 95% CI	0.89^^
No (n=496)	77/496 (15.5%)	150/496 (30.2%)	208/496 (41.9%); 33.2 to 51.2	83/496 (16.7%); 13.1 to 21.2	
Yes (n=479)	98/479 (20.5%)	153/479 (31.9%)	198/479 (41.3%); 33.7 to 49.4	90/479 (18.8%); 13.4 to 25.6	

95% CI= cluster adjusted 95% confidence intervals (ACCHS cluster). SD= cluster adjusted standard deviation (ACCHS cluster). Bold p-values imply statistically significant change at the 0.05 level.
^P-value= Cluster adjusted p-value (ACCHS cluster) determined using the svy linearized : clogit Stata command with differences of SF1 as the outcome measure.
^^P-value= Cluster adjusted p-values (ACCHS and participant cluster) determined using the svy linearized : logit Stata command with differences of SF1 as the outcome measure.
* Change in SF1 assessment from baseline was defined as 'improved' or 'worsened'. The six SF1 ordinal and categorical outcomes were converted to binary outcomes so that 'yes' pertained to 'excellent, very good' ratings and 'no' pertained to 'good, fair, poor, very poor' ratings. Improved was defined as a change from 'no' to 'yes' and worsened was defined as change from 'yes' to 'no'.
Health service= Aboriginal community-controlled health service (ACCHS)
HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
IRSEO= Indigenous Relative Socioeconomic Outcomes index. The IRSEO reflects relative advantage or disadvantage at the Indigenous Area level, where a score of one (1) represents the most advantaged area and a score of 100 represents the most disadvantaged area.[177]
MBS= Medicare Benefits Schedule. MBS items 10987 and 10997 provide a rebate for a service by a practice nurse or an Aboriginal and Torres Strait Islander Health Practitioner (e.g. staff within ACCHSs) that includes a follow-up the assessment of the medication adherence of an Indigenous patient.
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
SF1= Derived from the first question of the Short Form (SF)-36 health related quality of life instrument that asks: '*In general, would you say your health is excellent, very good, good, fair, poor, or very poor?*'
SIQ= A self-reported single-item question ('How many days in the last week have you taken this medication?') exploring the extent of non-adherence, assessed as a mean score for all medications. An 'adherent day' was defined as not missing any doses of prescribed medicines on that day. Pharmacists recorded the number of adherent days for each medication the patient was taking. A score of 6-7 was defined as adherence.

Figure 3. Graphical representation of change in participant responses to SF1 testing (single -item self-assessed health status) at baseline (initial assessment) compared with the end of study (final assessment), by percentage of participants.

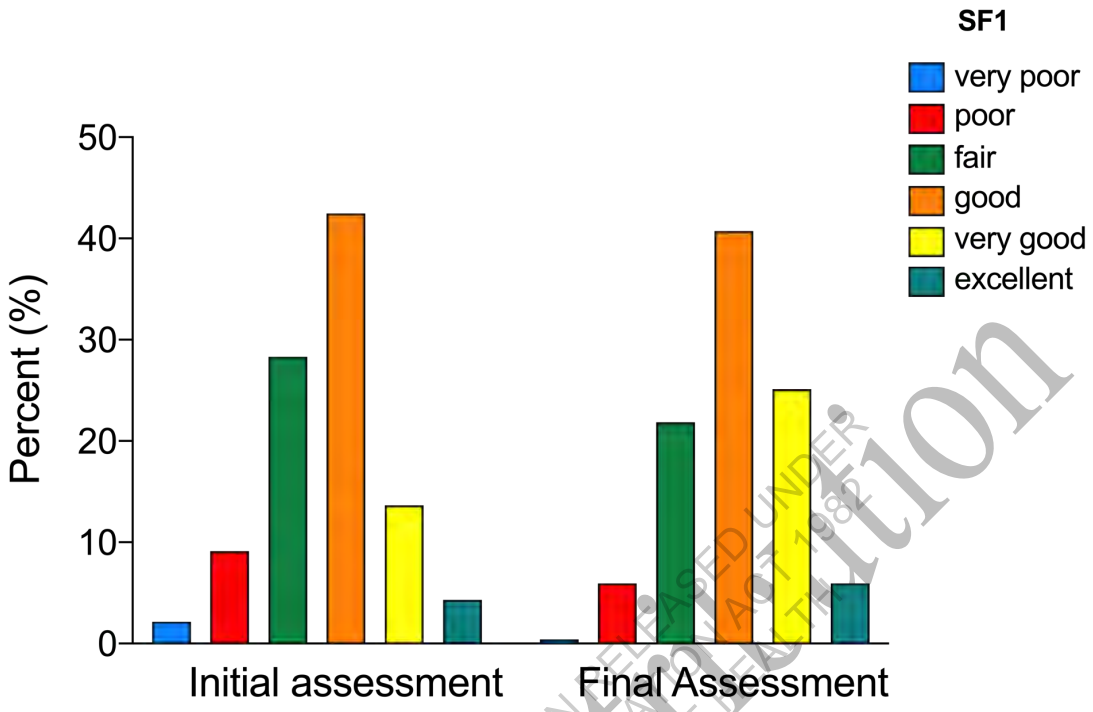

Table 7. Conceptual framework for the NMARS with comparisons to other self-report tools assessing medication adherence.

Item #	NMARS questions	Comparative tool*	Comment	Domain (TDF)**
Q1	**Did you forget to take any of your medicines yesterday?**	The MMAS-8 asks *"did you take all your medicine yesterday?"* MMAS-4 asks "*do you ever forget to take your medicine'?* MMAS-8 asks: *Do you sometimes forget to take your pills?* The ASK-12 scale includes: "*I just forget to take my medicines some of the time".* The ARMS asks: "*How often do you forget to take your medicine?"* RAMS asks: "*I sometimes forget to take my medicines"; "Some people forget to take their medicines. How often does this happen to you?"*	Forgetfulness is a significant predictor of non-adherence,[178] with most self-assessment scales including similar such questions.[179] Q1 is phrased to be more appropriate to Aboriginal and Torres Strait Islander patients as it asks the patient *to recall forgetfulness* when taking medicines. The recall time is short, pertaining only to the previous day. Replies are categorical (yes/no) rather than requiring the patient to estimate the frequency. The scale asks about missing 'any medicine' rather than taking "all medicines" to be less confrontational. It does not ask if medicines are forgotten 'sometimes' or 'ever' as forgetfulness can be very unpredictable, and responses may not be sensitive to change after intervention.	Memory, attention and decision processes
Q2	**Is it hard for you to remember to take your medicines?**	The SEAMS asks: *"How confident are you that you can take your medicines correctly when you are not sure how to take the medicine?".*	This question explores the patient's *confidence in their ability (self-efficacy)* to remember to take their medications, which is consistent with behaviour change theories such as the Health Belief Model. Patients expressing difficulty remembering to take medicines (cognitive decline and/or inadequate health literacy) are less likely to take their medications.[180] [181] The degree of self-efficacy is a potent positive predictor of behaviour change and disease self-management, but it may not be predictive of distal health outcomes with regard to medication adherence related behaviour.[182]	Beliefs about capabilities; Memory, attention and decision processes
Q3	**Do you know when, and how, to take your medicines?**	The BMQ includes: *"My medicines are a mystery to me".*	This question explores the patient's knowledge about their medicines and a belief about self-capability or *confidence in an ability (self-efficacy)* to take medications, which is consistent with behaviour change theories such as the Health Belief Model. Lack of comprehension of disease and treatment is a known patient-related dimension negatively affecting adherence.[183] Enhanced knowledge of self-care and proper use of medications can enhance adherence.[184] [185] The BMQ question pertains to 'concerns about medicines' which negatively correlate with adherence. A lack of knowledge of medicines is a known barrier to adherence for many Aboriginal peoples, mainly mediated by a lack of trust and limited communication with mainstream health services.[186] Aboriginal health workers have reported that Aboriginal patients who don't know how to take their medicines, what to do if a dose is missed, or what happens if they stop taking the medicine will cease taking their medications. Communication difficulties may be layered upon feelings of shame about asking questions.[187]	Knowledge; Beliefs about capabilities

Q4	**Is it hard for you to take your medicines in the right way? *(like the Dr/nurse/AHW said)***	The SEAMS scale asks: "*How confident are you that you will be able to take all or most of your medicines as directed?; How confident are you that you can take your medicines correctly when no-one reminds you to take the medicine?"*	This question explores perceived difficulties with taking medications, that may be influenced by the environmental context and resources, social influences, emotion, knowledge of medicines, and may also be influenced by the degree of *confidence in the ability*, to take medications. See Q3 and Q2.	Environmental context and resources; Social influences; Knowledge; Emotion; Beliefs about capabilities
Q5	**Do you feel that taking your medicines will be good for your health?**	The BMQ* includes: "*My life would be impossible without medicines."; Without my medicines I would be very ill; My health in the future is dependent on my medicines; My medicines protect me from becoming worse; My health at present depends on medicines".*	This question explores the patient's *perceived benefits* that may arise from taking medications, which is consistent with behaviour change theories such as the Health Belief Model. Like the BMQ subscale items, it explores the *perceived necessity* of the medication for maintaining health.[188] Negative beliefs about the efficacy of treatment negatively affects adherence.[189] In patients with hypertension, stronger beliefs of the necessity of medications contribute substantially to positive medication adherence. [190] Patients who believe their medicine to be necessary are more adherent with their medications, and this has been shown for a range of diseases.[191] [192] For some Aboriginal peoples, a belief that western medicines are inferior to traditional medicines, combined with fear that contact with mainstream health services will bring more illness is a barrier to adherence. One focus group respondent explained: *"As soon as you touch hospital you get sickness. Medicine they give us, it kills us"*. Other cultural beliefs about the cause of illness may also influence perceptions about the necessity for medications: *"Blackfella way causes sickness, if you get sick for nothing*." Some community members perceive that young people still die at a young age even *without* smoking, drinking or eating unhealthy food. This may be perceived as the outcome of sorcery as punishment, or from other causes like jealousy and spite. If illness arises from sorcery, western medicine is considered ineffective. If a smoker, *"smoking sickness"* is considered inevitable rather than avoidable.[193]	Beliefs about consequences; Knowledge
Q6	**Do you sometimes take less medicine to make the medicine last longer?**	ARMS asks*: "How often do you change the dose of your medicines to suit your needs (like when you take more or less pill than you're supposed to)?"* RAMS asks*: "I sometimes alter the dose of my medication to suit my own needs"; "Some people miss out on a dose of their medicine or adjust it to suit their own needs. How often do you do this?".*	This question explores behaviour that limits or alters the use of medicines and if it is related to rationing the use of medicines (make it "last longer"). The *Reported Adherence Measurement Scale* (RAMS) asks patients to report if they alter the dose of medications and the frequency of that behaviour, but does not explore reasons.[194] Rationing may or may not be related to health beliefs about *severity* of the illness (see Q7) and/or *perceptions of benefit*. Sharing or swapping medicines has been reported as barrier to medication adherence in the Aboriginal and Torres Strait Islander population.[195] Rationing may be a response to difficulties in the social context that affect access to medicines such as cost or other barriers (see Q9). It is possible that interventions to	Intentions; Beliefs about consequences; Environmental context and resources; Social influences

			address the need to ration medicines can reduce this behaviour. Few studies have explored this phenomenon.	
Q7	**Do you sometimes stop taking your medicines because you think you are ok?**	MMAS-4 asks: *"When you feel better do you sometimes stop taking your medicine?"* The BMQ asks: "*My health in the future is dependent on my medicines"*; "*without my medicines I would be very ill"; "my life would be impossible without my medicines"; "my medicines protect me from becoming worse".*	This question explores *perceptions about the severity* of the health problem, consistent with the Health Belief Model, as well as beliefs about *the necessity* of taking medications. It is proposed that the greater the perceived threat of disease severity, the better the adherence to treatment. Conversely, if the patient thinks the health issue is not severe, they are less likely to continue to take medicine. The *perception of severity* is related to a belief about the potential for the health condition (or issue) to cause physical harm and interfere with social functioning. A relationship between this belief and medication adherence has been shown in meta-analysis. The degree of patient awareness of the severity of their health issue was positively predictive of their adherence to medications. In other words, the greater the perceived disease severity threat, the better the adherence.[196] For some Aboriginal peoples, disease is not a concern if one is still able to function as explained by a quote from a male Aboriginal health worker: *"As long as you can do what you want to do, then you don't worry about health"*. The perception that people are 'ok' and don't need medications is especially linked with asymptomatic diseases like diabetes.[197] The BMQ asks patients to rate how important their medicine is for their health, eliciting responses that reflect beliefs about *the necessity* of the medicines that have been shown to correlate positively with adherence, and are quite different questions to the MMAS. Question 7 is different from the MMAS, because it explores *perception* about illness (think you are ok) rather than clinical improvement (you feel better). It is expressed in a way that is more appropriate to the Aboriginal health context.	Beliefs about consequences; Intentions
Q8	**Do you sometimes stop taking your medicine because you think it might make you sick?**	MMAS-4 asks: *"Sometimes if you feel worse when you take the medicine, do you stop taking it?"* The SEAMS scale asks: "*How confident are you that you can take your medicines correctly when you are feeling sick (like having a cold or the flu)?"* ASK-12 includes: "*Have you skipped or stopped taking a medicine because it made you feel bad?"* ARMS asks: *"How often do you miss taking your medicine when you feel sick?"* The BMQ asks*: "I sometimes worry about the long-term effects of taking medicines,"; "Having to take this medicine worries me".*	This question explores perceptions of trust in health services, perceptions that medicines may be harmful, perceptions of vulnerability to adverse effects, and knowledge of the necessity for medicines (see Q7). Patients who perceive medicines as a threat exceeding the threat of disease, are less likely to be adherent.[198] Patients who think that the treatment *might* make them ill have less adherence.[199] This item should differentiate perceptions about disease threat versus medicines threat, rather than behavioural responses to adverse effects. For example, if adverse effects are actually causing harm, the patient should stop taking the medicine.[200] Patients who feel worse after taking a medicine, should seek advice to review the appropriateness of drug choices. This question is similar to the intent of the BMQ that explores perceptions the patient may have of medicines as a threat, expressed as a *concern* that medicines may generate adverse effects. However, the BMQ uses likert scale responses to these	Beliefs about consequences; Intentions

			items. For some Aboriginal peoples, a lack of trust in health services leads them to stop taking medicine because of belief the body cannot cope with it, fear the clinic may poison them, and fear of the medicine.[201] The SEAMS scale explores the degree of *confidence in the ability* to take medications correctly in spite of illness. Other 11-item questions already explore the theme of *self-efficacy*. Q8 explores if the patient thinks the medicine might make them sick (perception of the drug as a threat/concern) rather than if it actually makes them sick. The MMAS explores 'feeling worse' when taking the medicine, which may be an actual adverse drug effect, although there is some ambiguity with interpretation. ASK-12 and ARMS surveys ask similar questions to the MMAS.	
Q9	**Do you sometimes 'run out' of medicines because it costs too much, or it is hard to get more?**	ASK-12 includes: "*Have you skipped, stopped, not refilled, or taken less medicine because of the cost?"; "I run out of my medicine because I don't gel refills on time."* ARMS asks: *"How often do you put off refilling your medicines because they cost too much money?; How often do you forget to get prescriptions filled?; How often do you plan ahead and refill your medicines before they run out?"*	This question explores *perceived barriers* to taking medications, which is consistent with the Health Belief Model. Cost is a well-known barrier to medication adherence.[202] However, in view of the alleviation of some of the cost-barriers for the Aboriginal and Torres Strait Islander population through improved health policy (PBS co-payment measures, and access to medicines through S100 of the National Health Act (1953)), other access barriers may pose a bigger threat to adherence than cost alone. This question was expanded to include other factors that make it 'hard' for patients to have a suitable supply of medications.[203] Factors that influence how 'hard' it is to source medicines include: a patient's psychological profile (being too distracted or busy; poor coping skills, cynicism, poor insight, lack of self-worth, anxiety and depression, and other factors affecting motivation), concomitant social issues such as alcohol or substance abuse; and transport difficulties. These factors have all been shown to negatively affect adherence.[204]	Environmental context and resources; Social influences; Emotion; Behavioural regulation
Q10	**Do you sometimes run out of medicines because you give them away or share them with other people?**	ARMS asks: "*How often do you run out of medicine?"* ARMS asks*: How often do you take someone else's medicine?* [This Q was removed from the final set].	This question explores 'running out of medicine' as an outcome of sharing. It does not explore behaviour to ration the use of medicines, making it conceptually different to Q6. The sharing of medicines has been reported in studies about Aboriginal peoples and Torres Strait Islanders.[205] Aboriginal health workers in NSW reported that the practice of sharing medications by Aboriginal patients was common.[206] Behaviour that involves sharing of medicines may be influenced by culture (kinship obligations), arise from inadequate *perceptions of the severity* of the illness (see Q7) and/or *perceptions about benefit*, or lack of knowledge about when and how to take the medicine (Q3). Few studies have explored the impact that sharing medicines has on medication adherence given that the person sharing has less available to take, and the recipient has less incentive to seek medicines.	Environmental context and resources; Social influences; Emotion; Intentions; Behavioural regulation; Knowledge; Beliefs about consequences

Q11	**Do you go without your medicines when you are away from home?**	ASK- 12 scale includes: *"Have you not had medicine with you when it was time to take it?".* The MMAS-8 asks: *When you travel or leave home, do you sometimes forget to bring along your medicine?*	Being away from community has been identified as a barrier to medication adherence for Aboriginal peoples and Torres Strait Islanders.[207] To be away from home without medicines may be intentional ('shame' associated with carrying medicines, being seen to be 'sick', storage issues, etc) or unintentional (forgetfulness). Aboriginal and Torres Strait Islander peoples may be away from home when visiting other communities on sorry business, to fulfil kinship responsibilities, or other reasons. Whether the outcome is intentional or unintentional, going without medicines means being non-adherent to medicines. The MMAS only explores forgetfulness making it unsuitable for use in the Aboriginal context as patients may not 'bring along' their medicine when away from home for social reasons (as outlined) and not merely forgetfulness. Moreover, forgetfulness is already explored in Q1 of the 11-item scale. In addition, Q11 does not use the term 'travel'. In the Aboriginal context, the issue is about being 'away from community or home' (a connection 'with country') which is an Aboriginal definition of well-being,[208] rather than 'travel', or 'leaving' home, with the latter suggesting permanent departure. Q11 does not use the word 'sometimes'. The ASK-12 scale does not specifically explore being away from home.	Memory, attention and decision processes; Environmental context and resources; Social influences; Intentions; Behavioural regulation

NMARS= NACCHO Medication Adherence Response Scale (11-item) for the assessment of the reasons for medication non-adherence, generating a score defining adherence from 8 to 11.

*The *Morisky Medication Adherence Scale* (MMAS4/8) is a 4-item or 8-item scale exploring self-reported medication adherence. Most validation studies pertain to use in patients with hypertension.[209]

**Theoretical Domains Framework (v2).

The *Beliefs about Medicine Questionnaire* (BMQ) is a 5-point likert scale that explores medication beliefs and has been validated for use in patients with a range of chronic diseases. It explores patient beliefs about the necessity of their medications and their concerns about the potential adverse effects of taking it, with higher necessity scores correlating with better adherence.[210 211 212]

The *Self-efficacy for Appropriate Medication Use* (SEAMS) scale was validated for use with low-literacy patients with coronary heart disease and other co-morbidities as a measure of self-efficacy with taking medications.[213] However, it has not been shown to have construct validity with regard to predicting biomedical health outcomes such as blood pressure changes or changes in blood glucose levels in patients with diabetes.[214]

The *Adherence Starts with Knowledge* (ASK-12) survey informs on patient reported barriers to medication adherence and adherence-related behaviour. Validation studies pertain to patients with chronic disease with 56% being African American.[215]

The *Adherence to Refills and Medications Scale* (ARMS) is a 12-item scale designed to assess medication adherence in patients with low literacy levels with chronic disease in primary health care settings.[216] The ARMS was modified from the Morisky tool and the Hill-Bone Instrument (specific for hypertension).

The *Reported Adherence Measurement Scale* (RAMS) is a 4-item scale that ascertains the level of agreement with "sometimes forgetting to take or sometimes altering the dose of medication" and frequency according to a 5-point likert scale.[217]

Table 8. Item-specific content validity index (I-CVI) for 11-item NMARS scale: relevancy.

Item	Relevant (rating 3 or 4)	Not relevant (rating 1 or 2)	I-CVI	Interpretation
1	14	1	0.93	Appropriate
2	14	1	0.93	Appropriate
3	12	3	0.80	Appropriate
4	12	3	0.80	Appropriate
5	12	3	0.80	Appropriate
6	13	2	0.87	Appropriate
7	15	0	1.00	Appropriate
8	15	0	1.00	Appropriate
9	14	1	0.93	Appropriate
10	13	2	0.87	Appropriate
11	14	1	0.93	Appropriate

Results are based on assessment of 15- member multidisciplinary expert panel.
Ratings are results of responses to Appendix 3B questions.

Table 9. Item-specific content validity index (I-CVI) for 11-item NMARS scale: clarity.

Item	Clarity (rating 3 or 4)	No clarity (rating 1 or 2)	I-CVI	Interpretation
1	13	2	0.87	Appropriate
2	15	0	1.00	Appropriate
3	14	1	0.93	Appropriate
4	12	3	0.80	Appropriate
5	13	2	0.87	Appropriate
6	11	4	0.73*	Need revision
7	15	0	1.00	Appropriate
8	14	1	0.93	Appropriate
9	13	2	0.87	Appropriate
10	11	4	0.73*	Need revision
11	15	0	1.00	Appropriate

* The wordings of questions 6 and 10 were revised.
Results are based on assessment of 15- member multidisciplinary expert panel.
Ratings are results of responses to Appendix 3B questions.

Table 10. Scale-specific content validity testing (S-CVI) for 11-item scale: percentage agreement among expert panel members.

Question		Number of experts	Rating 4 or 5*	% Agreement
1	To what extent are the questions directed at important issues pertaining to the assessment of medication adherence as reported by Aboriginal and Torres Strait Islander patients?	15	14	93.3
2	Are there important issues pertaining to the assessment of medication adherence that should be included in the questionnaire which have been omitted?	15	8	60.0
3	To what extent are the questions simple and easily understood?	15	13	86.7
4	To what extent are questions likely to elicit information about medication adherence in Aboriginal and Torres Strait Islander patients?	15	12	80.0
5	How many questions are inappropriate or not needed?	15	9	66.7
6	How likely is the questionnaire to assess medication adherence in Aboriginal and Torres Strait Islander patients?	15	11	73.3
Mean % agreement and 95% confidence interval				76.7 (95% CI 63.6 to 89.8)

S-CVI: scale=specific content validity index

*Rating of 4-5 refers to the option choices shown below.

Option choice	Question 1	Question 2	Question 3	Question 4	Question 5	Question 6	Rating
Answer	Small Extent	Crucial Gaps	Small Extent	Small Extent	Very Many	Very Unlikely	1
Answer	Limited Extent	Important Gaps	Limited Extent	Limited Extent	Many	Unlikely	2
Answer	Fair Extent	Minor Gaps	Fair Extent	Fair Extent	Some	Likely	3
Answer	Moderate Extent	Minimal Gaps	Moderate Extent	Moderate Extent	A few	Quite Likely	4
Answer	Large Extent	Insignificant Gaps	Large Extent	Large Extent	Hardly Any	Very Likely	5

Table 11. Item-specific response frequencies to each question in the 11-item NMARS scale at baseline (n=1103 participants)

Item	Questions	Yes (n, %)
Q1	Did you forget to take any of your medicines yesterday?	363 (32.9%)
Q2	Is it hard for you to remember to take your medicines?	425 (38.5%)
Q3	Do you know when, and how, to take your medicines?	1013 (91.8%)
Q4	Is it hard for you to take your medicines in the right way? *(like the Dr/nurse/AHW said)*	319 (28.9%)
Q5	Do you feel that taking your medicines will be good for your health?	986 (89.4%)
Q6	Do you sometimes take less medicine to make the medicine last longer?	107 (9.7%)
Q7	Do you sometimes stop taking your medicines because you think you are ok?	239 (21.7%)
Q8	Do you sometimes stop taking your medicine because you think it might make you sick?	222 (20.1%)
Q9	Do you sometimes 'run out' of medicines because it costs too much, or it is hard to get more?	357 (32.4%)
Q10	Do you sometimes run out of medicines because you give them away or share them with other people?	19 (1.7%)
Q11	Do you go without your medicines when you are away from home?	306 (27.7%)

Table 12. Spearmans correlation coefficients between SIQ result and participant biomedical indices at baseline.

Biomedical indices	N, %	Correlation coefficient	p-value	95%CI*
HbA1c	441/677 (65.1%)	-0.20	<0.0001	-0.29 to -0.11
Total cholesterol	558/1103 (50.6%)	-0.14	0.0006	-0.23 to -0.06
Triglycerides	606/1103 (54.9%)	-0.09	0.026	-0.17 to -0.01
Low density lipoprotein cholesterol	470/1103 (42.6%)	-0.12	0.012	-0.20 to -0.03

*95%CI = 95% confidence interval

Table 13. Response frequencies to SIQ and NMARS adherence assessments from IPAC participants (n=1103)

	Single-item question (SIQ) score*		
NMARS score**	**Non-Adherent (0-5)**	**Adherent (6-7)**	**Total**
Non-Adherent (0-7)	196	99	**295**
Adherent (8-11)	126	682	**808**
Total	**322**	**781**	**1103**

79.6% overall agreement between the two tools.

*SIQ= A self-reported single-item question ('How many days in the last week have you taken this medication?') exploring the extent of non-adherence, assessed as a mean score for all medications. An 'adherent day' was defined as not missing any doses of prescribed medicines on that day. Pharmacists recorded the number of adherent days for each medication the patient was taking. A score of 6-7 was defined as adherence and dichotomized to a mean adherence (score >=6), or non-adherence (0-5).

** NMARS= NACCHO Medication Adherence Response Scale (11-item) for the assessment of the reasons for medication non-adherence, generating a score defining adherence from 8 to 11. NMARS scoring used a cut-off score that produced a similar proportion of adherent respondents to the single-item question.

Table 14. Medication adherence scores according to participant subgroups as measured by NMARS and SIQ adherence tools

Indicator at baseline	Adherence at baseline		Adherence at baseline	
	SIQ score (n, %)		NMARS total score (n, %)	
	No (0-5)	Yes (6-7)	No (0-7)	Yes (8-11)
Normal BP (<140 mmHg; systolic), *n=601*	173/601 (28.8%)	428/601 (71.2%)	157/601 (26.1%)	444/601 (73.9%)
High BP (≥140 mmHg; systolic), *n=234*	70/234 (29.9%)	164/234 (70.1%)	63/234 (26.9%)	171/234 (73.1%)
CKD A1 (<30 mg/g ACR) *n=278*	85/278 (30.6%)	193/278 (69.4%)	76/278 (27.3%)	202/278 (72.7%)
CKD A2 and A3 (30-300 and >300 mg/g ACR) *n=121*	38/121 (31.4%)	83/121 (68.6%)	35/121 (28.9%)	86/121 (71.1%)
HbA1c <6.4% *n=4*	0/4 (0%)	4/4 (100%)	1/4 (25%)	3/4 (75%)
HbA1c 6.5% or higher *n=437*	129/437 (29.5%)	308/437 (70.5%)	131/437 (30.0%)	306/437 (70.0%)

BP= blood pressure
CKD= chronic kidney disease
CKD (A1, A2, A3) = albuminuria categories in chronic kidney disease
HbA1c= haemoglobin A1c
NMARS= NACCHO Medication Adherence Response Scale (11-item) for the assessment of the reasons for medication non-adherence, generating a score defining adherence from 8 to 11. NMARS scoring used a cut-off score that produced a similar proportion of adherent respondents to the single-item question.
SIQ= A self-reported single-item question ('How many days in the last week have you taken this medication?') exploring the extent of non-adherence, assessed as a mean score for all medications. An 'adherent day' was defined as not missing any doses of prescribed medicines on that day. Pharmacists recorded the number of adherent days for each medication the patient was taking. A score of 6-7 was defined as adherence and dichotomized to a mean adherence (score >=6), or non-adherence (0-5).

Figure 4. Scatterplot for the assessment of association between SIQ score and the number of medications prescribed per participant (Spearman's correlation coefficient = 0.24, 95%CI 0.19- 0.30, p<0.0001, n=1103).

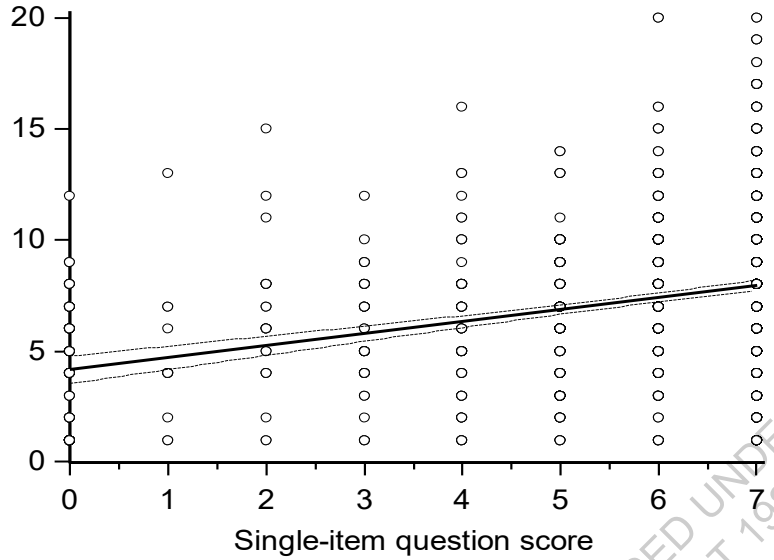

Figure 5. Scatterplot for the assessment of association between NMARS score and the number of medications prescribed per participant (Spearman's correlation coefficient = 0.15, 95%CI 0.09- 0.21, p<0.0001, n=1103).

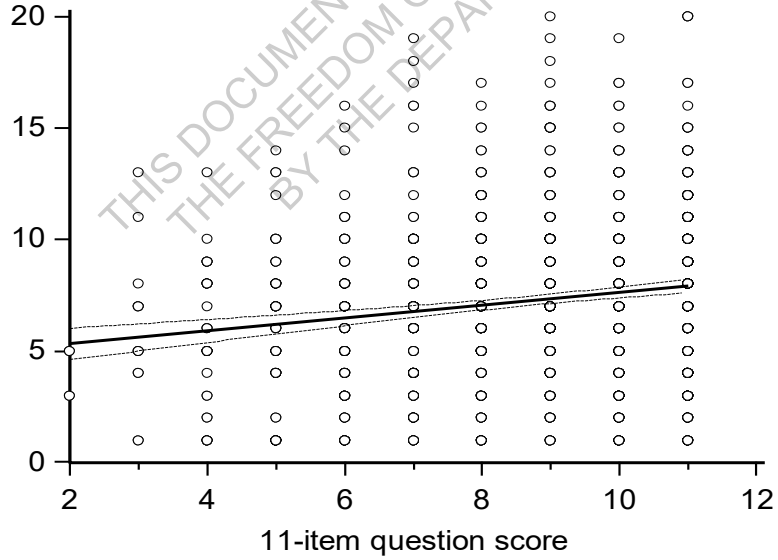

Table 15. Known groups comparison: medication adherence scores by BMI and sex as measured by NMARS and SIQ tests

Indicator at baseline	Adherence at baseline		Adherence at baseline	
	SIQ score (n, %)		NMARS total score (n, %)	
	No (0-5)	Yes (6-7)	No (0-7)	Yes (8-11)
Female	210/677 (31.02%)	467/677 (68.98%)	188/677 (27.77%)	489/677 (72.23%)
Male	112/423 (26.48%)	311/423 (73.52%)	106/423 (25.06%)	317/423 (74.94%)
BMI to 24.9	46/154 (29.87%)	108/154 (70.13%)	38/154 (24.68%)	116/154 (75.32%)
BMI ≥25	170/659 (25.8%)	489/659 (74.2%)	168/659 (25.49%)	491/659 (74.51%)

BMI= Body Mass Index (kg/m^2)
NMARS= NACCHO Medication Adherence Response Scale (11-item) for the assessment of the reasons for medication non-adherence, generating a score defining adherence from 8 to 11. NMARS scoring used a cut-score that produced a similar proportion of adherent respondents to the single-item question.
SIQ= A self-reported single-item question ('How many days in the last week have you taken this medication?') exploring the extent of non-adherence, assessed as a mean score for all medications. An 'adherent day' was defined as not missing any doses of prescribed medicines on that day. Pharmacists recorded the number of adherent days for each medication the patient was taking. A score of 6-7 was defined as adherence and dichotomized to a mean adherence (score >=6), or non-adherence (0-5).

Table 16. Spearman's correlation coefficient between baseline and end of study SF1 and SIQ and NMARS responses (paired data, n=975).

Adherence measure	Correlation with SF1	p-value	95%CI*
Baseline			
SIQ	0.12	0.0001	0.06 to 0.19
NMARS	0.20	<0.0001	0.14 to 0.26
End of study			
SIQ	0.15	<0.0001	0.09 to 0.21
NMARS	0.28	<0.0001	0.22 to 0.33

Correlations were based on z-scores transformed responses.
*95%CI = 95% confidence interval

Table 17. Item to test (total) correlation using participant responses to the NMARS to assess reliability with Cronbach's alpha, and effect on Cronbach's alpha of item deletion.

Item	N	Sign	Item-test correlation	covariance	Cronbach's alpha	Change in Cronbach's alpha if item is deleted
Q1	1103	+	0.59	0.02	0.62	-0.04
Q2	1103	+	0.61	0.02	0.62	-0.05
Q3	1103	-	0.23	0.03	0.67	0.01
Q4	1103	+	0.60	0.02	0.62	-0.05
Q5	1103	-	0.27	0.03	0.67	0.01
Q6	1103	+	0.37	0.03	0.66	-0.01
Q7	1103	+	0.60	0.02	0.62	-0.05
Q8	1103	+	0.52	0.02	0.63	-0.03
Q9	1103	+	0.48	0.02	0.65	-0.01
Q10	1103	+	0.11	0.03	0.67	0.01
Q11	1103	+	0.60	0.02	0.62	-0.05
Test scale				0.02	**0.66**	

Item-test correlation shown as Pearson's correlation coefficients
NMARS= NACCHO Medication Adherence Response Scale (11-item) for the assessment of the reasons for medication non-adherence, generating a score defining adherence from 8 to 11. NMARS scoring used a cut-score that produced a similar proportion of adherent respondents to the single-item question.
-Sign pertains to reverse scoring of the item.
N=number of participant observations

Table 18. Inter-item correlation matrix for the NMARS (unadjusted alpha, n=1103)

Variables	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Q1	**1.00**										
Q2	**0.33**	**1.00**									
Q3	-0.05	**-0.06**	**1.00**								
Q4	**0.28**	**0.43**	**-0.12**	**1.00**							
Q5	**-0.09**	-0.05	0.03	**-0.10**	**1.00**						
Q6	**0.07**	**0.09**	0.00	**0.10**	-0.02	**1.00**					
Q7	**0.28**	**0.21**	**-0.06**	**0.25**	**-0.18**	**0.15**	**1.00**				
Q8	**0.20**	**0.14**	-0.01	**0.22**	**-0.13**	**0.20**	**0.34**	**1.00**			
Q9	**0.15**	**0.20**	-0.01	**0.11**	0.02	**0.22**	**0.18**	**0.16**	**1.00**		
Q10	0.01	**0.07**	-0.01	0.05	-0.02	-0.02	0.00	0.00	0.03	**1.00**	
Q11	**0.27**	**0.28**	**-0.10**	**0.23**	-0.04	**0.21**	**0.33**	**0.22**	**0.21**	0.04	**1.00**

Inter-item correlation matrix represented by Pearson's correlation coefficients.
NMARS= NACCHO Medication Adherence Response Scale (11-item) for the assessment of the reasons for medication non-adherence, generating a score defining adherence from 8 to 11. NMARS scoring used a cut-score that produced a similar proportion of adherent respondents to the single-item question.
Unadjusted refers to directionless alpha computation. Values in bold refer to ideal alpha value >=0.15 and are different from 0 with a significance level p<0.05. Items 3 and 10 show no inter-item correlation with any items.

Table 19. Principal component analysis for the NMARS: eigenvalues

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11
Eigenvalue	0.51	0.21	0.19	0.16	0.15	0.12	0.11	0.09	0.08	0.07	0.02
Variability (%)	30.28	12.47	11.07	9.40	8.63	6.88	6.43	5.12	4.48	4.25	0.99
Cumulative %	30.28	42.75	53.82	63.22	71.85	78.73	85.16	90.28	94.76	99.01	100.000

*Cronbachs alpha for NMARS tool = 0.66

Figure 6. Scree plot indicating the Eigenvalues after principal component analysis of the NMARS in the IPAC study

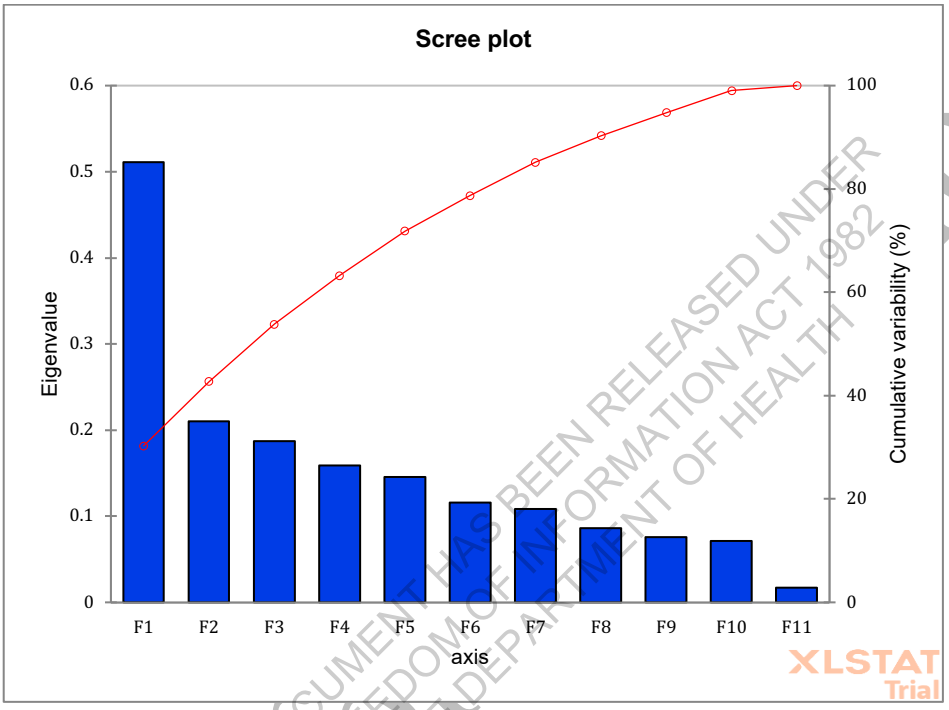

Table 20. Principal components analysis factor loadings of each item in the NMARS (n=1103)

	F1	F2	F3	F4	F5
Q1	0.301	-0.080	-0.066	-0.333	-0.064
Q2	0.340	-0.177	0.209	0.036	0.049
Q3	-0.034	0.018	0.005	-0.017	-0.023
Q4	0.291	-0.181	0.030	0.176	-0.087
Q5	-0.048	0.018	0.080	-0.018	0.056
Q6	0.080	0.088	-0.009	0.041	0.006
Q7	0.238	0.079	-0.188	0.040	-0.046
Q8	0.187	0.092	-0.175	0.104	-0.148
Q9	0.208	0.327	0.236	-0.020	-0.084
Q10	0.007	-0.003	0.006	0.004	0.004
Q11	0.274	0.101	-0.099	0.026	0.311

F=factor. No factor had an item loading >= 0.4. Only the first five factors are shown. Shaded rows highlight lower loadings onto factor 1 and pertain to items 3, 5, 6 and 10 which were noted to have ceiling effects.

APPENDIX 1

The *MMAS* was specifically unsuitable for the IPAC Project for a range of other reasons as outlined in Table A-1.

Table A-1. Reasons why the Morisky Medication Adherence Scale was not used in the IPAC study.

1. A decision to cancel an application for the license to use the Morisky Medication Adherence Scale **(**MMAS) was endorsed by the Project Partners in April 2018. The MMAS is arguably the most widely used self-report measure of medication adherence internationally. This decision arose following an unexplained 35% increase in the cost of the license, lack of adequate funds in the project budget to accommodate the increase, concern about the appropriateness of the tool in the Aboriginal context, and concern about the probity and ethics of the process to grant the license from the US developers. A recent article in the *Science* magazine outlined international concerns about the developers "demands for money".[218]
2. The licence to use the MMAS included the requirement for specific training that could only be delivered in the USA with timing that conflicted with IPAC project timelines.
3. The MMAS licence also required the use of the software provided by the developers to capture scores, which raised data security issues.
4. The MMAS would have required revalidation to infer meaningful information about medication adherence for Aboriginal and Torres Strait Islander patients. The inferences drawn from using the MMAS are validated for a specific purpose (predominantly for elderly patients with hypertension in the US health care system context). These conditions need to be matched in order to validate the inferences about medication adherence that arise from the use of the tool.[219]
5. The language and readability of the MMAS scale is too complex for use in the Australian setting. This was confirmed with readability testing.
6. The scale should ideally help the pharmacist to tailor strategies to suit the individual patient's issues, as such strategies are more likely to support good medication-taking behaviour.[220] The scale used needed to offer a consistent and standardized approach for pharmacists to explore medication adherence with IPAC patients. The MMAS had a limited scope with regard to behavioural factors and beliefs that may impact on adherence regarding Aboriginal peoples.
7. The scale needed to be able to draw valid inferences about medication adherence for patients with any chronic disease, whilst the MMAS was principally validated for hypertensives, which made it unsuitable given the broad patient inclusion criteria for the IPAC trial.
8. Given that the revalidation process is similar to the process used to undertake the development and validation of a new scale, and the range of other issues outlined above, a process to develop a new scale was agreed.

APPENDIX 2

A: Original 16-item scale to assess medication adherence for the IPAC project

	Yes	No
1. Is it hard **to remember** to take all your medicines properly?	0	1
2. Did you **forget to take** any of your medicine's yesterday?	0	1
3. Are you **unsure** how or when to take your medicines?	0	1
4. When you are away from home, do you sometimes **forget to bring** your medicines with you?	0	1
5. Do you sometimes **run out** of medicine/s and then stop taking them for a while?	0	1
6. Do you sometimes **give away** your medicines or **share** them with other people?	0	1
7. Do you sometimes **lose** your medicines?	0	1
8. Do you sometimes try to make the packet/box last longer by **taking fewer medicines**?	0	1
9. When you have no money, do you sometimes **stop buying** your medicine/s?	0	1
10. Do you **stop your medicine/s** when you **feel sick** (such as a cold)?	0	1
11. Do you think the medicine/s **makes you feel sick**?	0	1
12. Do you sometimes **stop taking your medicines** because you think you are ok, or **don't need** them?	0	1
13. Do you think **you can take** your medicines in the way the Dr said?	1	0
14. Are you able to **get a new prescription** before you run out of your medicines?	1	0
15. Do you feel that taking the medicine/s will **benefit you**?	1	0
16. Can you remember to take your medicine when there is **no-one around** to remind you?	1	0

APPENDIX 3

A: Scale-specific *content validity testing* tool

	Question	Selection *Please select below from the list*
1	To what extent are the questions directed at important issues pertaining to the assessment of the 'extent and the reasons' for medication non-adherence as reported by Aboriginal and Torres Strait Islander patients?	Not Selected Small Extent Limited Extent Fair Extent Moderate Extent Large Extent
2	Are there important issues pertaining to the assessment of the 'extent and reasons' for medication non-adherence that should be included in the questionnaire which have been omitted?	Not Selected Crucial Gaps Important Gaps Minor Gaps Minimal Gaps Insignificant Gaps
3	To what extent are the questions simple and easily understood?	Not Selected Small Extent Limited Extent Fair Extent Moderate Extent Large Extent
4	To what extent are questions likely to elicit information about the 'extent and the reasons' for medication non-adherence in Aboriginal and Torres Strait Islander patients?	Not Selected Small Extent Limited Extent Fair Extent Moderate Extent Large Extent
5	How many questions are inappropriate or not needed?	Not Selected Very Many Many Some A few Hardly Any
6	How likely is the questionnaire to assess the 'extent and reasons' for medication non-adherence in Aboriginal and Torres Strait Islander patients?	Not Selected Very Unlikely Unlikely Likely Quite Likely Very Likely

**This clinical sensibility testing tool has been adapted from: Appendix to Burns KEA, Duffett M, Kho M, et al.; ACCADEMY Group. A guide for the design and conduct of self-administered surveys of clinicians. CMAJ 2008;179(3):245-52.*

B: Item-specific *content validity testing* tool

Questions	Relevancy testing Please select below	Clarity testing Please select below	Suggested modification to the question to enhance clarity and relevance
Q1	NOT SELECTED not relevant item need some revision relevant but need minor revision very relevant	NOT SELECTED not clear item need some revision clear but need minor revision very clear	
Q2	NOT SELECTED not relevant item need some revision relevant but need minor revision very relevant	NOT SELECTED not clear item need some revision clear but need minor revision very clear	
Q3	NOT SELECTED not relevant item need some revision relevant but need minor revision very relevant	NOT SELECTED not clear item need some revision clear but need minor revision very clear	
Q4	NOT SELECTED not relevant item need some revision relevant but need minor revision very relevant	NOT SELECTED not clear item need some revision clear but need minor revision very clear	
Q5	NOT SELECTED not relevant item need some revision relevant but need minor revision very relevant	NOT SELECTED not clear item need some revision clear but need minor revision very clear	
Q6	NOT SELECTED not relevant item need some revision relevant but need minor revision very relevant	NOT SELECTED not clear item need some revision clear but need minor revision very clear	
Q7	NOT SELECTED not relevant item need some revision relevant but need minor revision very relevant	NOT SELECTED not clear item need some revision clear but need minor revision very clear	
Q8	NOT SELECTED not relevant item need some revision relevant but need minor revision very relevant	NOT SELECTED not clear item need some revision clear but need minor revision very clear	
Q9	NOT SELECTED not relevant item need some revision relevant but need minor revision very relevant	NOT SELECTED not clear item need some revision clear but need minor revision very clear	
Q10	NOT SELECTED not relevant item need some revision relevant but need minor revision very relevant	NOT SELECTED not clear item need some revision clear but need minor revision very clear	

Q11	NOT SELECTED not relevant item need some revision relevant but need minor revision very relevant	NOT SELECTED not clear item need some revision clear but need minor revision very clear	

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Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Project

QUALITATIVE EVALUATION REPORT

REPORT TO THE PHARMACEUTICAL SOCIETY OF AUSTRALIA

Final Report
February 2020

College of Medicine and Dentistry
James Cook University

Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project.

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Australian Aboriginal peoples and Torres Strait Islander peoples. We acknowledge that these two groups of people have separate cultural identities. We acknowledge the diversity of experience of Australian Aboriginal peoples and Torres Strait Islander peoples across the country. We use the separate terms Australian Aboriginal peoples or Torres Strait Islander peoples when discussing these individual groups.

Abbreviations

ACCHS:	Aboriginal Community Controlled Health Service
Affiliate:	NACCHOs State and Territory representative agencies
AHS:	Aboriginal Health Service
AHW / AHP:	Aboriginal Health Workers / Aboriginal Health Practitioners
AMH:	Australian Medicines Handbook
AMS:	Aboriginal Medical Service
APF	Australian Pharmaceutical Formulary
CIS:	Clinical information system
CPS:	Clinical pharmacist services
CQI:	Continuing Quality Improvement
CTG:	Closing the gap
DAA:	Dose administration aids
DNA:	Did not attend
eTG	electronic Therapeutic Guidelines
FG:	Focus group
FTE:	Full time equivalent
GP:	General Practitioner
GPMP:	General practice management plan
HbA1c	Haemoglobin A1c
HCH:	Health Care Homes
Health service:	ACCHS service
HMR:	Home Medicines Review
IPAC:	Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management
ITC:	Integrated Team Care
MIMs	Monthly Index of Medical Specialities
N-MARS:	NACCHO Medication Adherence Readiness Scale (patient survey)
NACCHO:	National Aboriginal Community Controlled Health Organisation
NT:	Northern Territory
QLD:	Queensland
QH:	Queensland Health
QUMAX:	Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander People
PenCAT:	Pen Clinical Audit Tool
PHC:	Primary health care
PPIs:	Proton pump inhibitors
PRG:	Project Reference Group
PSA:	Pharmaceutical Society of Australia
RMMR:	Residential Medication Management Reviews
Section 100:	Section 100 Remote Area Aboriginal Health Services (RAAHS) Program

Background and Aims

The *Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) to improve Chronic Disease Management* (IPAC) Project was developed in 2017 to investigate whether including a non-dispensing pharmacist as part of the primary health care (PHC) team within ACCHSs (the intervention), leads to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples with chronic diseases. The theory for the project suggests that pharmacists will facilitate increased access to medication-related expertise and assessments, which when coupled with integration into the PHC team and increased engagement with participants, staff and other stakeholders, will result in increased services and quality use of medicines, and improved health outcomes. The project was conducted in a partnership between the Pharmaceutical Society of Australia (PSA), the National Aboriginal Community Controlled Health Organisation (NACCHO), and James Cook University College of Medicine and Dentistry (JCU).

The intervention was designed to be delivered at two levels: 1) patients, and 2) health professionals and systems. Activities targeting patients included the assessment of medication management through medication reviews (including Home Medicines Reviews (HMRs) and non-HMRs), medication adherence and appropriateness, medication-related problems, improving patient medication knowledge and giving preventive health advice. Activities targeting health professionals and systems included conducting education sessions, responding to medication-related queries, reviewing prescribing, mentoring new prescribers, participating in case conferences, undertaking drug utilisation reviews, and liaison with community pharmacy and other stakeholders to ensure continuity of care and transitional care including supporting patients discharged from hospital.

The aim of the qualitative analysis was to evaluate perceptions from health service staff, patients and local community pharmacists on having an IPAC pharmacist integrated within the ACCHS. The analysis also explored perceptions regarding the effectiveness of the intervention through an in-depth assessment of implementation in an urban, regional and remote setting.

Methods

Data to inform the qualitative evaluation was collected between June and August 2019 after IPAC pharmacist placements within ACCHSs for at least six months. Three main strategies were used to collect data for the qualitative evaluation of the project:

1. Semi-structured interviews with IPAC pharmacists;
2. Mixed methods online surveys with general practitioners (GPs), Chief Executive Officers (CEOs), managers, and community pharmacists; and
3. Site-visits comprising focus groups and interviews with health services staff and patients, interviews with the IPAC pharmacists, shadowing and observation.

Proformas for interviews, focus groups and online surveys were developed by the qualitative evaluation team. The proformas were developed using the project protocol and considering issues which emerged throughout the implementation of the IPAC project. They were distributed to key stakeholders for comment. Feedback was taken into consideration and revised versions distributed for further input. Proformas were piloted with relevant members of the project operational team or evaluation team. Recordings and notes from the interviews and focus groups were de-identified, transcribed and thematically analysed.

The NACCHO and PSA Project Coordinators provided the names and email addresses of the recommended recipients for the online surveys. Recommended recipients were generally individuals with whom the coordinators had contact in the development and implementation of the intervention. Community pharmacists were identified by ACCHSs as those with whom they worked with regularly.

All ACCHSs participating in the IPAC project were invited to nominate to be involved in a site visit for the qualitative evaluation. ACCHSs were selected based on their willingness to participate (in line with principles of community based participatory research), geographic location, being a site with good patient recruitment and a high level of pharmacist activity; and sufficient pharmacist FTE. Other selection criteria included geographical dispersion ensuring a service was selected in each setting - urban, regional and remote. The Project Reference Group comprising representatives from all participating ACCHSs, NACCHO Affiliates and NACCHO, endorsed the site recommendations.

Results and Discussion

Twenty-four (24) IPAC pharmacists provided feedback on their experiences in the role and how well the project was able to be implemented within their ACCHS. The IPAC pharmacists represented all health services recruited in the project (n=20).[i] Thirteen general practitioners, 12 managers and 10 community pharmacists responded to the online survey. Three ACCHSs were visited for an in-depth assessment of implementation. One service was located in an urban area, another in a regional area, and one in a remote setting. Seven focus groups or group interviews were conducted with 17 service staff and 17 patients / carers. Individual interviews were held with eight (8) health service staff and three (3) patients / carers. Fieldwork included a day observing the work of the IPAC pharmacist (or shadowing) and the service in general at each site, as well as observation of the community context (e.g. a visit to community pharmacies).

Benefits

Patients and health services staff reported numerous benefits of having a pharmacist delivering services within the ACCHS. The majority of patients reported that the IPAC pharmacist had been able to look at their medications and suggest alternative or different combinations of medications, or regimes, that resulted in them *'feeling better'*. IPAC pharmacists took a holistic approach to patient care, listened to patients and better understood their lives. Some patients reported being more involved in decisions about their care with the support they received from the pharmacists. Pharmacists sometimes sat in on consultations with the patient and their GP. Patients felt they were empowered to better manage their health conditions through better understanding their condition, why they needed to take their medications and how they worked. Many patients indicated they were more adherent to their medications. In addition to feeling better, patients also reported other benefits as a result of medication changes such as losing weight, being motivated to do more exercise and engaging with other support groups in the community. The IPAC pharmacist and other health services staff concurred that patients' management of the health conditions (and adherence to medications) had improved, as had their biomedical test results, particularly HbA1cs.

The main benefit for health services staff was having access to an *'in-house medicines expert'*. IPAC pharmacists provided support and advice to health services staff informally such as through *'corridor conversations'* as well as formally through medication management reviews. Both the IPAC pharmacists and GPs reported that recommendations were commonly made by the IPAC pharmacists following medication reviews. Recommendations were perceived to be of high quality and prescriber up-take of the recommendations was reported to be high. Provision of education sessions for health services staff, including GPs, nurses and Aboriginal Health Workers and Practitioners (AHWs / AHPs) were perceived as valuable. Health services staff also benefited from the pharmacists having input into their clinical team meetings and case conferences. The pharmacists contributed to medicines safety and quality assurance activities by conducting drug utilisation reviews and assisting in reviewing ACCHS medication-related policies.

GPs reported having the IPAC pharmacist as part of the PHC team saved them time as medication queries were answered quickly, and they could refer patients to the pharmacist for education about their clinical conditions. The pharmacists could also better explain to the patient how their medications worked. Time was also saved for some GPs as they could make referrals for medication reviews to the IPAC pharmacist. Some IPAC pharmacists had conducted HMRs for the health services as an external provider prior to taking on the IPAC role.

[i] IPAC Project quantitative reports are based on patient data from 18 ACCHSs due to the discontinuation of two services in the implementation phase of the project.

The majority of patients, managers, GPs, other health services staff, and IPAC pharmacists recognised benefits received through the project and overwhelmingly supported the integration of pharmacists within ACCHSs.

Interactions with Community Pharmacies

Many ACCHSs already had strong relationships with their local community pharmacies, at the commencement of the project, particularly through the Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander People (QUMAX) programme, and section 100 arrangements. Relationships between ACCHSs and community pharmacies were further strengthened as a result of the IPAC project.

IPAC pharmacists worked together with community pharmacists to problem solve, access discharge summaries, confirm the patient's medication history, undertake medication reconciliation by correcting errors and medication lists, and facilitate provision of dose administration aids (DAAs) for health service patients. Community pharmacists reported that the IPAC pharmacist role was very helpful and useful to them and it facilitated communication between the community pharmacy and GPs.

Community pharmacists reported benefits from the IPAC project included increased referrals for HMRs and improved participation in HMRs. They also felt that patients were more interested in their medicines. Community pharmacists also perceived that patient knowledge of their medicines and adherence to medicines had improved since the IPAC pharmacists had commenced in the ACCHSs. All community pharmacists who responded to the question (n=7) believed that there was a role for an IPAC-type (non-dispensing) pharmacists within ACCHSs.

Enablers and Challenges

Having a pharmacist with the right *'organizational fit'* and personality was just as important as their skills and experience. As well as possessing relevant clinical skills, pharmacists needed to be culturally responsive, able to develop relationships, build rapport, be flexible, non-judgmental, and resilient. Pharmacists needed to be confident and understand the need to be proactive and engage with people to make the role more effective. These particular personality characteristics were one of five key factors for pharmacists to be effective in the IPAC role. IPAC pharmacists also required good clinical skills, and the ability to communicate, collaborate with internal and external stakeholders and practice in a culturally responsive way.

An enabling factor for effective engagement between IPAC pharmacists and their patients was the pharmacists' ability to access the ACCHSs clinical information system (CIS) and make clinical assessments according to comprehensive patient information. This facilitated access to the patients' medications history, conditions and other information regarding social situations which informed consultations with patients and medication reviews. IPAC pharmacists could also add notes on their recommendations and interactions with the patient into the CIS. This helped their integration into the PHC team. Pharmacist accreditation for HMRs enabled medication reviews to be completed and also allowed the GPs within ACCHSs to receive MBS benefits. Some participants reported health service revenue had increased as a result of the pharmacists' activity. Some issues were experienced with setting up appropriate levels of access to the CIS, and unstable internet connections and no internet access in some remote communities hindered practice.

'*Strategic loitering'* and *'hanging out'* in the waiting room was a strategy that helped some pharmacists to build relationships with patients and staff. Strong relationships between the IPAC pharmacists and the ACCHSs' AHWs / AHPs assisted the pharmacists to develop relationships with patients and fostered acceptance. Good relationships between the pharmacist and the patient resulted in some patients feeling comfortable making appointments to see the pharmacist themselves, and some patients also telephoned the pharmacists with questions. Many IPAC pharmacists reported patients were actively engaging in their consultations.

Through the project a number of challenges were identified to integrating a pharmacist within the PHC team. Prior to the IPAC project there were few pharmacists working in general practices or ACCHSs nationally and there was very little understanding of the role of a clinical pharmacist in the primary care setting. A few ACCHSs in the project had worked closely with pharmacists providing HMRs for patients of their service, and staff had a slightly better understanding of the value a pharmacist could add to patient care. However, service readiness for the project was a challenge for some services. All ACCHSs received support and a site visit as part of the recruitment process, and some services were well prepared for the pharmacist and understood the nature of the role and its potential value. However, staff in other services needed time to fully understand the role and learn how to utilise the pharmacists' expertise. Just under half of the IPAC pharmacists felt their service *'was not ready'* for their role. More discussion with ACCHS staff, education or systems changes may have assisted prepare their service before the pharmacist commenced. Some services needed to develop policies and procedures in order to guide ACCHS medicine-related activity so that the pharmacist could assist with these activities and establish their role within the service. This was burdensome for some ACCHSs. In addition, the need for pharmacist induction into the service, the problem of staff turnover, and other service priorities were also challenges.

The majority of the IPAC pharmacists felt accepted and well-integrated within the PHC team at the time of their interview (after approximately six months of practice in their service). However, at commencement an initial lack of understanding of the IPAC pharmacist role led to some of them being underutilised, and referrals to the pharmacists from other ACCHS health professionals were low. The provision of education to staff, predominantly by the IPAC pharmacist, on how they could contribute to the PHC team and their ability to improve health outcomes for patients, facilitated better understanding of their role, developed relationships and helped the pharmacist to integrate into the team. Over time, these factors contributed to more patients being referred to the pharmacist. Most pharmacists had a project champion who assisted with their integration. Support from GPs and Aboriginal Health Workers and a stable workforce were enablers to the integration of the IPAC pharmacist and referral process. Other support from ACCHSs such as provision of a uniform and consulting room space, as well as assistance with promotion of the pharmacist services were also enabling factors for implementation of the role and the project.

Many of the pharmacists and health services staff reported that the irregular attendance of patients at ACCHSs presented challenges. This often resulted in patients being seen by many health professionals when they did present, in order to deliver opportunistic care. Patients with chronic disease, especially patients with kidney disease also had many appointments with clinical staff and were often overwhelmed. Other issues that presented challenges for the pharmacists to organise follow-up appointments with patients included transience, language barriers and 'sorry business'. Several IPAC pharmacists commented that patients often visited their homelands or family meaning they were not readily available for follow up.

Other project-related challenges were the complexity of the participant consent process and the need for written consent from the patient. This was particularly challenging where patients had low health literacy or where English was not their first language. Another challenge within the project was the time it took for pharmacists to enter research data for the quantitative analysis. This was reported by some pharmacists to be quite time-consuming.

Conclusion

Overall, the qualitative evaluation of the IPAC project demonstrated there was overwhelming support for non-dispensing pharmacist services to be integrated within the PHC team of participating IPAC sites and in ACCHSs more broadly. Health service staff, the IPAC pharmacists and patients benefited from the initiative. Relationships with community pharmacy were further strengthened as they reported the IPAC role had been very helpful and useful. Acknowledging the time required for ACCHSs to develop systems to integrate the pharmacist and educate health professionals on the value of the role is important in future implementation of the model.

Summary of recommendations from qualitative evaluation participants

The following table summarises suggestions from participants in the qualitative evaluation on future policy and implementation of integrated pharmacists in ACCHSs.

Suggested actions for sector development	Owner and key partners	Potential pathways to implementation	Intended industry impacts
1. Support policy to integrate the role of a non-dispensing pharmacist within ACCHSs.	**Federal Government**	1.1 Participants in the qualitative evaluation suggested options to support ACCHSs implement an ongoing integrated pharmacist model of care: 1.1.1. Core services funding be increased to enable ACCHSs to implement the role. 1.1.2. In remote settings explore increasing the section 100 pharmacy support allowance to fund integrated pharmacist time onsite within the clinic to deliver patient-related services. 1.1.3. Consideration for other Federal Government sources of financial support for an integrated pharmacist within ACCHSs such as the creation of an MBS item for integrated pharmacist patient-related services (time based). 1.2 Participants in the qualitative evaluation suggested that the cap on the number of funded HMRs should be removed to enable ACCHSs to facilitate as many HMRs as is needed by their patients. Current HMR Program Rules as defined by the Sixth Community Pharmacy Agreement limits HMRs which can be conducted by an accredited pharmacist to 20 per month.	Implementing this recommendation will lead to: • Enhance quality of care outcomes for Aboriginal and Torres Strait Islander peoples with chronic disease • Continuity of care provided by pharmacists integrated into the team • Improved prescribing quality • Improved cost effectiveness • Improved medication adherence
2. Advocacy and support to ACCHSs to facilitate processes for integrating pharmacists	**NACCHO and Affiliates**	2.1 NACCHO and Affiliates support the development of processes and resources for pharmacists to be integrated in the primary health care teams of ACCHSs. Processes and resources should support ACCHS staff to be informed on the value of having a pharmacist in the team, to implement change management processes to introduce and embed the pharmacist and develop referral processes. 2.2 Resources to guide preparation should consider the IMPACT Framework [1] and assist ACCHSs for the pharmacist role. 2.3 ACCHSs that will be most ready to establish an integrated pharmacist role are those with systems established for quality improvement (eg. Referral, CIS). 2.4 Develop the capacity of Aboriginal Health Workers/Practitioners and Outreach Workers to facilitate referral for patients needing support from the integrated pharmacist.	• ACCHSs are prepared for the pharmacist role • All staff are aware of value and benefits of the role and facilitate integration into the primary health care team
3. Co-design of the pharmacist role with the ACCHS to ensure it	NACCHO, **ACCHSs** and PSA	3.1 Policy guiding the implementation of the pharmacist role should allow flexibility for ACCHSs to use the role to best meet the needs of the health service and promote self-determination.	• Pharmacist services are tailored to the local ACCHS and meets patients' needs

Suggested actions for sector development	Owner and key partners	Potential pathways to implementation	Intended industry impacts
meets their needs		3.2 ACCHSs should be actively involved in the co-design of the integrated pharmacist role to ensure it suits their needs and seek support from NACCHO and their Affiliate where necessary. 3.3 The recruitment of pharmacists to be integrated within ACCHSs should be flexible and be led by, ACCHSs so that pharmacists have the 'right organisational fit' and are skilled in key areas (character, clinical skills, communicator, collaborator and culturally responsive). 3.4 Future projects to assess outcomes from integrated pharmacists within ACCHSs or alternate new models, need to allow a lead-in time to allow pharmacists to develop relationships with staff and patients and develop a deeper understanding of the local community and health service culture.	
4. Training and support to prepare pharmacists for a non-dispensing, integrated role within ACCHSs	**PSA,** NACCHO, and ACCHS, pharmacist training providers	4.1 Support pharmacists to develop career pathways for integrated pharmacist roles. [2, 3] 4.2 Prepare pharmacists for integrative roles within ACCHSs through the development of a training program that includes the conduct of medication reviews, working with internal and external stakeholders, team-based collaboration, patient counselling, preventive health care, transitional care arrangements, medication adherence assessment of Aboriginal and Torres Strait Islander patients, the provision of education and training and medicines information to staff and patients, and undertaking drug utilisation reviews. The program should also include comprehensive training on clinical information systems including all basic functionality, how to generate quality improvement reports and how to set up patient recalls. 4.3 Ensure opportunities for pharmacists to undertake cultural safety training responsive to their place of practice prior to commencing activity within ACCHSs. 4.4 ACCHSs to provide pharmacists with induction to the service and the local community including introduction to staff members in key roles and cultural orientation to the local population. 4.5 Facilitate a community of practice network to enable knowledge sharing and peer support. Mentors can assist with clinical and/or cultural aspects of integrated practice and development of career pathways.	• Pharmacists and ACCHS staff are prepared and effectively deliver patient-centred care
5. Facilitate continuous improvement through further research and evaluation	**Federal Government,** Academic Institutions, NACCHO and affiliates, ACCHSs	5.1 Funding should be made available for further research and evaluation of integrative pharmacist programs to facilitate continuous quality improvement. 5.2 Research involving patients receiving services from pharmacists should use simplified information sheets and consent forms for patients and consider	• Improve evidence base and continuous improvement of role and service delivery

Suggested actions for sector development	Owner and key partners	Potential pathways to implementation	Intended industry impacts
		formal translation into local languages. 5.3 Future research projects may consider the use of the pharmacist logbook in order to facilitate data collection about the activity of integrated pharmacists. Some design improvements to simplify data entry, and comprehensive training, are suggested. 5.4 In the design of future research projects consider the time required for data entry and ensure this element is adequately factored into the allocation of working hours. 5.5 Mechanisms need to be established to support the continuation of trials, beyond the trial period, if they have been found to be successful. Short term projects have detrimental impact on Australian Aboriginal peoples and Torres Strait Islanders who have historically been over-researched, and on ACCHSs work processes.	

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1. Introduction

1.1 Aboriginal and Torres Strait Islander Health and Chronic Disease

Australia has diverse, resourceful and dynamic Aboriginal and Torres Strait Islander communities however, there are significant health disparities compared with other Australians. Aboriginal and Torres Strait Islander Australians live approximately 10 years less than non-Indigenous Australians [4]; and rates of chronic disease including diabetes and kidney disease are significantly higher among Aboriginal and Torres Strait Islander peoples [5, 6]. Many Aboriginal peoples in remote Australian communities have insufficient access to health infrastructure including housing and sanitation [7, 8].

1.2 Medications Adherence

Adherence to a medication regimen is central to good health outcomes. Medication adherence for many people is extremely poor, resulting in disease-related complications, higher levels of hospitalisation, and increased morbidity and mortality [9]. A systematic review found the economic costs of non-adherence are high [10]. Aboriginal and Torres Strait Islander people in remote Australian communities face many barriers accessing medicines including financial and geographic constraints, failed patient-clinician interactions, poor healthcare delivery systems and complex therapeutic medication regimens.[11, 12] The physical settings of community pharmacies, and the lack of adequate integration with Aboriginal health services for tailored information, have made it difficult for some Aboriginal and Torres Strait Islander people to have productive relationships with their community pharmacists.[13-15] While some Australian initiatives under the 6th Community Pharmacy Agreement (6CPA), the Section 100 Remote Area Aboriginal Health Services Program (section 100), and the Closing the Gap (CTG) Pharmaceutical Benefits Scheme (PBS) Co-payment measure, have removed some of the financial barriers to accessing medicines, the 2013-14 PBS per person expenditure for Indigenous Australians was only 33% of the expenditure for non-Indigenous Australians [16]. There is still considerable need for improvement.

1.3 Aboriginal Community Controlled Health Services

In reaction to previous government inaction and culturally inappropriate care, from the 1970s Aboriginal and Torres Strait Islander peoples developed Aboriginal Community Controlled Health Services (ACCHS) to deliver primary health care [17]. In mainstream services many health professionals are inadequately trained to undertake culturally safe care, and are unaware of how upstream determinants of health including employment, housing and racial discrimination can influence patient care or how to support patients with these social needs [5, 18, 19]. "Closing the gap" in health, education and social indicators requires a significant investment of resources across all levels of government and partnerships with Aboriginal and Torres Strait Islander peoples [7]. One strategy is to co-design innovative models of health care with Aboriginal and Torres Strait Islander peoples. Innovative but culturally appropriate models of care to enhance the quality use of medicines for Aboriginal and Torres Strait Islander peoples need to be devised.

1.4 Integrated and Collaborative Pharmacist Models

'Integrated care' ensures patients with chronic disease who need care from multiple providers, have a joined-up experience of care, or patient-centred care [20]. This is a health system goal to ensure the centrality of patient's needs around which care is organised, more efficient and cost-effective care.

Rosen, Mountford [21] described processes necessary to deliver integrated care based on four international case studies and Wagner's 'chronic disease care model' to enhance the organisation of care for chronic disease. The six dimensions of integrated processes of care developed by Rosen et al were:

1. Organizational: governance structures within and between institutions and design of organisational structures that aid integration. These include the relationships between organisations that could be formalised through "partnership, structural integration through merger, contractual relationship" (page 27). They also encompass the frameworks that ensure aims and objectives are achieved. Organisations

have a governance group to guide goals and integration initiatives. Goals were clearly communicated to all staff.

2. Informational: clinical information systems that support communication between clinical teams, outcome measurements and performance management. Examples include identifying gaps in care through population registers; patient access to records (to check results of book appointments); and secure messaging to share clinical records between primary and tertiary care. Informational integration was identified as challenging to achieve as not all clinics had access to electronic health records. Furthermore, in some areas there were privacy issues with data sharing.

3. Clinical: Consistent and standardised clinical care along the whole continuum of care. These are underpinned by standard guidelines or shared work practices. Examples of practices include: clinical prompts through population registers; evidence base guidelines used for standardisation of care for common conditions; and multi-professional care coordination for patients with complex problems.

4. Functional or Administrative: These aim to reduce administrative work. Support systems such as strategic planning, joint HR systems, and secondment of staff. Shared administrative functions include contract and claims management; central employment of shared staff; and joint education and training.

5. Financial: joint budgetary arrangements and payment systems. These can vary across organisations and may include micro-incentives (performance-linked payments).

6. Normative: Identifying, communication and operational shared professional standards, vision, goals and values. Professional leaders were key to establishing and sharing these shared standards and visions and values. Shadowing of other professionals and social events also assisting in understanding different roles and building trust between professions. [20, 21]

Pharmacists working within ACCHSs is one way to integrate non-dispensing pharmacist services with the existing primary healthcare team. The National Health Service in the UK have invested heavily in integrating pharmacists into health care teams [22]. New Zealand, Canada and the USA already have pharmacists providing clinical services in general practice settings [23]. In Australia, the concept has received endorsement from leading organisations such as the Pharmaceutical Society of Australia (PSA), Australian Medical Association, the National Aboriginal Community Controlled Health Organisation and pharmacists. [23-27]. However, there are still very few pharmacists practicing in primary health care settings in Australia.

Currently, pharmacists are providing only limited clinical pharmacist services to Aboriginal Australians due to several barriers.[28, 29] These include restrictive Home Medication Review (HMR) business rules including processes that are not always possible nor culturally acceptable [13, 14, 29]. Aboriginal health service GPs provide few HMR referrals for Aboriginal patients. One of the factors inhibiting these referrals is a lack of trust in pharmacists' ability to appropriately manage their patients [14, 30]. Yet, when medication reviews are delivered in culturally appropriate settings there is great potential to increase patients' medication knowledge, medication adherence and chronic disease management [14].

Co-location of pharmacists within general practice has enabled greater communication, collaboration and relationship building among health professionals.[25, 31] Practice pharmacists have been shown to increase uptake of medication review recommendations by doctors [32]. Moreover, the 2010 UK PINCER and PRACTICE studies[33, 34] found that pharmacists play a critical role in reducing medicine errors in general practice. A 2015 report by Deloitte Access Economics (DAE) demonstrated that the integration of pharmacists in Australian general practice has the potential to generate $1.56 in health system savings for every $1 invested in the program [35]. The analysis estimated that integration of pharmacists into general practice would cost the Government $969.5 million over four years, however, this investment is more than offset by the broader heath savings at a federal, state and consumer level [35].

Hazen et al (2018) undertook a systematic review that aimed to investigate whether the degree of integration of non-dispensing pharmacists into the health care team may be a determinant for its success.[36] This association had never been properly assessed**.** The authors define the 'degree of integration' according to the six dimensions of integrated processes of care outlined by Walshe and Smith (from Rosen et al). The review found 60 studies had 89 health outcomes from which the researchers could count how many outcomes were positive and how many were not positive. For all outcomes (surrogate and proxy) most studies showed that integrated pharmacists improved these outcomes (62% of outcomes from these studies were positive; 67% surrogate outcomes, and 72% proxy outcomes were positive). Surrogate health outcomes were clinical, or patient reported health outcomes. Proxy health outcomes were defined as improvement in medication errors.

Hazen et al found there was no relationship between the degree of integration and the proportion of positive outcomes [36]. Low integration and high integration levels showed the same proportion of studies with positive outcomes. Fully integrated clinical pharmacist services (CPS) had about 62% positive outcomes which was the same as low integrated CPSs. However, the study also explored the type of CPS (whether disease-specific or patient-specific).[36] *Disease-specific CPSs* targeted patients by their disease e.g. predominately protocol driven services specifically to patients with diabetes. Forty-nine percent (49%) of *disease specific CPSs* were fully integrated, and these had a lower percentage of positive health outcomes than those service that were less integrated (59% compared with 72%). In contrast, *patient-specific CPSs* targeted a more heterogeneous range of patients such as those with co-morbidity or risks like polypharmacy. This model of fully-integrated *patient-specific CPSs* resulted in more positive outcomes from these studies (70%) compared with 57% for partially integrated CPSs and 55% for non-integrated services.

The six dimensions of integrated care are 'processes' to achieve integration. There is no evidence to show that the more of these processes that exist, the more effective the integration and the more effective the outcomes.[20, 21] Protocol-driven services may not be dependent on systems that optimise the integration between services, which may be why Hazen et al (2018) found that the association between outcomes and the degree of integration with regard to clinical pharmacist services that were *disease-specific* (ie protocol driven) was weak.[36] In contrast, there was an association between the degree of integration and the proportion of studies that showed benefit for *patient-specific* pharmacist services (for patients with co-morbidity). This finding is consistent with the large body of evidence supporting key processes of care within health services and the role of collaborations to optimise the management of patients with chronic disease as in the 'chronic disease care model' [37, 38].

The McDonough and Doucette (2001) Model for *Collaborative Working Relationships (CWR)* between general practitioners (GPs) and pharmacists explains that if patient care is to be improved, then the activities of GPs and pharmacists needs to be better coordinated [39]. To this end, they developed a 5-stage model to measure the degree of collaboration between GPs and pharmacists. Based on organisational theory, the model describes how such a collaborative relationship progresses from Stage 0 where the exchange between GPs and pharmacists is discrete, at a distance, and of short duration (such as pharmacists alerting GPs of a dispensing issue by phone), to Stage 4 where there is a formalised collaborative working agreement between the pharmacist and the GP. Stage 0 describes the degree of collaboration that for many GPs is observed as usual care. Stage 4 has progressed collaboration to the point where many of the integrative processes by Rosen and Moutford are fulfilled, and there is an interdependence between GP and pharmacist.

1.5 Enablers and barriers of integrated pharmacist models

At a pragmatic level, the literature outlines the enablers and barriers of integrated pharmacist services models into primary health care. A literature review on the enablers and barriers of integrated pharmacist services models into primary health care was conducted (see Appendix A).

Enablers for pharmacists working effectively in primary health care

Orientation of both health service staff and pharmacist to fully understand the role and competencies of the pharmacy profession was an important enabler. Preconceived ideas of health services staff about the role

and capabilities of pharmacists in primary care should be addressed [40]. Recognition of the value of skills and specialist knowledge of the pharmacist [41, 42] and enhanced training on how to work together [43] were also required. Prior to the pharmacist joining the primary health care team, their role and how they will work in the team should be clearly defined. Furthermore the pharmacist should continue to educate team members about their role [44, 45]. Promotion of the role to both health professionals as well as patients should also continue once the pharmacist has commenced [24, 44].

Professional trust and respect between pharmacists and other health providers was recognised as a facilitator of integration in several studies. In a study of pharmacist recommendations for changes to medications, Benson et al (2018) found that pharmacists who had already established relationships with General Practitioners (GPs) had a higher acceptance rate of recommendations. Benson et al (2018) and Barry and Pammett (2016) also noted need to demonstrate value and build relationships [40, 46, 47].

Benson et al (2018) highlighted that if doctors recommended and introduced the pharmacist to patients; patients were less resistant to recommendations. Benson, Sabater-Hernández [46] outlined that trust was needed to enhance existing relationships and build new relationships [41, 48].

There was a need to ensure a supportive environment including "strategic positioning" in the clinic [40] as co-location facilitated integration of pharmacists into primary health care teams [41, 44, 49, 50]. Pharmacists' should ideally have consulting space within the primary health care clinic. Access to a patient's medical file was useful for pharmacists conducting medication reviews [32, 50-52]. Other strategies for successful integration and to remain highly visible were to have a dedicated workspace, attend meetings and social events as well as practice "strategic loitering" such as standing in corridors and waiting rooms [48].

Increased face to face communication [46] facilitated by co-location [41], were key to pharmacists building rapport with staff and patients. This communication included informal and formal opportunities to communicate [32] and regular meetings and debriefs [42]. The importance of face-to-face communication was highlighted by Tan et al (2014b) who found there were more positive outcomes when pharmacists delivered the results of medication reviews face to face to the GP [49]. Using case conferencing to discuss medication reviews was also found to be most beneficial by Kwint et al [52].

For pharmacists to be effective in integrated primary care settings they need to be experienced, have good clinical skills and be highly motivated [45, 53]. For best practice pharmacists also need to have ongoing training [24] and personality traits which include motivation, assertiveness and confidence [42, 48].

Other enablers to effective practice included the willingness of health professionals to collaborate [46] and share records [41]. Flexibility in funding arrangements and variations in models of practice enables the pharmacist to adapt to the needs of patients and the practice [54-56]. Mentorship and appropriate supervision of practice-based pharmacists were also cited as keys to success [42, 45, 48, 57].

The Integrating Models of Pharmacists Across Care Teams (IMPACT) Framework identifies six domains to guide PHC services in readiness for the integration of pharmacists. [1] The six domains identify enabling factors and include the characteristics, skills and experience of the pharmacist; relationships; scopes of practice; connectivity; localisation; and sustainability. The framework was published after the commencement of the IPAC project, however has similarities across the domains, with the protocol for the IPAC project. [58]

Challenges or barriers for pharmacists working in primary health care

Lack of co-operation from GPs [46] has been identified as a key barrier to effective integration of a pharmacist into a primary health care team. This lack of co-operation may be due to GP feeling threatened by the

pharmacist's role [53, 59, 60] or, lack of understanding of the pharmacist's role [24, 51, 61] Nurses have also felt threatened by the role [60]. The lack of collaboration may have been caused by, lack of communication [41] and a lack of existing relationships [51]. Hostile relationships with the community pharmacists has also been found to be a barrier to effective integration of a clinical pharmacist into the practice team [46, 53, 60].

A lack of resources, for example consulting room space and computer software posed logistical challenges and barriers to the employment of a pharmacist for some health services [23, 48, 56, 62]. A lack of pharmacist remuneration and government funding for the service [24, 49, 51, 59, 63] and the limited availability of the clinical pharmacist (some between 4 to 8 hours per week) [46, 61] were also barriers. Furthermore, having no space in the practice to accommodate the pharmacist was a key resource and logistical challenge

Other key barriers and challenges for pharmacists in primary health care cited in the literature include:

- Patient resistance to the service and difficulty recruiting patients [46, 59];
- Difficulty accessing medical records [41];
- Only a 'pilot project" so reluctance by other team members to integrate [61]; and
- No orientation or support for the pharmacist from health service management [61].

1.6 IPAC Project

In order to investigate the potential gains in health outcomes arising from integrated models of care, the *Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) to improve Chronic Disease Management* (IPAC) Project was developed in 2017. The project aimed to determine if including a registered non-dispensing pharmacist as part of the PHC team within ACCHSs (the intervention) leads to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples with chronic diseases. The theory for the project suggests that pharmacists will facilitate increased access to medication-related expertise and assessments, which when coupled with increased engagement with participants, staff and other stakeholders, will result in increased services, improved quality use of medicines and patient health outcomes.

The IPAC project targeted adult patients with chronic diseases to optimise the pharmacological management of their condition. There is evidence that the Aboriginal and Torres Strait Islander mortality gap due to chronic disease can be especially attributed to coronary heart disease (22% of the mortality gap); diabetes (12%); chronic lower respiratory disease such as chronic obstructive pulmonary disease (6%), and cerebrovascular diseases, such as stroke (5%) [64].

The IPAC Project made two clinical claims. Firstly, patients who are managed by this model of care, involving delivery of services by a pharmacist integrated within ACCHSs, experience either equivalent or superior quality of care outcomes for Aboriginal and/or Torres Strait Islander adult patients with chronic disease compared to baseline data representing pre-intervention. Secondly, appropriate funding for services provided by pharmacists within ACCHSs is likely to lead to superior health care service utilisation (towards equity) of patients with chronic disease compared to utilisation at baseline (pre-intervention). This report describes the outcomes of the qualitative evaluation of the intervention within a community-based participatory research model.

IPAC Pharmacists were supported to be integrated within ACCHSs by:

- Functioning under governance, cultural, and clinical protocols within ACCHS with identified positions and roles;
- Having shared access to clinical information systems to facilitate data sharing and aligned practice;
- Delivering continuous clinical care to patients (working within health service teams, undertaking patient follow-up);
- Communication with GPs and supporting patient self-management, etc);
- Receiving administrative supports from primary health care staff and joint education;

- Sharing the same visions and goals as the ACCHS and supporting shared goal formation with other services;
- Being physically co-located with clinic staff.

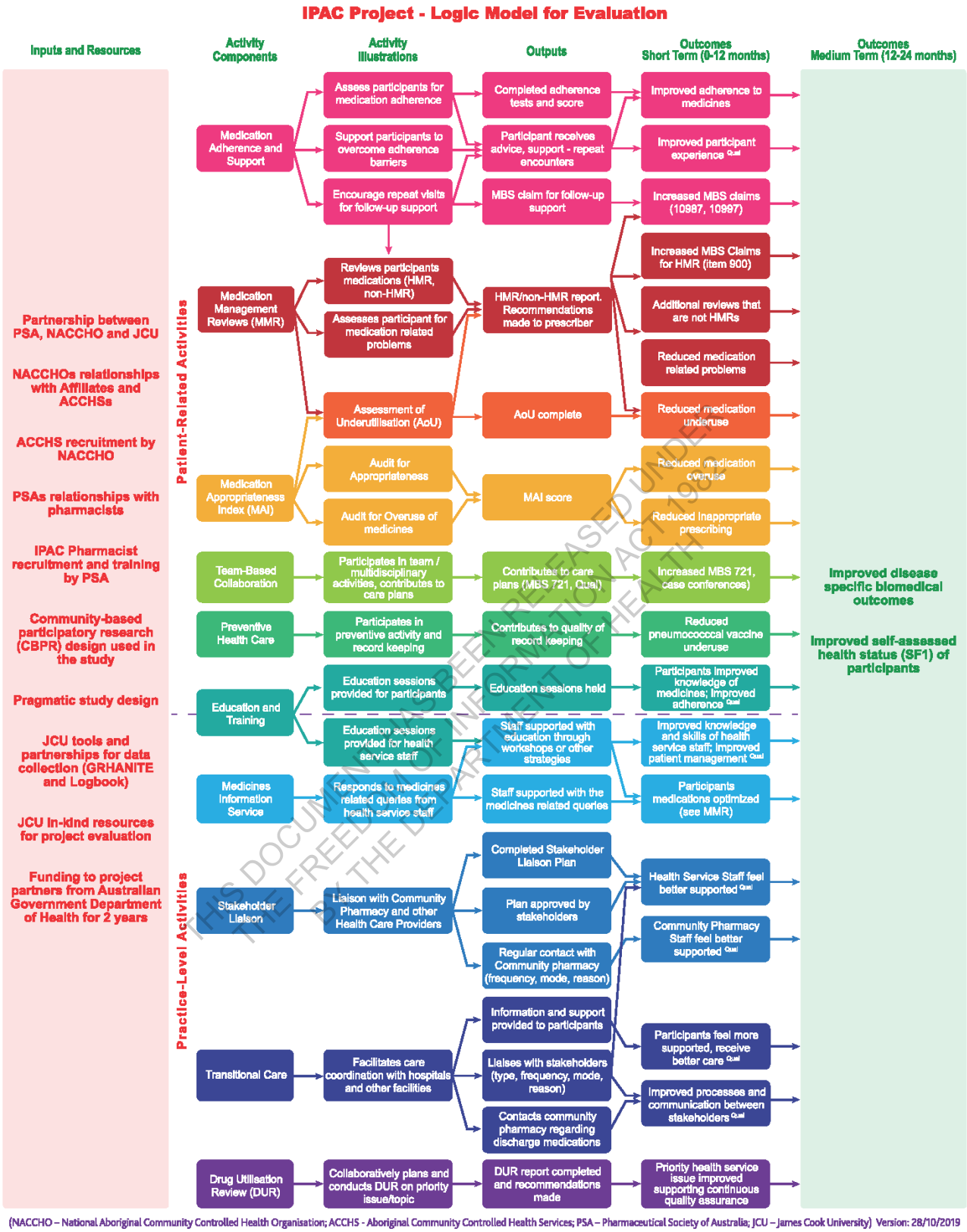
Financial integration within ACCHSs did not occur as pharmacists were externally funded by the project. (Based on international consensus criteria for integration processes: [36].

1.7 Pharmacists' Core Roles (the Intervention)

IPAC pharmacists delivered non-dispensing services within an ACCHS through a coordinated, collaborative and integrated approach to improve the quality of care of patients. The intervention was designed to be delivered at two levels: 1) targeting patients, and 2) health professionals and systems. Ten core roles were delivered over the 12-15 months' intervention phase. The Logic Model for the Evaluation outlines the roles and the expected outputs and outcomes from each (see Figure 1).

The first five months of this project focussed on participant recruitment whilst the remainder of this period comprised participant follow-up activities. Activities targeting patients included the assessment of medication management through medication reviews (including HMRs and non-HMRs), medication adherence and appropriateness, medication-related problems, improving patient medication knowledge and giving preventive health advice. Pharmacists undertook an audit of medication appropriateness for a sample of participants at the rate of 30 participants per 1 FTE (pro rata). Activities targeting health professionals and systems included conducting education sessions, responding to medication-related queries, reviewing prescribing, mentoring new prescribers, participating in case conferences, undertaking drug utilisation reviews, and liaising with community pharmacy and other stakeholders to ensure continuity of care and transitional care that supports patients discharged from hospital [25]. Participants were reviewed according to clinical needs and Medicare rules. Additional roles as specified by services and the service agreement were included to reflect the pragmatic approach to the intervention and evaluation of 'real-life' health service roles.

Figure 1. Logic Model for Evaluation



2. Methodology

This report outlines the methodology and results of the qualitative evaluation component of the IPAC project. For an expanded overview of the methodology of the intervention please refer to the project protocol [58].

Three main strategies were used to collect data to inform the qualitative evaluation of the project:

4. Semi-structured interviews with IPAC pharmacists;
5. Mixed methods online surveys with GPs, CEO and managers and community pharmacists; and
6. Site-visits comprising focus groups and interviews with health services staff and patients, interviews with the IPAC pharmacists, including shadowing and observation.

The purpose of the qualitative evaluation was to obtain data on perceptions of health service staff and patients of having an integrated pharmacist and explore project effectiveness including an in-depth assessment of implementation in an urban, regional and remote setting. Data to inform the qualitative evaluation was collected between June and August 2019 after IPAC pharmacist placements within ACCHSs for at least six months.

2.1 Semi-structured interviews with IPAC Pharmacists

2.1.1 Rationale

Interviews with the IPAC pharmacists collected their perspectives on how well the project was able to be implemented within their health service and explored their perceptions on how well they were able to integrate into the primary health care team, the quality of relationships with other health care providers (internal and external), changes and impacts on the health service and overall effectiveness of their role. In addition, it was important to evaluate aspects of the project including their induction and preparedness for the role, processes for patient recruitment and consent, the project resources and generally what worked and didn't. The interactions IPAC pharmacists had with patients and whether they perceived their interactions with patients had had any impact were also explored.

2.1.2 Tools

An interview proforma was developed by the qualitative evaluation team based on the project protocol and considering issues emerging throughout the implementation of the IPAC project. The proforma was distributed to the project operational team, the steering committee and the evaluation team for comment. Feedback was taken into consideration and a revised version distributed for further feedback. While there were many questions in the templates it was noted that focus groups and interviews would be conversational and not all questions were likely to be asked. Sub-questions were provided to prompt the interviewer if required. Five quantitative questions were subsequently included in the proforma after consultation with team members, as the interview was seen as a formal way to collect this data, in the absence of another process.

The proforma was piloted with a pharmacist member of the project operational team and final edits in wording and structure were made (see Appendix B). The interviews were undertaken by two researchers. The pilot interview and the first few interviews were undertaken by both researchers to ensure consistency in approach and implementation of the interviews.

Following the initial interviews and the semi-structured nature of the investigation an additional question was introduced *"Can you give me a picture of your service?"* Including this question served two purposes: firstly, it fit in well with the rapport building questions; and secondly, it provided contextual details of the service in which the pharmacist worked and obtained information about the local community and its' location. Pharmacists may have been prompted with *"How many GPs are there? Are they permanent/stable or locums? Is there a local hospital?"* prior to asking questions about how they collaborate with other health care providers.

2.1.3 Recruitment

All IPAC pharmacists who had been recruited and commenced work in the IPAC project were invited to participate in an interview, with the exception of one pharmacist who had commenced but only worked two weeks in the role before resigning to relocate for other commitments. Other pharmacists who had spent some time in the role but had since resigned were also invited to participate. The PSA provided contact details of the pharmacists.

IPAC pharmacists were invited to participate via email and provided with a list of potential interview times. A time convenient for the pharmacist was confirmed for the interview. The day prior to the interview a reminder was emailed to the pharmacist along with the five quantitative questions to allow them time to think about these and prepare a response. Only approximations were requested. Pharmacists had already received a copy of the information sheet and had signed a consent form upon employment which covered the qualitative component of the project.

The results of the data collected from pharmacists were validated through a workshop held at the NACCHO Conference in early November 2019. The workshop, facilitated by the PSA Project Coordinators, discussed enablers and barriers to the pharmacists' role. The outcomes of the discussions aligned with the results presented in this report.

2.2 Mixed methods online surveys

2.2.1 Rationale

Online surveys with ACCHS' GPs, CEOs and managers aimed to collect information from their perspective on how well the project was able to be implemented within the health service in which they worked, and the impact of the IPAC pharmacists' role on staff and patients. Perceptions were elicited on how well the IPAC pharmacist integrated into the primary health care team, their relationships with other health care providers (internal and external), changes and impacts on the health service and the overall effectiveness of their role. Managers and GPs observations of the IPAC pharmacists' interactions with patients and impacts were also sought. In addition, it was important to evaluate process aspects of the project including induction, patient recruitment and consent processes, the project resources and generally what worked and what didn't work.

Online surveys with the community pharmacies with whom the health service generally worked collected the perspectives community pharmacists on the nature of the project and role, engagement with the IPAC pharmacists, collaboration with the health service and any changes that impacted on their work.

2.2.2 Tools

Questions were developed by the qualitative evaluation team based on the project protocol and considering issues that had emerged throughout the implementation of the IPAC project. The draft questions were distributed to the project operational team, the steering committee and the evaluation team for comment. Feedback was taken into consideration and revised versions distributed for further feedback. The questions were converted into the online survey monkey tool and piloted by the project operational team members and relevant members from the evaluation team. Reordering of some questions and a few minor changes to wording were made in response to the piloting. The online surveys were a combination of yes/no responses, Likert-style and 'slider' rating scales and open-ended questions. Demographic questions collected data on gender, age group, role and experience working within (or with) ACCHSs. The tools are presented in Appendices C, D and E.

2.2.3 Recruitment

The NACCHO and PSA Project Coordinators provided the names and email addresses of recommended recipients at all 20 ACCHSs[ii] participating in the project, and the community pharmacies for the online surveys. These contacts were generally individuals with whom they had contact in the development and implementation of the intervention. An email invitation was sent to all recommended recipients with a copy of the information sheet and link to the respective survey. Consent to participate was obtained at the start of the online survey, and completion of the survey was considered evidence of consent.

CEOs and Managers

Nominated managers were invited to participate in the qualitative evaluation, including one from a service that withdrew and others from a service that discontinued the implementation phase. A total of 38 CEOs and managers who were identified as the key contacts for the project were invited. Invitations were sent by email with two follow-up reminder emails. A phone call from the NACCHO Project Coordinators was also made encouraging managers to participate.

GPs

Email invitations were sent directly to 11 nominated GPs and to an additional 10 other contacts within the health services who were tasked with liaising with their local GPs. This approach was recommended by health managers as it was reported that GPs did not regularly action requests sent via emails. The original invitations were followed up with two follow-up reminder emails. The NACCHO Project Coordinators also encouraged participation by GPs through phone calls to the managers at each service. Managers were requested to follow-up with their GPs.

Community Pharmacists

A total of 23 community pharmacies were invited to participate and provide feedback on the IPAC project. Community pharmacies were identified by participating ACCHSs as those that were their main provider/s of services. Invitations were sent by email with two follow-up reminder emails sent.

2.3 Site-visits

2.3.1 Rationale

Site visits to ACCHSs provided the researchers/evaluators with the opportunity for in-depth exploration of how well the intervention had been implemented in different settings. Through focus groups and interviews with health services staff and patients, and observation of the IPAC pharmacist for a day, the researchers collected information on how well the IPAC pharmacists were integrated within the health service, and the impact of the role on staff and patients. Perceptions were elicited on how well the IPAC pharmacist integrated into the primary health care team, their relationships with other health care providers (internal and external), changes and impacts on the health service, and the overall effectiveness of their role. In addition, it was important to evaluate process aspects of the project including induction, consent, resources and generally what worked and what didn't work. The patient experience was explored through focus groups and individual interviews.

2.3.2 Tools

Proformas for the focus groups and individual interviews with health service staff were developed in conjunction with the online surveys and both explored the same question themes. However, the interviews enabled other issues raised or reasoning to be further explored through discussions.

Proformas for the patient focus groups and interviews were developed by the qualitative evaluation team based on the project protocol and considering issues that had emerged throughout the implementation of the IPAC project.

[ii] IPAC Project quantitative reports are based on patient data from 18 ACCHSs due to the discontinuation of two services in the implementation phase of the project.

An observation framework was also developed by the qualitative evaluation team to guide aspects of practice that may be witnessed throughout the site visit, and shadowing of the IPAC pharmacist. The framework also noted documents that may be available for collection and potential evidence of the use of resources for project promotion. For example, photographs were taken of any signs and posters about pharmacists, the project or medicines, and clinic layout. Examples of documents collected included medicine's-related patient resources; newsletter articles and other documents.

All tools were distributed to the project operational team, the steering committee and the evaluation team for comment. The Project Reference Group (PRG) comprised representatives from all participating ACCHSs, NACCHO Affiliates and NACCHO and also had the opportunity to provide input into the patient and health service staff proformas for the focus groups and interviews. Feedback was taken into consideration and revised versions distributed for further feedback. Two Aboriginal academics on the evaluation team were consulted and provided edits to the wording to ensure that the language used was culturally appropriate and would be more likely to be understood by patients. While there were many questions in the templates it was noted that focus groups and interviews would be conversational and not all questions were likely to be asked. Sub-questions were provided to prompt the interviewer if required.

The interview proformas were piloted by relevant members from the evaluation team. Reordering of some questions and a few minor changes to wording were made in response to the piloting. The tools are presented in Appendices F, G and H.

2.3.3 Recruitment

All ACCHSs participating in the IPAC project were offered the opportunity to nominate to be involved in a site visit for the qualitative evaluation of the project (see Appendix I). Only services that nominated were eligible to be selected for the visit in line with CBPR. Other selection criteria included geographical dispersion (ensuring a service from each setting - urban, regional and remote); a site with good patient recruitment and a high level of pharmacist activity; and pharmacist FTE.

Six (6) ACCHSs nominated to be involved in the qualitative evaluation: one each from the Northern Territory and Victoria, and four from Queensland. The qualitative evaluation team assessed each site against the selection criteria and recommended sites for selection. These recommendations were sent to the project operational team for comment, and PRG for discussion and endorsement (see Appendix J). The site recommendations were endorsed in the PRG meeting on 22 February 2019. The steering committee noted the selected sites and endorsement by the PRG in their meeting on 5 March 2019.

The three (3) ACCHSs were visited as 'case study' sites for qualitative data collection in July – August 2019. Site-visit fieldwork was undertaken over a three-day period at each service by two qualitative researchers experienced in health services research. The researchers were supported by an experienced Aboriginal academic who led community liaison and provided advice on cultural safety.

Service staff and/or IPAC pharmacists assisted the research team prepare for the visits by recruiting appropriate patients who would be willing to be part of a focus group or interview and assisting them to attend. Assistance was also provided in answering questions and arranging logistical issues including rooms. Some ACCHS staff were also asked to participate in a focus group or interview. Appendix K outlines the Site Visit overview and preparatory tasks. At the conclusion of the focus groups and interviews patients were offered a $20 gift card as a thank you and compensation for their time and travel.

The site-visit fieldwork data collection activities included:

- Non-participant observation of pharmacist for one work day (Shadowing)
- Photographs, collection of relevant documents
- Focus group discussion with patients
- In-depth semi-structured interview with one patient

- Focus group discussion or individual interview/s with health service staff (Aboriginal Health Workers/Practitioners/CEOs/ Practice Managers / GPs)
- Semi-structured interview with the IPAC pharmacist/s

2.4 Data analysis

2.4.1 Interviews and focus group data

All interviews and focus group discussions were audio-recorded, transcribed verbatim through the program TRINT and imported to the qualitative management software package, NVivo 12 [65] to facilitate data management and qualitative analysis by the research team. Initially, deductive analysis, using the interview questions as a framework were performed as a classifying framework. Subsequently line by line inductive thematic analysis was employed by the research team. Each transcript was independently coded by one member of the research team. One member coded two transcripts from each of the other members to cross-check the coding and verify the accuracy of coding. The team met on several occasions to discuss the codes and emerging themes. Differences between team members were resolved by consensus where the team returned to the transcripts to consider and verify the context of the differences. Further investigation of coder differences has improved the quality of the analysis and conclusions.

Together, the coding team aggregated the codes into overarching themes. The team considered any variations between sites and between types of service providers (e.g. pharmacists, GPs, Aboriginal Health Workers) and managers although care will be taken in reporting to avoid compromising anonymity. A formal multiple case study approach is beyond the scope of this evaluation.

Each case study is presented with:

- Background of service (service, staffing, clinic structure, local issues)
- Profile of pharmacist and their role (integration into the team, communication, relationships with patients and community, key roles
- Project – induction, patient recruitment and consent processes, resources, enablers and challenges, benefits, general implementation
- Patient cases studies outlining the impact that the pharmacist role has had on individual patients. This data has been triangulated from different sources where possible.
- Health systems changes facilitated by the pharmacist

2.4.2 Survey data

Basic descriptive statistics (frequencies, means and percentages) were used to summarise the participant characteristics and various aspects of the intervention under investigation. A simple content analysis of open-ended responses was undertaken grouping responses into categories. The researchers met to discuss and cross-check emerging categories and associated frequencies for these.

2.5 Rigour and Trustworthiness

Various strategies were used throughout the analysis to enhance qualitative rigour and trustworthiness of findings. Regular meetings to discuss interpretation of codes and themes, sharing of memos and notes, co-coding of qualitative data, data triangulation (using multiple data collection methods and sources including interviews with a range of services, documents and field notes) and consideration of disparate views will ensure balanced investigation of service provider perspectives. Provision of ample and rich quotes from participants are provided to enhance the connection between data and conclusions.

2.6 Ethics

Ethics approval for the project was received from four ethics committees in the three jurisdictions including St Vincent's Hospital Melbourne (SVHM) Human Research Ethics Committee (HREC), Victoria (HREC/17/SVHM/280), James Cook University HREC (mutual recognition of SVHM HREC, approval

HREC/H7348), Menzies School of Health Research (HREC/2018-3072) and the Central Australian HREC (HREC/CA-18-3085). Consent processes for participants are outlined above.

2.7 Data storage

Qualitative data was stored and transported as follows:

- Qualitative interviews and focus group discussions (including video or telephone interviews) were recorded on a digital recorder and stored in a password-protected file.
- Photographs were taken on a password-protected mobile phone.
- Field notes were recorded on a digital recorder and in a notebook (non-participant observation/pharmacist shadowing).
- During field work all digital files (recorded interviews, field notes and photographs) were downloaded to a password-protected laptop and stored on a password-protected file immediately after interviews or field work.
- All electronic files (digital recordings and photos) were removed from recording devices (recorder and mobile phone) immediately once transferred to the laptop.
- All electronic files were stored on password-protected computers during and after the project (under the control of the data custodian).
- Identifying information were removed from data collected immediately after the interviews and focus group discussions have been transcribed.
- Paper copies of any identifiable project data are stored in a locked filing cabinet, in a lockable room (i.e. Field notes, paper-based forms, and photographs).
- Electronic questionnaire data collected was stored in a password-protected 'Survey Monkey' account until the end of the data collection period. At that time, the data was downloaded and stored on a password-protected computer, under the management of the data custodian.

3. Results

3.1 Pharmacist Interviews

Twenty-four (24) IPAC pharmacists out of the 25 invited provided feedback. Pharmacists represented all 20 health services[iii] who participated in the project. One pharmacist did not respond to the invitation and was not followed-up due to illness.

Nineteen pharmacists undertook their interview via video conference (zoom) or teleconference. Interviews ranged from 46 minutes to 123 minutes. In addition, four pharmacists participated in face to face interviews on the 3 site visits; ranging from 63 to 100 minutes. One pharmacist provided a written response. Nineteen of the pharmacists were currently working in the role, four had resigned and one had provided services to an ACCHS who subsequently withdrew from the project.

3.1.1 Background of Pharmacists

Of the pharmacists enrolled in the IPAC project, four were international pharmacy graduates, and the remainder had studied in a variety of Australian institutions (including QUT, JCU, US, UQ, Monash, CSU, and La Trobe). With the exception of one JCU and one QUT graduate, most said that they remember having either very little or no placements which situated them in a rural or remote setting or placed them in a setting where there were Aboriginal and Torres Strait Islander patients. *"The only rural placement that I did was on the Sunshine Coast, and that was considered rural."* (Pharm19)

Prior to their role in the IPAC project, most pharmacists had at least 12 months' experience in a rural or remote setting within or similar location to their IPAC role, and in managing the care of Aboriginal and Torres Strait Islander patients. However, most of these had well over 12 months' experience, with many citing they had spent between 5 and 15 years in these practice locations before the IPAC project commenced. This includes three who were raised in the same or neighbouring town to where they practiced and indicated their desire to support the communities in which they were raised. *"[Town] is home and always has been, so I just went away for university and then came back"* (Pharm04). These previous experiences also involved travelling from their main site to neighbouring communities, where they developed strong relationships with the people, they helped during the IPAC project.

> *"I am hardly ever in [town], most of the time I am in the communities'* (Pharm24), *'I get a lot more understanding of their social structure and what is actually happening with the patients from being at the practice."* (Pharm06)

> *"I was very fortunate in that I already have relationships both with the clinic but also with the community here. So, my face is kind of known around town and the community here."* (Pharm01)

Another primary driver behind working in these rural and remote locations was the desire to try *'something different'* and to '*get away from the big city'*.

> *"When this job came up through the pharmacy I was working at, it just was a good opportunity. I felt that was where the profession needs to move to, so I jumped on it."* (Pharm03)

> *"When the opportunity came forward, I could play a role that was a great thing to experience."* (Pharm05)

[iii] IPAC Project quantitative reports are based on patient data from 18 ACCHSs due to the discontinuation of two services in the implementation phase of the project.

"I saw an ad in December 2014 looking for someone for four weeks in the [remote community]. I haven't been back since." (Pharm18)

Apart from experience in the community or hospital pharmacist setting, additional clinical experience prior the IPAC role was varied. Half of the pharmacists cited significant experience in conducting HMRs and Residential Medication Management Reviews (RMMRs), two also had nursing degrees, and four had research experience.

"I'll be coming up to 10 years accredited having done over, I would guess over 400 HMRs." (Pharm09)

"Just ticked over my 10-year HMR anniversary, and then I went part time at the hospital so I could do HMRs as well, which I did around [town] for Indigenous and non-Indigenous patients." (Pharm20)

3.1.2 Background of Services

The clinics/services in which these pharmacists were placed were quite varied in terms of their size, services provided, and mode of providing these services. Half of the pharmacists described their services as being well staffed and providing a broad range of services for patients through the use of a variety of health professionals, such as diabetic educators, dentists, men's and women's/maternal health specialists, and Aboriginal Health Workers. Factors that led to having what was considered a strong service included having Aboriginal Health Workers present who could provide support and translate when needed, staff who were full time and permanent, and strong communication between the staff.

Conversely, half of the pharmacists reported understaffing, particularly of full-time doctors and Aboriginal Health Workers. This resulted in poor communication and a lack of follow-up.

"*The most challenging thing that was happening…because a GP was coming every two weeks, a different GP with difference experience and cannot follow up with patients there. Also, a sense of frustration from some of the patients."* (Pharm08)

3.1.3 Pharmacists' Role in IPAC

Expectations

There was a diverse range of expectations from the pharmacists, ranging from having no expectations, to mixed expectations, to very high expectations on what they anticipated their role would be.

"Oh, it's been a lot more interesting and I've been doing a lot more than I expected." (Pharm14)

"So, I'm not sure I actually knew what to expect when we went out there and I don't actually think the clinic knew what to expect either." (Pharm10)

As there have been very few pharmacists previously working in ACCHSs there is little understanding of the role of an integrated pharmacist in this setting. This resulted in pharmacists having to be more proactive in promoting their services and proving their value: *"I think the difficulty with this project has been that it's a very new role for a lot of these clinics and the staff out there had no idea what a pharmacist did"* (Pharm10).

The training provided by the PSA assisted pharmacists by providing an expected scope of practice and roles to be carried out, though there was still a level of uncertainty. *"I knew we had the training which is amazing, and I learned so much through the PSA training, but then what you learn on paper is never what it is in real life"* (Pharm04).

Certain aspects of the pharmacist's role were more closely aligned with what they expected, such as the provision of medication-related information and conducting HMRs, whilst other activities were unexpected though generally well received by the pharmacists.

> *"My role here is much broader than I had expected. I had thought it was just going to be a clinically supported role to the GP essentially, patient education things like that, but so much more, which is great, I love it because that's the education and clinical going on here."* (Pharm02)

Utilisation of Skills & Expertise

Pharmacists delivered the ten core roles to their respective communities throughout the project. The IPAC pharmacists believed that their physical placement within these services was essential in providing appropriate care to patients as it enabled them to liaise between multiple health professionals within the team and gave them access to patients to whom they could provide essential information on their medications.

> *"The purpose of embedding a pharmacist in that health care setting is one I felt that the connections that I had with the staff and the connection were very, very good and rewarding on both sides."* (Pharm09)

> *"We deal a lot with the doctors and the physicians, but we never have had much of a decision-making role until we actually ended up in this project and then we were able to have a bit more of a clinical role in … the patient's medications."* (Pharm14)

> *"These patients get completely overwhelmed by the health system and have very little health literacy and no ability to navigate their way through multiple referrals and so I see my job more than anything, as pulling things together."* (Pharm12)

> *"So, we've been able to sit down with the patient having spent a bit more time with patients outside of the community pharmacy and be able to talk to them about their medicines and educate."* (Pharm14)

> *"I feel like I've really become the conduit between pharmacy, community pharmacies, between hospitals, between doctors, between clients. So, we see people starting to come in and ask to see the pharmacist now."* (Pharm17)

The pharmacists also indicated that providing advice on appropriate medication prescribing, following-up and clarifying discharge summaries and prescriptions, conducting HMRs (and similar activities), improving patient adherence to medications, and the provision of staff education on medication safety were their most consistently performed roles. Most pharmacists felt fully utilised in their service, and their skill set was broadened by the experience in the IPAC project.

> *"So, our Aboriginal health workers here haven't received a great deal of continual education in the workplace … and [so] I put my hand up I was like hey you know I love education I would love to help."* (Pharm02)

> *"It's made my team collaboration skills better and my perspective on what's important with regards to the patient."* (Pharm03)

"That's the biggest thing that people have come up to me and [say] 'We're so happy that you're here because no one knows why they take their medication.' Because no one's ever been in this position before, there's not much that, prior to me starting, there was no governance on medications and that's really big in the other areas in hospitals." (Pharm19)

As staff within these health services became more familiar with the skill-set of the IPAC pharmacists, their roles evolved over time, and the pharmacists were requested to provide more services and deal with more complex patient cases.

"Certainly, over time the role has evolved into more of a medicine information component as well as the staff became more comfortable with my role out there and what they could or couldn't expect from me. They've come to ask me more about those therapeutic options …whereas in the start [they] would possibly come and ask me if a dose was correct. But now they've come to ask me more in-depth things… asking me about drug interactions and that sort of thing." (Pharm10)

Pharmacist access to the patient's electronic medical records such as the Communicare clinical information system (CIS) was seen as an enabling factor to improving patient's health, by allowing pharmacists develop a more accurate view of the patient's health.

"You can see compliance is the issue and compliance is really funny because you look at Communicare and the nurses [have] written 'Oh no, they say they take it every day' and then you just go through the notes and see when they've collected and haven't collected it for six months." (Pharm18)

"You can help with that transitional care which has been really rewarding I think and time consuming. … there's just no one else that would do that role. Like community pharmacy doesn't have time to do that stuff and they don't have access to Communicare, so they can't really see it." (Pharm20)

Being physically present during case conferencing and staff meetings was also seen as beneficial in ensuring that the recommendations being made by pharmacists were utilised.

"I do reviews for them and we set up times for case conferencing and that's been really handy for… getting my recommendations actioned…because just sending reports is no good." (Pharm16)

For these skills and services to be fully utilised, staff within the health services were often required to be informed as to the scope of practice of pharmacists and the processes for referral and consultation.

"…starting to realize they can use me… like the health promotions person said, 'oh the mental health team were quizzing about medications and stuff' … we've actually got a pharmacist, we will organize a session for you." (Pharm13)

"I was attending the meetings, the clinical meetings they have. I was putting pharmacist input in lots of things and from my point of view I find it very useful… they didn't realise how a pharmacist could be useful in Aboriginal Health but then after me attending some meetings and doing some in-services they kind of: 'ah, he can do this, he can do that.' (Pharm05)

Meeting Organisational Requirements

When asked if they felt they were meeting organisational requirements, half of the pharmacists believed that they were, with a few indicating that they felt they had exceeded these requirements and had become an integral part of the health service.

"I feel like they've been pleasantly surprised with the things I've managed to help them with." (Pharm10)

"Just getting more and more reliant on us and we have tried to be mindful when we set things up, set procedures and policies and things like that in place so that if we do go in October then it's not going to fall apart." (Pharm17)

"As you became more familiar with say the medical staff, their ability to draw on you and to get you to review patients could escalate exponentially." (Pharm09)

However, the other half were unsure, or stated that they were not able to meet organisational requirements, which was perceived as a result of being an external person to the health service.

"[I] was seen as an external person, not as an employee. [I] wasn't utilised well due to not being full time and being seen as external." (Pharm08)

"No, because the organization's requirements were that I did my job but didn't actually create any work for them…either they weren't listening or the project wasn't explained in such a way, that they were going to have to work do some work for some of this. And …I think … [that's] where the resentment came from." (Pharm22)

The IPAC pharmacists' ability to meet the health services' requirements and conduct appropriate clinical (and other) activities within these health services was also dependent on their working status (part-time or full-time). Smaller services were perceived as only needing a part-time pharmacist, whereas those placed in larger services found that working part-time was insufficient to meet the needs of the service.

"I was doing that over two days, but I actually found that it was really hard to get the staff to see me as part of the team just being out there twice a week, so I elected to spread my hours over three days. Once I switched it to three days which I didn't sort of do until I think it was about five or six months into the project, the staff started to think of me being there more often than not." (Pharm10)

"I was here Tuesday, Wednesday and Thursday. But then when I was at the pharmacy on the Monday and Friday my phone, mobile, would still ring from the services trying to chase things up. So, I can see how … a full-time position would definitely benefit." (Pharm04)

"It's a full-time service because I noticed when I started, I was underutilized. Now like when I get here on Monday mornings, my in-trays got stuff in it. Yeah, notes from a doctor from Friday going 'you weren't here!'" (Pharm02)

Additional Roles Performed

The expected IPAC pharmacists' activities were grouped into 10 core roles. Most pharmacists did not perform duties outside of these core roles, which were cited as being quite comprehensive and took up the majority of their time.

"I think actually the 10 core roles are very comprehensive because they are all really different and they involve lots of things to be done by the IPAC pharmacist. … I didn't find myself having to do anything outside of those roles." (Pharm05)

"I think coming in I was [thinking] 'no I need to meet these targets. I can't do anything', … [I worked] very projects-based. So, I think if I had my time over again, I'd just say …'Use me as a pharmacist to the best of the capabilities that their service needs'." (Pharm16)

"I think given the hours, and I think that the role was fairly well set out as is, I think you need some boundaries initially, until you have [been] established in that setting." (Pharm09)

"I think the 10 core roles are exactly what I do. It's just a matter of how and when, and I think they do pretty much cover exactly what you do." (Pharm12)

A few pharmacists took on what they perceived to be additional roles, that they believed were essential to provide to the community, even if they were not patients of the IPAC project. Additional roles included advocacy, activity related to non-chronic disease patients, and participation in responses to outbreaks including health promotion.

"So, these were people that had come to my attention, had got out of jail for example, and/or had just simply dropped off the face of the earth and I went hunting for them. You know, [I] then found out that they needed some help to get back into the health system, as much as getting back into their life." (Pharm23)

"if I come across something such as hydroxychloroquine and somebody is not having their eyes checked, they may not actually be part of the IPAC project in its central core. But I can't leave something like that and not do something about it. If I come across something, I guess I don't even think about the parameters of the project." (Pharm22)

"We had an outbreak of PSGN [Post-Streptococcal Glomerulonephritis] in the community so I was actually part of the teams that went out in terms of doing our [part], when we had to actually mobilize teams to go out into the community and check every child in the community for sores and then have a penicillin injection." (Pharm01)

Also, a few pharmacists found it was difficult to fulfil these core roles due to having limited time, particularly if they were part-time.

"I think I feel like the time frames for actually getting all that done in a day or at least in a part-time position has been very difficult." (Pharm10)

"But I've found quite often I was spending so much time doing it and that maybe possibly at times it wasn't adequately [done]... I found it difficult to demonstrate that within the core roles." (Pharm02)

Negative Aspects of Role

Half of the pharmacists described challenges to implementing the role. Challenges included poor support from ACCHS staff including low referrals, or a poor understanding of the role of the pharmacist within the service.

"It's interesting because my expertise is very clinical and I'm very used to giving doctors feedback, but I don't think the GPs are always…open to it." (Pharm16)

"I think it's also been quite difficult out there to catch patients that would agree to see the pharmacist because not only did the staff not know what a pharmacist did, the [Aboriginal] people had not really experienced them ever." (Pharm09)

"I was kind of already known to the GPs, so I was maybe a little bit disappointed in the amount of referrals that we ended up getting." (Pharm21)

"Wasn't able to fully utilise skills due to lack of exposure to clients, including lack of internal referrals." (Pharm15)

There were also barriers relating to the patient population, staffing shortages, travel, and information technology. *"Lots of IT issues with Communicare, didn't work half the time"* (Pharm07). Pharmacists found that the patient population often had no experience with pharmacists and were therefore not comfortable in discussing their health issues with them, or had language barriers, which affected their effectiveness.

"But the problem was the patients that was refusing the service from the beginning. That was also an issue. If they refuse a service, they refuse the project too." (Pharm08)

"I had no-one to help me. There [were] the nurses, they're really under pressure." (Pharm22)

"You don't get anywhere without really flying. So, it's vital that everyone knows everybody so they make it a lot easier for me to do my job ." (Pharm18)

"Nobody in the health service could speak more than a few words of the language. [With] the answers they were giving me as well, [you] have to be really careful in these sorts of settings because people …especially [if they] don't know someone really well, they'll tell you what they think you want to hear, so you get off their back basically." (Pharm22)

"You can't sort of plan in advance to do home visits for example, or book HMRs in during IPAC time. It was really difficult because it wasn't until that morning when the manager would come in and then, you know who's not coming in for the day, who's called in sick, which clinics do we need to be covered, and then if there's anyone left over you can have them then." (Pharm17)

"You might make appointments with people, but the number of 'no shows' is the, probably the biggest challenge I think. Yesterday, it was a fairly full book and in the morning went along to the doctors there but I think 80 percent of them [patients] didn't show." (Pharm12)

Working in the health service part-time was reported as a barrier, as patients who would benefit from the pharmacists' input, may not come into the clinic on the days the pharmacist was working. Follow-up with these patients was also considered to be more difficult. *"Because they're not necessarily all visiting the clinic at the day that I'm there."* (Pharm05)

Using a rating scale between 1 (not effective) and 10 (fully effective), the IPAC pharmacists rated the overall effectiveness of their roles at an average of 7.9 out of 10 (n=23), with responses ranging from 4 to 10.

3.1.4 Integration into PHC Team

Integration into the primary health care team was mixed. Whilst the majority of pharmacists felt accepted and well-integrated within the team, not all pharmacists felt that way initially. About two-thirds of the pharmacists indicated that there were initial difficulties with staff understanding of the role of the IPAC pharmacist, which led to them being underutilised, highlighted by low referrals. Over time, these issues

appeared to resolve, largely due to the initiative of the pharmacists in educating staff members on how they can contribute to the functioning of the team and health outcomes for patients.

> *"[I] felt like an outsider at first, though [I] became an integral part of the team, being thought of first to help with problems, [and] frequent communication through many modes. We've really integrated into the clinic so the GPs and nurses are comfortable to just walk in the room and say, "I've got this person I'm worried about can you come out and chat to them before they go."'* (Pharm11)

> *"I think at this start… they might not have realized what we could do but then after we sort of did a bit of education and then talked to a few people, I think just by word of mouth people sort of understood and could say the benefit of having us there and what we could do."* (Pharm07)

> *"So, it took time too. To even for the doctors to know what exactly I can do. And now they know me. They rely a lot on me to help them.*" (Pharm24)

> *"The acute nurses [have it] hard because [the] turn-over [of] their staff has been quite frequent and because they're often dealing with the acute things that are presenting through the door…even if they have someone who I am trying to catch, they're [the patient is] not often in a state, they're acutely unwell, they don't really want to sit down and have a chat to the pharmacist."* (Pharm10)

The remaining pharmacists felt immediately accepted within the teams and able to provide their expertise in the care of patients. This appeared to be more likely in services where the staff were pre-prepared for the arrival of the pharmacist, of where there were staff shortages, or the existing staff had experience with the pharmacist involved in their service.

> *"You know, actually I felt really involved like and as I said, really, the staff members in general, the Aboriginal health workers and the manager and the nurses, they were very supportive and they were always like asking for my help. They would come and ask me some clinical questions or…needed medical information."* (Pharm05)

> *"But they've all been so lovely. Staff are great. Clients are great across the clinics, like seriously, no complaints at all. Everyone's certainly made me feel really super welcome."* (Pharm20)

> *"They just were really open about, you know, we've got a new staff member. This is what her role is, get her involved, that sort of stuff."* (Pharm03)

Pharmacists were asked to rate their level of integration (at the time of the interview) on a rating scale from 1 (not integrated into team) to 10 (fully integrated into team). They self-rated their level of integration into the primary health care team with an average of 7.7 out of 10 (n=25, one pharmacist practiced in two services).

However, even after successful integration within the teams, there were ongoing barriers that the pharmacists felt reduced their ability to provide services. This included working part-time and working in health services where there was frequent staff turnover.

> *"That's the only limitation. I've only been here a couple of days a week, you do sort of get quite forgotten from week to week…clinical meetings where everybody got together, but funnily enough the days that I was working, that wasn't when the meeting was on, so you are sort of left out of the loop there."* (Pharm12)

"The barrier …if the staff aren't convinced or aren't used to having someone there and … I'm not there very often." (Pharm18)

"So, I think integrating into the team did get a lot easier once I was there more days. And once the staff became comfortable with my role as a pharmacist." (Pharm10)

PHC team understanding of IPAC role

A poor understanding or awareness of the purpose of the IPAC pharmacist (especially initially) was considered the greatest inhibiting factor for integration into the PHC team. Staff who did not have previous experience with pharmacists were particularly difficult to engage with, and even those who did have experience with pharmacists were confused by the concept of a non-dispensing pharmacist.

"So I think at this start, there was a bit, they might not have realized what we could do but then after we sort of did a bit of education and then talked to a few people, I think just by word of mouth, people sort of understood and could say the benefit of having us there and what we could do." (Pharm07)

"Someone told me they didn't know what I was doing there. There wasn't anything I was doing that they weren't doing." (Pharm18)

"When I started on my first day…no one kind of knew that I was even here and… what I was here for." (Pharm19)

"At the start they really didn't know what we were doing. There was a lot of misconception that we were to dispense…clients and some of the other allied health [and] other team members are thinking 'oh … can they bring you scripts?" (Pharm17)

This confusion and underutilisation of the pharmacist's role (including referrals) was ongoing for some pharmacists. Nurses in particular were sometimes unsupportive of the IPAC pharmacist, which was considered to be either a result of their being used to performing these roles themselves, or feeling intruded upon and having important roles being taken away from them.

"I reckon probably the RNs and the AHPs wouldn't know exactly what it is that I'm doing still in some of the sites." (Pharm20)

Not to the full capacity…I think that they understand that I know about medicines, that I can talk to patients about medications and do a review and all of that kind of thing, but I don't think that they quite see the, like grasp how big this could be or how important it could be." (Pharm19)

"Not fully no, even though they were all, they were all introduced. I think that some of the nurses felt I was just being intrusive because they had their system" (Pharm22)

"I think again they were like... 'What are you doing here? Why are you here? Are you stepping on my territory?' So we didn't get off to a great start, and … I literally sat down one day and was like 'ok, I'm not here to take away your work'." (Pharm02)

Even when staff had met the pharmacists prior to the project, in a different setting, they were unclear of the role of a non-dispensing pharmacist: *"When I first started one of the GPs who was working here, I've actually known for years from my work and she is an older doctor and she was one of the ones who said: 'what the hell are you doing here, and what do you do?'."* (Pharm12)

There were, however, some pharmacists who as previously mentioned felt immediately welcomed and well-utilised within the PHC team, as a result of a good understanding of the knowledge and skill-base of pharmacists.

> *"I always felt welcome, I always felt appreciated by all the skill. There was even a psychologist, she used to go there on Fridays, and she referred patients to me more than once … so I feel really appreciated."* (Pharm05)

Champions and Staff Support

Most pharmacists had a person they considered someone who championed their role and assisted in overcoming the aforementioned issues of poor staff understanding of the role of a non-dispensing pharmacist. These champions were usually a manager with the team, who likely had a better understanding of the overall needs of the service, as opposed to individual health professionals.

> *"I think [we are] very lucky to have [name] as a clinical director. She is super supportive of the pharmacy services. So, I think that came down from the top that very clear it was a good service."* (Pharm21)

> *"My number one champion would be [Aunty AHW] who's amazing, an amazing health worker that probably volunteered in the first instance to help me out…Our practice manager [name] is very supportive of the project and … improving the scope of practice."* (Pharm01)

> *"The allied health coordinator, without her I probably would have quit after Week 1."* (Pharm04)

> *"Our manager at the time, was wonderfully supportive of anything we suggested."* (Pharm11)

However, several pharmacists felt they had no champion, which was a consequence of staff turnover, poor understanding of the purpose of the non-dispensing pharmacist, or internal politics.

> *"There's no real champion here that really gets it because I think the champions have now left, and I don't think they really got their head around it to start with anyway."* (Pharm16)

> *"I think from day one this health service was under a lot of pressure- the staff were very upset. I think everybody was pretty much preoccupied with the internal politics that were going on. There was one GP who welcomed … me on my first day and she didn't, I don't think she even knew I was arriving that day."* (Pharm09)

In general, regardless of the level of understanding of the staff on the role of the pharmacist, staff were generally supportive of the pharmacist and assisted in their activities when possible.

> *"I had a huge support from everyone in the Aboriginal service where it was from the manager to all Aboriginal workers there. So, I really enjoyed my time there. And we worked really hard together and to just make it as successful as possible."* (Pharm05)

> *"I know and they're all so friendly, so I feel I'm able to approach all of them if there is anything I need to discuss or do with any of them."* (Pharm06)

Support from health services

Integration within the health services and utilisation of the pharmacists' knowledge base was supported by several factors. Factors that were particularly beneficial at the commencement of the project included the

provision of a staff uniform, use of promotional resources, and introduction of the pharmacist to the health service team.

Staff uniforms allowed the pharmacists to identify themselves as a member of the team, both the patients and to other staff members, rather than being seen as an external health professional.

> *"It makes a big difference having the shirt. You are part of the team, you're one of the good guys."* (Pharm20)

> *"The manager organized the meeting, she introduced me and explained exactly how I could help, and I had really huge support from everybody. I mean…most of them at one stage had something to ask me or to seek my help with."* (Pharm05)

> *"As soon as you have this blue shirt [staff uniform] on everyone knows that you're a safe person to talk to."* (Pharm11)

The pharmacists who were not provided with a shirt/uniform (even after asking) indicated that it was a disappointing issue that may have affected their integration within the team, and the health service.

> *"I would have loved one of those [uniform] and we actually spoke about it, but it never happened."* (Pharm12)

> *"No, I know ... other IPAC pharmacists had been given Aboriginal type clothing to wear and I had raised it with the health service manager and others, but nothing ever happened."* (Pharm09)

> *"I felt that as a new face at the health service, a uniform would have been a great identifier for me to be viewed as part of the team."* (Pharm15)

Promotional resources such as posters, newsletters, and social media were utilised in a few of the health services and were considered beneficial in alerting patients to the services of the pharmacist and their intended benefits to patient health.

> *"We're in the phone book. We've got fliers everywhere and they've let us put the IPAC poster up, so people will say I saw your photo in town or I saw your photo in [town]. So, they've just yeah and even at [town] we've just got a new board put up with all the people who work there and there's a space for pharmacists"* (Pharm11)

> *"When I first started, they put they put it in the newsletter and then … they put it on the social media when I first started as well. They had a poster up in reception and in the triage room for quite a while. We had some like some medication pamphlets with my information on the back of it. So, they [pamphlets] were sitting in reception as well"* (Pharm04)

Throughout the IPAC project, factors that had ongoing effects on pharmacist utilisation included their involvement in general staff meetings and clinical meetings (described in previous sections), and their physical location within the service. There were positive and negative aspects to having either their own consulting room or office, or a shared office with other team members in the health service. Pharmacists who had their own office were able to discuss private matters with staff or patients easily and provided sufficient space to perform clinical activities (such as demonstrating inhaler devices and perform blood

pressure monitoring). However, some pharmacists found that this isolated them from other team members and affected their visibility and integration within the healthcare team.

> *"I'm lucky I've got a meeting room that has got a [computer] and that's actually been a benefit being able for people to come and go out of that [room]. I think if I had an office I would be less happy and there'd be less interaction with people to get that connection out there."* (Pharm18)

The location of the office was also important, with several pharmacists indicating that if their office was next to the GPs office, or next to the waiting room, it allowed them to have greater visibility and accessibility

> *"Yes, I have my own room. And most of the time next to the GP, they like me to be next to the GP."* (Pharm24)

Pharmacists who shared a space with other workers said that it could help with engaging with other staff and patients.

> *"Quite often I would jump into [consultations] with the chronic disease and the complex care nurses. They would just call me when they had a patient that I'd been chasing or that they wanted me to see."* (Pharm10)

> *"So, I have a little space at the clinic which is actually with the health workers in their area which is great and that's been very good for me in terms of team building and rapport building with the health workers or the community members that I work with closely."* (Pharm01)

However, this often meant that they were frequently moving office, depending on what other staff were doing, which caused a flow-on effect on where the pharmacist was located throughout the day.

> *"When I started, I was sort of sharing with a health worker and … I felt really bad because I thought I have to kick them out to talk to someone in the room."* (Pharm07)

> *"I think that's been a bit of a barrier to the success of the project because there's just been not enough consistency in it. So, some days, well at the start of the project, I was working between the two clinics and then I would get asked to go on a trip up to one of the other sites, and then I come back and there's not a room available."* (Pharm19)

> *"The reflex paper boxes that I kept my paperwork in and I just shuttled that round the tea room in which there were two computers at one end. Those computers had to be shared with one or two of the nurses as well."* (Pharm22)

> *"There wasn't a room specially created for me and I often felt like an inconvenience as I bounced around different consulting rooms/interview rooms depending on the day."* (Pharm15)

3.1.5 Collaboration and Relationships with Other Health Professionals

The support of other health professionals within the health services were seen as key predictors of pharmacist utilisation. GPs, nurses, Aboriginal Health Workers, and other allied health staff were all described by the IPAC pharmacists as playing a role in receiving referrals, and a source of patient and staff education activities.

GP Collaboration and Uptake of Recommendations

All pharmacists within the IPAC project found that most GPs were supportive of their role within the health service. They were open to communication, provided referrals for patients who needed medications reviews and education, and utilised the pharmacists' recommendations.

> *"So, the four doctors that I've really worked with, three have been absolutely 100 percent supportive and one's becoming more and more…willing to involve me early. I might be deluded but I don't think I've had any issues at all. Everything's been very positive."* (Pharm23)

> *"They've certainly made me feel welcome and been happy for input… Even with the locum doctors that we've had coming through I haven't had any resistance in terms of them [saying] 'oh what are you doing here. We don't need the pharmacists', that sort of thing."* (Pharm10)

> *"They are really open and happy to talk to me. They'll approach me if they need to, or email or message or whatever to find me."* (Pharm02)

> *"Because they know that there's another clinical body in the service that probably knows these patients, … even like when we do HMRs and we do case conferences, most of them go, 'oh geez, these patients are really complex'. Again, this doctor said to me 'You know this is great. You've done a medication management plan.'"* (Pharm02)

There were initial barriers for many of the pharmacists, however, with many GPs not understanding the scope or purpose of the non-dispensing pharmacists' role (and differentiating them from community pharmacists), and the value of clinical activities such as HMRs. In these circumstances, the pharmacists would usually take the initiative to approach the GPs and provide education on the purpose, logistics, and benefits of HMRs and other pharmacist-initiated activities.

> *"The full time GP… he's [a] relatively new GP and he's actually new to the area. We've had a couple of meetings with him. Initially he didn't even know what is a HMR, like what exactly could be involved with them. He was trying to refer some patients to me but he kind of really didn't have a really good understanding of when to refer patients to me or what I could exactly help with."* (Pharm05)

> *"Now that I've been here for a while they properly understand what I can do and…they know I'm not going to talk to them or mention something unless it's actually worth mentioning and I'm not trying to second guess them. And if I suggest something it's for a reason and therefore I believe I've got their support because … 90-95 percent of the time, they do what I've suggested and if they don't, then we had a good chat about it and I understand why …."* (Pharm12)

There were also some barriers relating to time limitations and lengthy processes that affected the pharmacist's ability to interact with patients while they were still in the clinic.

> *"I worked with the GP because … most people needed changes [made] to Webster Pak or recommendations for changes. I would actually then discuss those in person with the GP. But by the time those came into play and … there had to be counselling on them [and] I'd be long gone"* (Pharm22)

> *"Yeah so it's hard to have one on one or face to face communication with the GP. Us not being there with the GPs, … we tried for a bit... We tried just sitting in the waiting room of the GP clinic because that was the only spot we could get because there was limited workspace. That said I think we're realizing now that that it's something that they need to work on, and we are a valuable resource to their services."* (Pharm14)

Finally, whilst the IPAC pharmacists reported most doctors were supportive of them and utilised their knowledge, older GPs and locum GPs were sometimes less likely to utilise the pharmacists. This was thought to be due to a poorer understanding of the scope of practice of the pharmacists and being used to performing their role without the input of other health professionals, as well as feeling like they were being 'policed'.

> *"One of our other doctors who's been here a long time…she's been a challenge. She has a whole stream of chronic disease patients, so perfect patients for us and so you know working with her and then trying to remind her that we're here and she has said that it's something that she has to change her practice because it's not what she normally does. …. I think she's quite set in her ways."* (Pharm21)

> *"They feel that there's someone there trying to police their work and it's not that at all. It's about providing another avenue to improve the patient's health. …but it's never personal. It's not that they don't like me. … they possibly just don't like pharmacists."* (Pharm02)

> *"The locum GPs we tried to educate them on the project but some of them were old school and didn't quite get what our role was as a pharmacist, you know HMRs. The locums are a bit on and off. I guess some of them just do not understand what our role is. Then by the time we get to them, they're just about to leave."* (Pharm14)

> *"Probably older as in age or been practicing for a while …. Whereas the younger ones seem to come and ask me more questions."* (Pharm13)

Aboriginal Health Workers and Nurses

As well as having support from most GPs, other staff within these health services were generally quite accepting of pharmacists and utilised their knowledge to improve the outcomes of patients within the service. They provided support to pharmacists in a range of ways, including not only administrative and background advice on the service and its patients, but also cultural and language support, and acting as a source of referrals (especially when GPs were not referring at the commencement of the project).

> *"I had a huge support from everyone in the Aboriginal service where it was from the manager to all Aboriginal workers there. So, I really enjoyed my time there. And we worked really hard together and to just make it as successful as possible."* (Pharm05)

> *"The Aboriginal Health Workers and health professionals have been really key there, because language is really important and we are that much more isolated."* (Pharm18)

> *"In terms of being included in the team, the Aboriginal health practitioners are really helpful and have been great at trying to find me patients."* (Pharm10)

Patients within the health service were usually quite comfortable with existing staff, who facilitated interactions with the pharmacists, especially if they were new to the area/service. These support staff also had a better understanding of the local community, and provided information not routinely gathered in a practice, such as living arrangements and family issues.

> *"The one's that I deal with day to day the same thing, so the nurses are really good at identifying people and dragging me in and have a chat to the people or dragging them up here, or they are regularly coming and pick my brains too if they've got something they are not sure about."* (Pharm12)

"There were big changes in the way that Aboriginal Health Workers were screening, asking questions, coming to me. Aboriginal Health Worker's coming to me saying 'I figured out that such and such is living with such and such. I think that's where the tablets might disappear...' … Just really the sort of skills that I think that I have was starting to rub off on other people and they were coming back to me and saying 'I think I figured this out'." (Pharm23)

"I liaised with the Aboriginal Health Workers which was essential if you're just going out to visit people in the homes that we got along well and the HMRs that I attended were well received by the Aboriginal community. Then I felt that we had significant contributions to make to their health care and their medications." (Pharm09)

They also provided advice on how to better integrate into the community, such as seeing elders, and ensuring that patients attended clinic visits, and were engaged during HMRs. Overall, they were considered to be a key part of the IPAC project, and general success of the health services.

"They encouraged me to go to the elders' group when I first started. So that was probably the best thing, because by going to the elders, if they accept you, they will spread the news and gossip like there's no tomorrow. So, I think being encouraged to go to that and going with me to introduce me to those key people. Definitely helps that situation to get into the community." (Pharm04)

"So, we have two Aboriginal health workers and one of them always comes out with me on her medication reviews. So, it's quite useful in that sense because she kind of knows about the family structure and what's likely to be happening with that person. So, she's good at getting hold of the patients." (Pharm06)

External Providers and Community Pharmacy

The IPAC pharmacists commonly served as a liaison between the health service and surrounding health providers, including hospitals and their clinical units, and community pharmacists. Issues that were commonly addressed within the non-dispensing pharmacist role when liaising between these groups included transition care and medication reconciliation, and subsequent activities such as HMRs and DAAs. IPAC pharmacists were quite descriptive of these interactions and found that they were appreciated for serving as a liaison, and felt they were having a significant positive impact on patient outcomes.

"There's been a lot of work that I've been doing with probably the core roles of transitional care between discharges from hospital and coming back into community and also probably with the renal unit is probably a really big one as well. We've been trying to improve the communication between the renal unit and [health service]. They have medication changes really regularly and, in the past, [health service] has been bypassed in that step for medication changes and they've gone straight to the community pharmacy which makes it tricky when the clients come to [health service] for general GP services and they have, their medication list has not been reconciled." (Pharm19)

"So the renal nurses have probably been the ones that I have liaised with most…The hospital pharmacy were quite happy to send me like any discharges of patients from [community] and then they call me if they have anything specific they need to chase up on or if a patients left without their medications and we need to try and get them to them. There's been major pack changes that we needed to organize urgently they would ring me as well. So, I've liaised with them through email and phone quite frequently and I'm due to go see them next week to work on the liaison plan" (Pharm10)

There were, however, some communication issues that were encountered with some external staff, particularly within the hospital system. These were generally due to pre-existing tension or ineffective communication methods that had persisted for some time.

> *"There's a lot of history and I didn't know about it. A lot of problems between the hospital and here and sharing of information, but I get on like a house on fire with the pharmacist there [hospital] so, I just ring her. The doctors therefore use me to use that relationship."* (Pharm02)

> *"I've asked for him to notify me … through the medication changes when people are discharged and that just hasn't happened. So, for him, he sees potentially as me complicating an issue that he's got sorted because he sends the things to the local pharmacy and they sort that out themselves. So, he kind of doesn't really necessarily see me adding value."* (Pharm16)

Overall, pharmacists described several successful aspects of their communication with other health providers, and changes that were adopted as a result of their role within the health service.

> *"I think really, probably the biggest change would be the communication between the different, different areas looking after that client like the hospital, the renal team especially. We've built up a really good rapport with the renal team and that's been commented on numerous times. We got an email recently from one of the doctors who was just so happy because he's been there for 20 years or something and he said you know this is the first time this has worked."* (Pharm17)

> *"I've spent a lot of time with the doctors showing that when they're prescribing and checking the patients list, the clients list of medication. So, they're changing strengths [of medications] but not removing the old strengths off the current medication list. So, when we've got other clinicians coming in, the referral letters are getting sent off and the medication list isn't correct or accurate by any means. So, I've spent a lot of time with the doctors trying to change that and increase their understanding of the whole process. So, I guess [that's] the biggest thing."* (Pharm04)

> *"We can fix things straight away because what has happened historically particularly with the HMR model is things get flagged and identified but then there's a lag between me being able to actually sit and talk to the doctor about these issues and share the additional pieces of information. Because I write very short reports because that's what the doctor's like."* (Pharm01)

> *"I'm thinking that GPs are communicating a little better with the pharmacy and definitely with the hospital. I think that communication line has opened up and there's some pharmacies now who have a better ability to contact a doctor when they want something."* (Pharm11)

3.1.6 Cultural Competence

Most IPAC pharmacists felt they understood the local people and their culture. However, those who had worked in the community prior or who had had many years' experiences in Aboriginal and/or Torres Strait Islander Health felt they had little understanding of the local community compared to those who were new to the ACCHS sector. The complexity of Aboriginal culture was appreciated:

> *"Oh my God, it's so goddamn complex. … it's one of those things that for them, they grow up with it … When you grow up with it, it doesn't seem complex at all to them."* (Pharm08)

> *"No. No I don't. I have a lot more than I did and the more you know, the more you realize you don't know. … Now I know that there's things that I do know, but there's still a lot more that I don't know."* (Pharm23)

Pharmacists also felt that the cultural awareness training provided through the IPAC project either introduced them to new learning or reinforced their prior knowledge. Most also had access to local cultural induction. Few pharmacists were allocated a formal cultural mentor; but most felt they could seek out information to supplement what they had learnt at cultural orientation with a local staff member, including AHPs. Some of those who chose not have a cultural mentor believed that having a formal cultural mentor would have been beneficial.

Furthermore, there were vast differences between cultural requirements in remote areas to urban areas. In urban areas the pharmacists identified the impact of the stolen generation, and the community may comprise of different cultural groups due to colonisation:

> *"I was told by a GP that [the health service] had the 'stolen generation'; I found many community members did not appear or report to have cultural awareness themselves and stated they were not concerned about it." (Pham09)*

Most pharmacists felt that they had been welcomed into the community. Examples given about how they were welcome was because patients for happy to see them. However other pharmacists also cited that evidence they were welcome was due to invitations to local cultural events. In remote areas two pharmacists had been given names in the local Aboriginal language:

> *"I've been adopted. …. So, one of the women at [community] gave that [name] to me which was lovely."* (Pharm08)

> *"…actually they gave me a name two days ago"*. (Pharm24)

At another few services the community had given the pharmacist other 'endearing' or identifying names:

> *"I'm kind of a bit known as you know they call me … that 'bony Migaloo medicine lady'. So that's my nickname here. And it's said, you know, with love I believe." (Pharm01)*

> *"So, he [CEO] started to call me just 'medicine woman' and he's made it a bit of a joke but then everyone in the yarning group just knows, ah yeah [IPAC pharmacist's] the 'medicine woman.'" (Pharm11)*

> *"I'm the 'medicine lady' and they know that I'm looking at their medicines and trying to help them with their medication." (Pharm19)*

Most pharmacists understood the value of participating in cultural and community events outside of their role:

> *"I go out of my way to try and be part of the community so I come to all the cultural events whenever I can, I'll bring my family across, chat with people about what's going on in their lives. Ask questions about local cultures and customs and really try and understand and I think that over the years that definitely helped. But it comes from a genuine place, I genuinely want to help and want to feel part of it, and I think probably people can tell that so that's been that's been really good."* (Pharm01)

However, one IPAC Pharmacist felt that they did not understand that this was part of their role; and this was not made explicit to them:

> *"And after speaking with the Director of Health Services, my understanding was that she wanted greater commitment from me in terms of attending community meetings and functions outside of my allocated work hours which I was already stretched, and I wasn't able to because of my own pre-existing commitments. … I think that might have been important to [the Director of Health Services] in terms of cultural awareness and involvement in the community but to me, from my perspective on*

that, which I understood from PSA, that [level of involvement] was outside what the allocated time was and not a requirement of my role. I think that's probably the main issue." (Pharm09).

3.1.7 Relationships with Patients

There were mixed responses from pharmacists as to whether all patients understood the role of the pharmacist. There was some confusion depending on what the prior role had been in the service or the community. For example, if the pharmacist had worked in the community pharmacy patients could be confused about why the pharmacist was at the health service. Sometimes pharmacists were mistaken for doctors. Furthermore, as explained by one pharmacist, the public, patients, and even other health professionals, had a misunderstanding of the role of pharmacists; that was beyond the stereotypical role of being in a pharmacy behind a counter. However, if communities had been exposed to a non-dispensing pharmacist or HMRs previously, there was more understanding of the IPAC role; even in very remote areas:

"… it's funny because I thought coming here, I was going to get inundated with 'ok where's my medicines' like the dispensing pharmacist. I've had hardly any problems … because I think they have in the past had an HMR pharmacist come through so [they are] used to having a pharmacist here providing medication reviews. They still have to go to the pharmacy [for medicines]." (Pharm02).

An effective strategy used by some pharmacists was to explain their role to patients at the first meeting:

"I guess it was … back to basic understanding that they don't really understand. But once I explained that I'm actually paid to just look at the medication, the doctors are only with you for 10-15 minutes they don't have time to do everything…. And I think once they sat down and I explained all that … they would then say they understood. Then it just took a while for it to get across." (Pharm04)

"As part of my intro, I explain that I've got two roles and its patient focused, like 'are your medicines working for you, can I help with anything' …. And then there's a GP focus to update things and I can't change anything. So, I have now asked them to ask at the GP appointment about what the pharmacist has talked about. So that's [my role] really to just to get those recommendations seen and actioned. I thought that that was another way for them to get that done. And then I see that I get good feedback from them at the follow-up. So, I think they are fairly clear on how it works and my scope. Yeah, I think they do understand." (Pharm16)

Patients began to understand role as project progressed and those who had more contact with the pharmacist grew to understand the role:

"But I think the longer I was there and the more comfortable I got with the role the more that they understood it. … [I'm] starting to see those repeat clients that we had them coming in asking for us now. They just turn up with their, just to see us if they've had medication changes or whatever. So that's great." (Pharm17)

While most pharmacists noted that it was easy for patients to come and see them; with other staff helping organise appointments and multiple ways of following up; people not attending appointments was an issue cited by most pharmacists across all settings. However, patients who 'did not attend' (DNA) was common for various clinic staff, not just for pharmacists.

"I found that booking appointments ahead of time didn't work well, with a number of people not attending these pre-booked appointments." (Pharm15)

"I think one day I had like five booked in and not one turned up. But it happens in the allied health as well, so … I book them in on the day they come in for allied health thinking that's a good day to get them and they just don't turn up for anything." (Pharm17)

"No Aboriginal place that I've been to... The appointment system doesn't work particularly well." (Pharm23)

Despite pharmacists accepting that DNAs were to be expected, people not attending did impact on their ability to undertake their role;

"That's the thing. A bit of an issue especially with the recall and the HMRs. ... I think one day I had five booked in one day and not one turned up. But it happens in the allied health as well, so … I book them in on the day they [are] coming in for allied health thinking that's a good day to get them and they just don't turn up for anything." (Pharm17)

Another reason for DNA cited by some pharmacists was the number of appointments that patients had to attend, particularly renal patients.

While building rapport depended on the patients, most pharmacists reported that trusting relationships with patients took time to develop, from three weeks to three to four months. One pharmacist felt that she was continuing to build rapport.

"Probably a couple of months but then after that, now that they see me here, and they see me involved they're quite accepting of it." (Pharm3)

One pharmacist demonstrated how their relationship had developed with patients through how patients had become more honest in their responses to their questions:

"Well I think there are … a few of them have been actually repeat clients and have actually come back afterwards and said 'well actually I know I told you before but I'm not actually taking that' or 'you know I haven't used my puffer for six months really'. So, they've become more honest during repeat visits, they've opened up and said 'well I admitted that the first time…' So it was just building up a bit of trust." (Pharm17)

Other strategies to build trust and rapport used by the pharmacist including being involved in other groups such as women's groups and elders' groups; as well as community events.

The majority of pharmacists highlighted that having good communication skills were essential to be able to undertake the IPAC role and being able to communicate effectively with patients. Having cross-cultural communication skills and experience were important in remote, rural and urban settings:

"To be honest I think you know your clinical skills are very, very important no question. But I think that your communication skills are far and away more important. The way you can explain things to people, the way you listen, your storytelling… you've got to tread very delicately in the way that you do that, if you're trying to create behaviour change and create and maintain relationships." (Pharm01)

"… being able to communicate with people sometimes who can't read and write and haven't been to school …" (Pharm04)

An ability to adapt their communication and education styles to the different patients was also important. Pharmacists in urban and rural areas in particular noted that there was a diversity of patient experience:

"Some patients are really, really good at communicating how they feel and really comfortable in a one on one situation. Others are just a bit timid and they say what they think you want to hear. That's like with anywhere." (Pharm14)

"… you just, individualize it for who you're talking to … there was a vast difference in clients, on how we could speak. … some you can talk to like I'm talking to you, others not so much and then the ones that are really from remote [areas], it was quite basic. But I don't feel like there were any, that I felt I wasn't able to communicate with them at all." (Pharm17)

"It just depends on the patient. So, we have a sort of a broad demographic of Indigenous people, some who are very mainstream and others who are not.... Most of them will understand what they need to take their tablets, but not why they have to take them all the time or things like that. So, I mean they're pretty happy to talk about it. They know the rules. I haven't had many not want to discuss anything." (Pharm03)

Pharmacists gave examples of how they used cross cultural skills to communicate effectively with patients about their medications. This pharmacist was working in a very remote area with people who did not have English as their first language:

"… a lot of the times in my consults with patients it's been going back to the core principles of what their condition is and trying to explain that to them. Certainly, pictures work better than anything else. And then trying to tie those things back into their life and why it's important to try and prevent some of these things from getting worse and that the medicines are the things doing it. So I think whilst in some other areas a large portion of your time might be explaining the ins and outs of each medication with the [people], you know I've been satisfied if we've just managed to get through what their actual condition is and how these medicines might actually help their condition." (Pharm10)

"I draw pictures ... I assess their knowledge base. I assess how they are going to learn the easiest. I do all those things. But still it takes more than one or two or six times." (Pharm23)

The most common strategy used by pharmacists to ensure that patients understood information was to ask questions or to ask patients to repeat back information about their medications:

"I regularly ask them to repeat it back to me and do it that way so they can try and think of it rather than just getting lectured about their medication. I like to think 'well let's try and do it that way' instead of me giving all of the information that I think is necessary." (Pharm04)

Information given to patients also had to be practical and meaningful to them. Clearly outlining what medications were for and why patients had to take these medications was an effective strategy:

"I just ask them questions. … because you don't want to just talk to someone. But [questions] like 'do you know what this one [medication]… is for? Did the doctor tell you what this is for? Do you know how it works and if it is a blood pressure tablet, how has your blood pressure been?' or 'I don't know' and then you know we'll check that. Or 'how has your sugar been?' …. And also recommend to them, this is how often I think you should be getting that checked... I always try and get back to the actual reason [why] they're taking it." (Pharm07)

However, the level of understanding of patients depended on health literacy and their English language skills; particularly in more remote areas:

"Generally … I had to have someone who they agreed could interpret for them. So, I may have missed some things along the way. It's once removed by the time there's a general interpreter. But I couldn't see any other way of getting any useful information at all at that point. Only because … I try not to go past what they can understand. If they can only understand one thing. If I pick up one tablet and say 'sugar' and they all seem to understand sugar. If they are vague at that … I don't go beyond that. There's no point in overloading someone with information when they've got such basic or virtually nil health literacy. You have to goa step at a time at their pace and … I try not to overdo it over. Because if I overwhelm people they're just going to be overwhelmed and not want to see me ever again. But

if I can just get one or two quick little things across, messages as well as getting information I'm looking for. If the English was a bit better, I probably go through the whole Webster Pak with them. But at that stage I would only say some things for sugar or it's for… your heart or whatever and then my idea was to come back later once we got those basics out of the way and then enlarge on it at later visits ....” (Pharm22)

While a few pharmacists found that patients did not openly discuss their medications or have much understanding; most found that as they built rapport and developed relationships, patients became more open to discussions.

“They will give you the answers that they think is the right answer and I found that it [takes] a lot of digging around and asking maybe five or six different ways of one question to get … the actual correct answer, and not what they think they want you to hear. I think that's the hardest thing and the most time consuming. Apart from that I guess a lot of our clients [with] a lot of medication do get Webster Paks. So, when you ask them about the medication, they have no idea. They're just taking it because it’s in there, they know what colours and what sizes and how many and that's about it.” (Pharm04)

Some patients were very open to admitting that they did not take their medications and were honest with the pharmacists:

“It's quite funny there was one young girl, and she just said ‘I haven't taken my medication I haven't taken any of it’ and was like, ‘No, oh I'm not going to lie or pretend that I did take it’, she was quite open.” (Pharm06)

“I haven't had any trouble with that, and they seem to answer honestly and as I said at the end of this, as I say to them when I start, I'm not judging you … at the end of the day, if you're not going to take it.” (Pharm12)

Pharmacists gave examples of how patients better understood and discussed their medications. These included patients picking up changes to medications or changes to how medications looked.

“One day one patient he said, ‘Where is my Ramipril it's not in my sachet?’ ... So, Ramipril is usually white and the capsule is … blue and white and maybe we ran out of stock and our pharmacy they put in the tablet which is the orange one. So, [a patient] came and told me ‘where is my Ramipril? It's not in here.’ But it was there, it was different colour … I couldn't believe he knew that. …. And [patients] want to know … what is each one of their medications and what they do to them.” (Pharm24)

Pharmacists gave examples of patients who would book in to specifically discuss their medication changes, particularly after being discharged from hospital:

“I'm now getting a few, and it's not many but it's enough, that are booking to see me after every change has happened to their medicine. …. So, it's not often but they will book in and say okay they've changed this, what do you reckon or those types of things so that works relatively well, I think.” (Pharm16).

Often patients mentioned that other health professionals had not previously taken the time to explain their medications; therefore, they had not had the forum or opportunity to discuss medications.

“I find that most people are actually very interested. They were very hungry for information particularly information that's delivered in a way that's digestible and relatable. So, I've spent a lot of time over the years trying to really refine my storytelling around different things to make sure that it's meaningful and relevant and understandable but still technically correct.” (Pharm01)

The patient survey (N-MARS) enabled some patients to talk more freely about their medications in a structured way. The N-MARS tool is discussed in more detail later in the report.

3.1.8 Changes as a result of the IPAC role

IPAC pharmacists cited four categories of changes as a result of their role: changes at the health system level; changes at the service level; changes for other health staff and changes for individual patients.

Health-system and services changes

At the health system level there was improved communication between hospitals and pharmacists. This had led to improved discharge summaries and medical reconciliations.

> *"I think probably we've managed to achieve better medicine reconciliation in terms… of the collecting of information from the hospital pharmacy, liaising with the local pharmacy and probably in a timely manner [for] those changes actually happening. So, I think a lot of the times the process before would be that a discharge summary might come through and it would get scanned into a person's notes and then it wasn't really until it was flagged to be looked at that people would look at it and then that process would be started. But I got [the hospital pharmacy] early on to send me the discharge summaries for [name of service] so I generally tried to sort of start that process a bit sooner. Whenever I see a discharge summary, I'd reconcile the medications and see if there are any changes and try to catch the doctor if there was anything that needed to be sorted out. So, I think that process is probably with the pharmacist on board has probably been more timely in terms of what the patient eventually gets."* (Pharm10).

> *"The only other thing that changed probably is that even the hospital now will actually directly contact me whenever they discharge anybody that is, especially if they are concerned about the medication so rather than just … sending an email and saying Mrs X has just been discharged, here's the new medication list. And we'll try and chase them up and at least have a chat to them or sometimes I'll print it out and give it to the doc, so I know they've seen it before it is scanned into the system. The hospital's actually much more proactive in contacting us now directly rather than before when they would only talk to the pharmacies."* (Pharm12)

> *"I think really, probably the biggest change would be the communication between the different areas looking after that client like the hospital, the renal team especially. We've built up a really good rapport with the renal team and that's been commented on numerous times. We got an email recently from one of the doctors who was just so happy because he's been there for 20 years or something and he said you know this is the first time this has worked. The patients are discharged, medication changes, pharmacy, doctor, everyone [is] aware and new packs given. …. So that's changed."* (Pharm17)

At one service the IPAC pharmacist used communication and collaboration with pharmacy networks to resolve issues.

> *"Relationship with the hospital, relationship with community pharmacies, we've put a lot of effort into that too into you know like letting, promoting that we are there, utilize us we can help you. With … the renal clinic at the hospital and also the nurse navigators at the hospital. We've become part of that team and we've been dealing more with the nurse navigators that works at the [name of health and hospital district] as well which has been fantastic. For those remote [patients] we can actually find out what they are taking, which has been difficult for the doctors up there. They really envy the pharmacy network. You know we had one fellow when I was at the homeless hub and he …, had no idea what he was taking, his sister's bought him in and said he needs his tablets and the doctor's sitting there going 'well where do I even start'. So, the health worker came out to me. He said, 'oh can you see what you can do' and this was, at the time sitting on the footpath in front of the [Homeless Hub] and within 15 minutes, oh not even 15 minutes, 10 minutes I had a sheet of his packs that were*

packed in his Webster's up in... And the doctor was just like 'how do you do that?' And you know we've got the pharmacy network. So, they're very jealous of that pharmacy network." (Pharm17)

Improved relationships and changes between community pharmacists and the health service was also cited as a change which resulted in improved communication and continuity of care for patients:

"I'm thinking that GPs are communicating a little better with the pharmacy and definitely with the hospital. I think that a communication line has opened up and there's some pharmacies now who have a better ability to contact a doctor when they want something. So before they used to send faxes which go to some central faxes and would get lost in Neverland, whereas now they can email the doctor direct and the doctors have agreed [that it's] okay for the pharmacies to contact them so they will email direct, cc the pharmacist, so we if we know someone's on leave then we can get someone else to action it or tell them this is why it's not happening. And the hospital is now doing that as well so today oh just this week. This has been crazy but patients who the hospital have directed to [name of service] to get CTG scripts; anyone who is discharged will get a little summary even if they're not even on our books, that they've been told to come to [name of service] to get their CTG scripts and help get organized with Centrelink cards or whatever that all comes through. So, I think the communication between those groups has improved immensely." (Pharm11)

"I think mainly the continuity of care has improved by having the community pharmacy a bit more involved in the clinical decision making. Because there's two different GP clinics in the area and I guess … the patients don't understand that we don't … share information through their computer systems. So, the pharmacy became the middleman who had all the current information and by being part of this project and being in the services we were able to expand our role and help through continuity of care and … making sure that the clinics knew what [medications] the patients were on." (Pharm14)

Pharmacists also discussed policy or procedural changes at the services, including education. One pharmacist had previously undertaken HMRs for service patients and noticed the changes with following up those patients:

"*I think being here for IPAC has definitely improved our ability to instigate the changes that [we] identify through med reviews whether they be HMRs or non-HMRs and get that process happening quicker. Being able to do follow up, I think, has been really good because, through the follow up process, I'm able to see when things haven't happened, whereas before those people [were] lost for sometimes up to a year or more before actually they crossed my path again for another reason*." (Pharm02).

Other pharmacists noted changes to systems or procedures that they had helped develop or stream line:

"…between me and the managers we're just trying to streamline a lot of things. We've definitely stopped a lot of overprescribing. We're trying to reduce the amount the pharmacy is unnecessarily dispensing and those type of things to try and fix the process and a lot more communication. It's weird because there have been a lot of changes since I've been here, so I'd hate to say that it's all because of me but if you like the services is always a new thing changing around here. So, I guess it's a bit hard to work it out, but we've just tried to make processes in the sense it does matter who walks in that it's the same process and it's not different for each staff and it doesn't get changed. So basic things like handing out spacers to clients all has to be documented correctly so we know what's coming and going out and, so one client ended up with six of them by the end of the year, so basic things like that that were being avoided." (Pharm04).

Often the changes introduced were simple work procedures, however they made a big impact on patient care:

"…when I come here oh, I would say you know with the sachets. It was a mix up. Oh my God their medication didn't match with their charts and all of that. …. checking the chart thing that makes a big difference now for the nurse because they're not allowed to give the sachets without checking in the charts and they get very frustrated that sometimes … no medications were there [in the charts] … I arrange all the sachets in alphabetical order for [the doctors] so they can find this and they can make the orders much easier to use for them for the manager. Managers are very, very happy with that." (Pharm24).

Staff changes

For other health professional staff, there were changes in their understanding of medications, facilitated through education by the pharmacist. Education took place either through formal sessions with all interested staff or through "on the job" individual interactions. Pharmacists had modelled patient-centred care, not only education about medications, but about talking to patients and having patients at the centre of their own care:

"…*inviting the patient to be the team leader and putting them in my chair and inviting them to read their files. So, it's about empowerment there isn't it. That I'm very, very willing all the time to change seats. And you mentioned that other health staff are starting to do that now. I see them trying to involve the patient much more. So, for example there was a culture of screeners not telling patients their blood pressure and blood sugars and things. That had to change, didn't it? So, we started little on things like that and then you know more and more I invite patients when Aboriginal health workers are in here to read the correspondence that comes from the specialist with me. 'So come on, pull up here, now see where he says this, do you understand what that's about. Can we, can we talk about this'. So, the more I'm talking to you the more I realize that I'm being much more of a teacher here than a pharmacist."* (Pharm23).

"I think the main thing from organizational level is just having an understanding that medicines are an important component of holistic health care and giving them the appreciation that ... We need to keep up with relevant guidelines for them and we need to make sure that people are taking the medicines that they need to be taking and not taking medicines that they don't need to be taking. Making sure that the patient is involved in that process. I think for a really long time the doctors or any clinician has been making decisions on behalf of the patient without the patient being at the centre of that decision-making process and that means that they don't know what their medication is for." (Pharm19).

"The input into clinical discussions about patients. So that's an area where they've [health service staff] ever had pharmacist input before. So, the feedback from the staff has been that it's been quite helpful to have someone there to think about that side of things. And my biggest sort of take-home message to all of them has been along the lines of we can do the best prescribing in the world and the best diagnostics but if the person doesn't actually go home and take their medicine then we haven't actually completed that loop. So, I think I've just been trying to drill that into everyone's head." (Pharm10).

With improved education, health professionals had a better understanding of medications and their prescribing role and were able to enact changes for patients.

"Medication management … being more aware, for example, of drug interactions, adverse effects and just prescribing information, education to help Aboriginal Health Workers, nursing staff, medical staff." (Pharm09)

Patient changes

Similarly, pharmacists reported that for patients, there was a change and also an improved understanding of their medications and their conditions. Patients were better equipped to talk about their medications with other health professionals and to identify issues:

> *"We've improved the amount of people taking their tablets. We've improved compliance. The staff have a much better understanding of what pharmacists can do and how they can get involved. What we can offer. Probably the biggest thing is just taking their tablets more."* (Pharm03)

> *"I definitely have more people understanding what their medicines are, being able to talk about them, understanding what the actual name of the drugs is as opposed to the brand names. Knowing how to look for problems themselves which is something I place a lot of importance on when I speak with people in the community is that they are essentially the last line of defence against any sort of mistake or problem and that they, if they are aware of what they should be taking and what everything's for, and why, then they can pick up on something that's not right and let us know before we pick up on it…* (Pharm02)

Pharmacists reported that patients also felt better as a result of medication changes and were experiencing better health outcomes:

> "*I think patients probably had a better understanding of their medications and in terms of adherence and simplifying regimens and identifying adverse effects. Patients receiving correct doses, more appropriate medications, reported feeling better – less adverse effects.*" (Pharm09)

> *"We have one client that had a HbA1C of 14 and … her glucose readings were in the 30s and we as a team, nurses and myself [sic] and one of the doctors, we've talked to her about medication and the importance of it and how it needs to used. So, we've got her coming in every Tuesday to have her Bydureon injection so that's been over the last three months and we've finally got a HbA1C down to 8 which we would like to get it to 7. So, we are doing random glucoses of around 7 and … you can just tell the she's so happy in herself and that she understands what her medication is doing and how important it is now that she can see actual figures of things and she's losing weight and she's just so right. They're the clients that you're seeing and yes, a success!"* (Pharm04)

> *"We've had certainly quite a lot of clients … there's been huge improvements in their biomarkers. Have we captured them within the timeline of the project? I'm thinking maybe a couple of them we have, but there's quite a lot of others that maybe the changes were already starting to happen and this has just been flow on from that as well."* (Pharm02)

Some pharmacists also cited changes to chronic disease management as a result of their role:

> *"Like most of HMRs that I've done there were issues … there were some big issues. …So, the things that I probably recommended or commented on would have made a difference to the chronic disease management for that particular patient."* (Pharm05).

A few pharmacists felt like there had been no changes or felt they had felt little impact. This was due to either workforce issues or the short time period that they had been in their IPAC role:

> *"I wouldn't say much [change]. I wouldn't say that I was very influential, mainly because of the having locum GPs and me working two days, there was not much collaboration happening in the clinic between me and other staff or between me and GP. So, I think I think it would be very successful if there was a regular GP. And [the GP] knows very well the benefit of a pharmacist there and if there was a pharmacist working full time then that will be different completely different scenario."* (Pharm08).

Holistic approach

Pharmacists also described how they took a holistic approach to patient care, appreciating that patients needed to be involved in changes to their medications to help improve adherence. Listening to patients, understanding their lives and experiences and adapting regimes to suit their own needs, were all strategies that pharmacists enacted to help improve adherence. These techniques and strategies were often contrasted with the strategies used by GP and other health staff that did not address compliance.

> *"Well there was one [patient] that hasn't come back actually, and he was taking medication in the morning and in the evening. And he was quite a special case actually because at the time he was homeless. Anyway, so it took us quite a while to track him down and actually get him to come and see me and actually go to through all his medication with me. And what I explained to him was that because he wasn't on that much medication anyway, he could just take all his medication in the evening. He seemed quite happy with the idea that he could take all of [his medications] at once though and then it would be done in one go. And I'm hoping that's what he's doing."* (Pharm06)

> **"***I had a lady who saw a male doctor. She didn't want to see male doctor but there wasn't a female there. She went in she said 'I got swallowing difficulties. These [unknown] tablets are so big I've been crushing them.' Something got missed in translation and he put her on a slow release tablet that couldn't be crushed. So, then she goes home, and she knows she can't crush [the tablet] because it says swallow whole. So, I went and did a HMR on her and she was just so upset. But … I got her in for a follow up and she felt I think more supported knowing that there was someone there who actually went, 'oh yeah that's pretty shit, let's fix that.' You know listened to her. You know we're listening to our patients.*" (Pharm02)

> "*Look I think I have seen that [change]. The way that it manifests sometimes is in a negotiation process. I mentioned earlier [I am] often trying to advocate for the clients. So, I'll try and make it as easy for them as possible. So, one of my goals, and I'll quite openly say this to everyone, … is trying to get you on the absolute least amount of drugs possible to keep you well. So, in doing that … I'm ruthless when I go through and I'm like where's the indications for that, why is this person on it, what's the risk benefit for that particular drug in that particular person. I'll go through that quite vigorously and try and tie that in with my discussion with the patient, what's important for them, where their priorities sit, what they're able to manage, what they're willing to manage and we kind of go through a bit of a process and that's where I've found the most buy-in. That's why I think I've seen the biggest changes because of wins. I'll give you a renal patient as an example, they've got this Webster Pak that rattles when they walk and they're slightly terrified to look at it when they pick it up and it's overwhelming and to be completely honest, and I'll say this to them as well, 'I'd be frightened if this was my Webster Pak too' and they'll be like 'yeah, I'm not quite sure what to do and I don't know if I really want to take them' … and then you get to the conversation. So … if we can reduce the drugs down to a less amount, even things like the way we negotiate around phosphate binders, even just visually changing the fact that we have them in a separate container that they then use as their after dinner mints as opposed to them looking like a medication per se. That whole sickness that people get, it's very overwhelming and very burdensome. And then I can make them not feel as much like they're really unwell and then they will actually start to take them. And I've witnessed that time and time again. But I think that's where I see the big wins. The small wins are in people where they've not been taking something. Well they stop taking everything because one of the drugs is making them sick. So, we get to the bottom of what, which one that is. We fix the problem. I reiterate to them that this is not you, this is the medicine. You and this medicine are not friends. We need to find a medicine that's going to be nicer to you. And you know there's plenty to choose from. We need to make this a bit of a bit of a two-way street. You need to tell us how you're going so we can fix the problem because there's been a history of people you know not coming forth with that information for a variety of reasons. So that's something that I'm very kind of open and honest about and say 'look if the medicines we're making me sick I wouldn't be taking them either, I don't blame you. How can we fix this?' And we kind of open that dialogue and that often creates an increasing concordance with medicines as well.*" (Pharm01)

"I found that by really kind of empathizing with people's situation … you're a mum with six kids at home running wild and your meant to take your drugs three times a day, it isn't going to happen. So, you need to go 'okay well how can we make this workable. What are your priorities? We need to make sure we focus on your priorities and then we need to focus on how we keep you well.' And I sell it to people particularly people in caring roles because they're the ones that don't care for themselves most. You know in general society as well, not just here. And when I sell it to them in the context of 'Well look if you're not healthy then the whole system is going to fall down. So, we need to look after you so you can then look after all these other people that are dependent on you'. And when I sell it to them in that way, they're like 'ah'. It's kind of like you see people kind of stop and think for a minute and go 'I didn't think about that. I thought I was being selfish or whatever' insert other cultural thing. And you know this is not something I just see here. This is something I see in [name of town] and I saw in [name of city] and I see everywhere where people put themselves last, particularly in health and I try and really make them re-evaluate that decision and what that might actually mean in the long term. Doesn't always work. But I think it does with a lot of the time." (Pharm01)

"I just think that they feel better equipped or better... There's someone there explaining to them all their medications, why they're taking it, relating it back to their health and so because [of] that they're empowered with knowledge, they feel like there is a reason why I'm taking this. Rather than sitting in a room going 'Ok well we're going to start you on this medication, take one in the morning' and that's the end of the conversation." (Pharm02)

"There's so many patients that we're seeing so … I would never dream of saying that 100 percent of them are better because there are still some that you think you get on the road and then you ring them the next two weeks and they haven't taken their medicines for a week. So I think there is a group of people who have really found a lot of benefit from what we've been able to teach them and discuss with them and negotiate regimes with them to make their life easier and help them understand, fit their medicines into their life, and sometimes we change BD things to daily with the doctor just because they still take them and then there's still a large percentage that we've probably got lots of years of work to do and lots more contacts if we're able too." (Pharm11)

"So multiple times probably in a day even you'd see a couple of people who you'd have, either changed to something that's slow release all in the morning or even if it's meant to be at night you know getting them to have it in the morning cause at least they take it. And they're happy because they don't feel guilty that I'm not doing what they should not do. … You say well we can help there's always something we can tweak with and so they feel better once they're not feeling guilty." (Pharm11)

"One of the problems is staff consults saying, 'you've got to take these, you've got to take these, you've got to take these.' And I keep saying 'actually no they don't, they have a choice to take them. It would be best if they did. But if they don't we can't force them to.' As an example, we had one woman who's only mid-30s. She's got three kids, one with a disability. She's a primary caregiver in a house with 20 people. She was on metformin XR, gliclazide XR, some anti hypertensives, around about six or seven medications, [and she] couldn't swallow any of them. So, she was crushing them. Funnily enough, huge bolus doses of slow release medication and vomiting and [she] just didn't take them. …. You can see on their results the HbA1cs are up at 15s …. They're not compliant. So, I start with 'these must be awful to take,' kind of thing. And then we go from there. She was a big victory because we cut all her tablets out, put her on dulaglutide and … her BSLs went from 24 to 12 in a week. So that was a big victory. Then she got a urinary tract infection, but we swapped her back over to the bidureon for the exenatide. But you know that makes life much easier for her. And prior to that she kept saying to them 'I'm taking it. I'm taking it and I'm using the insulin every day.' And they kept saying 'well you must, you must' not hang on what is it you don't like about it." (Pharm18)

Involving family members to assist with adherence and frankly discussing the patients' conditions and test results was another strategy discussed by one pharmacist:

"I was actually showing … one of the GPs here and he has been living in this community for a long, long time. He knows everybody very well. So, I said look at this patient today how much the sugar levels have been decreasing since the time [the patient] has talked to me. And [the GP] said 'I can't believe you made him change his mind'. …. what's happened is I involved the wife. The wife was in there in the same room and I talked to her. And I said 'listen you make him remember it's very important [for him to take his medication] because [he has] already had a heart attack already. It can happen again'. And, I think she took [it] very serious. And I said to him 'really I want you to come back in two weeks.' So [he came back in] two weeks and [his] sugar was normal again. Well it was nine and the blood pressure was settling down too. …. They come back to me 'look at these, look at the difference between when you were taking [them] and when you're not taking'. …. Yeah it works, showing [the patient] their results is very important." (Pharm24)

Adherence

Most pharmacists believed that patients had become more adherent or compliant with their medications as a result of their role. Some pharmacists attributed improved adherence as the most positive outcome of their position:

"We've improved the amount of people taking their tablets. We've improved compliance. The staff have a much better understanding of what pharmacists can do and how they can get involved. What we can offer. Probably the biggest thing is just [patients] taking their tablets more." (Pharm03)

"A patient that had just been labelled non-compliant and never takes their medicines and multiple records in Communicare of that. And when I sat down and spoke to them we realized that they actually physically couldn't take their medicines because they'd had a stroke and it impacted on their ability to use the hands and they couldn't actually get them out of the pack. So, through that process I'd liaised with aged care to have their medicines done through there and now they're getting access to their medicines every day and actually physically being able to take them." (Pharm10).

Pharmacists at some services noted that non-adherence was expected and that little had been done in the past to address this issue with patients or across the service:

"I'm doing more follow through than most people are because I'm trying to find these people and find out how they are going. As soon as you can figure out that compliance is the issue and you have a talk to them about it, then you've got to follow that up. Don't just let it go." (Pharm18)

Patient education was attributed to improving adherence:

"So, the biggest thing is that they think 'I'm taking my tablets today. I don't really need to take them tomorrow.' So, explaining, why they have to be taken every day. That's how [medications] work. Why they need to work. A lot of people here on dialysis so everybody knows what that is and talking about that, and if you don't take your tablets, that's where you might end up. But then another big thing is that they won't take methadone with food. So, it's finding that you don't always have to have food, it's better … just misconceptions and misunderstandings about medications that they may have had that I can clarify." (Pharm03)

"I know certainly there's one lady who at the very start of the project when I saw her she was flatly refusing to take all of her medication because there were way too many of them. We sat down with the prescriber and we set out the plan for just a few tablets that she could take to try and get her back on track with compliance and certainly when I followed up with her further down the track she does seem to be doing a better job of taking them. I mean at the time she had osteomyelitis and was requiring frequent trips to [town] for debridement and there were discussions around whether or not she would need an amputation of her toes and things. We seem to have managed to get her through this phase where she had to take all these extra antibiotics and out the other side and the other day

I ran into her and she's walking down the street doing some exercise. I feel like perhaps we've made some improvements since she's gone from being sitting around hardly being able to walk on this leg to actually being out on the street walking, so that feels like a positive impact." (Pharm10)

The IPAC pharmacists believed compliance or adherence had also improved due to patient education and improved understanding. Some patients had never had staff take the time to explain their medications:

"I'm hoping that the compliance is better because the patients understand the medication better and those that need Webster's have actually got Webster's but it's not as simple as just buying of a Webster is it, it's getting them to actually take it from the Webster Pak. Yeah. So, it's a matter of me going through everything with them again and again." (Pharm06)

"I know that [education has] improved because you know I've had more than one person say to me at the end of it [explaining medications] ... 'Oh no one's ever explained it to me like that before. I understand now'. And they'll take it. You know I've had that said to me in more or less those exact words more than once." (Pharm17)

Furthermore, pharmacists also outlined how changing medications or simplifying medication regimes had improved adherence. Through changing medications that had adverse side effects; changing combinations or types of medications or changes drugs so that patients could take them at different times.

"*There was a lady who we visited who was on a cocktail of antipsychotic medications and she was experiencing a lot of adverse effects and interactions and we were able to simplify her medications and she felt a lot better.*" (Pharm09)

"*You know I feel like people have been pretty honest with that stuff when they say I don't want to take night time meds, I can't remember. Cool. Let's see if we can make them all once daily. Cool. Actually, we can. Great, people like that, total wins for compliance I reckon. We've managed to rejig it and get it once daily, so you know you don't know that stuff if you don't fossick around. GPs do not have time to do all of this. Like how are [GPs] going to fit that into a consult. This is what's it's great having a pharmacist here because we can sit down we can actually do the tablets one by one and I prompt for that [with questions] 'How many days in the last week have you taken this medication?'. I guess I added a lot of prompts to that [N-MARS] like 'What about the night-time ones?' ….*" (Pharm20)

"And one of the things we do a lot of is just making sure the GPs are looking out for, which is the subject of my DUR I suppose, was using combined medications to cut down the medication load. We've gone through most the Webster Paks, a lot of them just trimmed down the number of tablets that people are taking to combined tablets. That's been a real focus and people like that." (Pharm12)

Webster Paks or blister packs, sachets and other DAAs also assisted with adherence; particularly for patients who travelled. Pharmacists ascertained what type of DAA would best suit the lifestyle and needs of patients:

"So, the people that I have suggested that should go on to sachets were two people … One was a really busy person who just would forget to take their stuff away with them or found it … cumbersome to put four boxes of something into their bags so would often leave them behind. So, I think for that person having them in the sachet and just being able to take six days of sachets with them and sticking that in a bag should help to improve compliance. And for the other one it was a lady who was busy in the mornings and would … have time to take a couple of tablets but not all of them. So certainly, having them all together and just being able to tear it open and take it hopefully will be helpful for her. I think because the understanding and the language is so hard out here that if they weren't packed into sachets or medicos a lot of people would just take even less medication than what they currently are. I do think it helps with compliance." (Pharm10)

"I spoke to a man who he was very non-compliant. He wasn't on blister packs. He had bottles at home. No one knew what he had. His blood pressure had consistently been 200 over 100. … I spoke to him and we started him on a blister pack, got all the bottles out of the house and yet his compliance went from like who knows, to very good and his blood pressure went from 200 over 100 right straight down to 130 on 80 like perfect. And yeah, he was compliant." (Pharm07)

We've got another interesting lady who she was all over the place actually because she had a Webster Pak but she was actually chopping the Webster Paks up into little bits and pieces because she reckoned it was easier and then not necessarily taking it all the time and it was a real mess. We sat and chatted to her [and arranged for her to get sachets] …. And she's actually taking them regularly now because the sachets are like what she was doing with the Webster Pak anyway and she could see the tablets in there nice and easy and so she was taking her tablets regularly now." (Pharm12)

Two pharmacists felt that there had been no changes to compliance. One pharmacist noted the difficulty of influencing compliance; however, had worked with other staff to make this a team priority:

"I don't know, that's still a hard one. I think we've got a couple that are just completely non-adherent and it doesn't matter what you do. We've tried working with a couple of the ITC [Integrated Team Care] workers when they're going to check on clients, to say 'well have you taken your medication?', cause obviously it's impossible to call them every day and ask, 'have you taken your medication today?' So [I say to the staff] 'look let's just check on them'. Are they taking the meds if we're going there for another reason just ask them while we're there to make sure that everything is on track. So, adherence is always going to be an issue, unfortunately." (Pharm04)

Another pharmacist also noted, that while they had noticed changes with adherence in some patients, it was difficult to follow up patients over a short project period:

"I don't know. It's really hard so I've been trying to catch a lot of the patients that I saw earlier in the project recently to see how they're going with the changes that we made and I haven't managed to follow up with a lot of them." (Pharm10)

While some pharmacists used a more direct and frank approach to adherence:

"I haven't had any trouble with that and they seem to answer honestly and as I said at the end of this, as I say to them when I start,' I'm not judging you but at the end of the day, if you're not going to take it, … I'd rather know so that we can stop your packs so we are not buying packs if we don't need to. So, I'm not here to judge you I'm just here to help you'." (Pharm12)

Other pharmacists believed that a "softer", slower approach was required:

"It's just I think there had been black and white and not necessarily grey, you know you need to take your medication. That kind of stuff whereas I think you sometimes need to be a bit more softly, softly approach." (Pharm13)

Medication review impacts

All pharmacists but one reported making prescribing or other recommendations to the GPs after completing a medication appropriateness index (MAI) audit, HMR or non-HMR. Just under half of the pharmacists said they made recommendations for "most" or the majority or patients and five (5) said *"all"* (or 100%) of patients were flagged for recommendation. A couple of pharmacists described frequency temporally as *"daily"* (Pharm02) or *"probably once a week"* (Pharm03).

"Pretty much always there's something. Now sometimes it's major and it might be major but... we've got great doctors here. … a lot of people I see, the medicine's lists don't match. So, there's often

something that needs correction. And that may be because they're managed by cardiac or renal or somewhere else or they've got multiple GPs ... So, then there's people that are on prescribed medicines that they haven't taken [them] for however long because they don't have that condition anymore. For example, PPIs [proton-pump inhibitors] or they shouldn't be taking the medicines because, for example, they were put on aspirin back when the guidelines recommended everyone with diabetes to be on aspirin which has since changed obviously. And there's other kinds of leftover things that aren't always questioned. So, I would say nine in 10 people there is a recommendation to make, sometimes they're quite serious, I'd bring the client in with me … let's fix this right now. Sometimes they're just minor tidying up, kind of what I call my administration thing. But yet if they were left undone, they have potential to cause problems downstream." (Pharm01)

"A lot of them, just little tweaks here and there. A lot of them with the changes in the [medication] for asthma, changes there." (Pharm17)

Five pharmacists discussed the process of how they made recommendations but did not discuss the frequency or how often they made changes. There was no response to these questions from the pharmacist who provided a written response to the interview questions.

While most pharmacists discussed prescribing recommendations, pharmacists were also involved in providing education, health promotion and referrals to other allied health services:

"75 percent of the time maybe. .... Other times it was just, a lifestyle, it's supportive, or access, getting them access to allied health because you broached it and I've finally said 'Yes well I will go to exercise sciences' and facilitating that. I'd say maybe 75 where there's been can we change this, can we tweak this, this way or this person has this symptom can you think about adding in a drug for this." (Pharm11)

Prescribing suggestions were made in a variety of ways. Often pharmacists used two or more ways to communicate their prescribing or management recommendations. How suggestions were made often depended on the preference of the prescriber or the service's systems.

Approximately half of the pharmacists noted that face to face discussions, where they would *"knock on the door"* and speak about changes directly with GPs, were effective ways of communicating changes. This method was used by pharmacists who were physically close to the GPs.

"That's the beauty about being in health services, you're physically there so you bump into the GPs and staff in the corridor and it's one to one, it's perfect. You've got all the resources at your fingertips and all the information and the patient is there so your level of intervention is way higher than anywhere else. (i.e. compared to being offsite or somewhere that's remote or distant). You're at the point of prescribing so it's essential that's really where you have to be. That was me working in in that health service. …You just walk past the GPs door and if the doors open you go in and discuss it with them." (Pharm09)

"One of the things I've been doing lately, especially in the mornings, is when I come in have a look in the appointment book and just have a look at who's coming in and, if it's a name I might have seen pops up, I have a look at their medications. I had one yesterday. She was actually one of the targets for a HMR but I could never tie her down, so I saw that in the appointment book and I actually went and saw the doctor before he saw her, and …I said 'look if we change these two to this one, these two to this one, she'll only be on two tablets rather than five. What do you reckon?' And then when [the

GP] saw her, he changed it over. I don't have any problem going up to any of the docs it and just saying 'Hey listen what do you think about that?'" (Pharm12)

"So, what I'm doing now. I'm writing my medication review as the report and then, when I'm in [name of clinic] for example, I take it to the doctor very quickly. … I say, 'look at this, what I find' … he said 'OK we'll do the changes now'. And then I said 'ok'. The change is done because they can see my work." (Pharm24)

If a face to face discussion was not practical, pharmacists emailed GPs or messaged them through the CIS:

"*… the doctors rotate through the different clinics. So, if the doctor is in that clinic that I am in that day I'll just go and have a chat to them. Otherwise I'll just email or message them through the prescribing program*" (Pharm03).

Face to face interactions were especially useful when there was an urgent change:

"So, after I do my review, I just write my report up and give it to the Aboriginal worker or to whoever is responsible there for uploading such reports to the system through the clinical software. If there were any urgent matters I would just quickly …approach the doctor and just speak to him about it. If a matter can be attended to the next visit which could be in a few days, then I'd just write it in the report." (Pharm05)

"So certainly, just being present and being in the clinic [I could discuss] the verbal changes. So, if you just see something that you think should be actioned straightaway and the doctors are very, very happy with that... Other processes with discharges are they get uploaded to the GP inboxes in the medical software and I find out which doctors that they're getting allocated to and approach them directly because [the GPs] get a lot of inbox things and medication changes are sometimes missed. So just to have my finger on the pulse to make sure that these changes happen, if the GP agrees with them …" (Pharm19)

Verbal discussions were undertaken with locums who did not have access to an ACCHS email:

"I communicate it through the system and then I speak to the GP directly because having locum GPs there is no emails so, usually I recorded it on the clinical system and then I have a print out and go and speak to the GP if they are available. If not, I leave it to the end of the day until they're available and speak to them." (Pharm08)

Even when changes were put in the CIS or in a report, it was still useful to speak about changes directly with the GPs to further explain the pharmacists' recommendations:

"Lots of face to face with messaging through Best Practice [CIS], I'll just shoot them a message and … attach a specific patient and I'll just say 'oh hey you got this patient coming in, in half an hour. This is what I thought can you check'." (Pharm02)

"A lot of notes in the clinical information system in each client's folder and then a lot of the time hanging out in the hallways waiting for the doctor to be free five minutes and just jumping on him to chat about different things. I find when they do have a meeting it's usually quite overwhelming and there's a lot of information getting thrown around. So, I find it's sometimes easier to grab a doctor individually to gauge understanding, all of our doctors are international. So, sitting in a meeting is usually quite challenging." (Pharm04)

"When I write in here [Best Practice], luckily it comes up in big capital letters and so the doctors are supposed to go back to my last visit and always read the notes but you know what, often I'll knock on their door and go, 'I see you're about to see [Name of patient] can you read my notes. Good.' Or I send BP message, or I put big things that flash up on their screen." (Pharm23)

However, one pharmacist noted that sometimes changes were discussed verbally through the provision of medicines information, without a formal medication review being undertaken:

"So sometimes the doctors come to see me and we've had a chat about a patient and she's asked for just suggestions about things and then I just talk verbally with her and then she goes off to do it. But I don't always go and make a note in Communicare if I haven't had to actually assess the patient, if she's just come to me with 'these are the medications the person's on' ….." (Pharm10)

Another pharmacist preferred to put the recommended changes in the CIS for the GP to consider when they had the patients file and details in front of them:

"… if I see them there in the corridor you know we can discuss it then. But I've found that that's not the best way for me because the head's not on that client so it I prefer to send them that email and say 'Can you look at this and think it needs to be looked at'. And then they can open the client's file and get their head right before they read." (Pharm17).

Case conferences or team meetings were the preferred way to recommend changes for three pharmacists. They felt that this was more effective than sending reports that were not often read by GPs. Case conferencing was also a form of joint decision making where the doctor and pharmacist could discuss their decisions and the logic behind the changes:

"I have set up with one of the doctors … times for case conferencing and that's been really handy for just getting my recommendations actioned pretty much because … just sending reports is no good… It's interesting because my expertise is very clinical and I'm very used to giving doctors feedback, but I don't think the GPs are always open to it…. I try and case conference with people because sending reports in their [work] flow just doesn't happen. And then you have to pull back on all your recommendations and some of these a page is not enough of recommendations." (Pharm16)

Two of the three pharmacists provided a written report as well as participating in case conferences:

*"In theory we try and have case conferences every week. So, our [work] flow is to try and see clients, anyone that needs discussion which is most of them. Sometimes I'll send intra-mail and then things will just get followed up that way by whoever is relevant and fixed. Sometimes or, if there's a little bit more to it, I try and case conference and have a chat with the GP for every person where this is relevant. So certainly, anyone that's had an HMR or non-HMR that process will probably happen. So technically what we try and do is have a case conference period blocked off with whoever the chronic disease GP is for that week and either [Indigenous Health Worker name] or [the] health worker [that] has been working with me and myself sitting with a doctor and we pull up the clients one at a time that I saw that day or the week before and run through. Because I try and keep my notes nice and brief to make it easier for the rest of the team." (*Pharm01)

"I'm a member of the case conference and tele-meds with the specialists. … And two weeks before the conference I prepare myself I take everything from these patients, and I write a report and so I'm

ready for the conference and the doctor sometimes I have time with them, and they rely on me now to do that." (Pharm24)

One pharmacist mentioned that they wanted to start case conferences as the GPs were interested in using this form of communication (Pharm14).

Six pharmacists made recommendations through report templates on the CIS or by uploading them into the CIS. There was no standard way to do reports, with pharmacists following the requirements of the CIS or of the template they used.

"I write a report that gets uploaded and then we notify them. That's the kind of system that the medical director wanted but specific changes I also put in the notes as well." (Pharm13).

"So, if I've done a home medication review then I give them a copy of it or even if it's a non-home medication review. If it is a review, then I still pass on all the information to them in written form… and that goes into Best Practice and then they respond and that response comes back to me and in Best Practice as well." (Pharm06).

"Well we do HMRs, we've done a few HMRs and we do reports, so an HMR report that we sent to the GPs." (Pharm14)

"I do two things. I give the doctor a printed copy and I upload it into Communicare… into the progress notes. If it was uploaded as a separate document [it would] get lost." (Pharm18).

"So usually when I do a med review I've been doing an actual formal report up and then emailing it to the doctor and then … I've been uploading them into the files when they've been done …. I do try to leave the clinic, you know when I've seen the patient about what they've told me in terms of their compliance, so I try to put that in initially in my initial consult with them and then drew up the report and sent it to the doctor." (Pharm10)

While many pharmacists also communicated through email as well as the CIS (particularly for urgent actions) only one pharmacist found email to be the preferred form of communication:

"Email is the preferred method I think that we've found, and I've talked to the doctors about that too and that seems to be their preferred method." (Pharm17)

A few pharmacists reported suggestions to prescribing or changes in the CIS. A couple of these pharmacists (Pharm20 and Pharm21) worked at the same service.

"So, we put everything in Communicare under the clinical item and then when we've got any recommendations, we do a recall for a medication review and we list the recommendations in the recall. So, it sits there in the 'to do' list. So that's flagged to the GP in the system. …. So, it's there and it's got a due date. …. So next time they are in there is the theory is that all the 'to do' items that can be done are checked off. [It] doesn't always happen but that's the theory." (Pharm21)

Two pharmacists who worked at the same service developed their own report format with their ACCHS CIS officer. This was useful as many reports they had previously sent through were not read or actioned by GPs. It was also useful as the GPs did not have to print them out:

> "[*Name of Pharmacist] and I had always used a similar HMR report format before we started, and we realized that a lot of the reports that we'd sent through never ever got seen by a doctor. We found a pile of them in a tray one day, way back from years ago. So, we knew that we needed a different system. And so, we worked with [name] up in Communicare to make a template of our report and medication management plan which he's put in for us and we ran it past the doctors and so it's a working document for a little while and now that's how we do it."* (Pharm11)

Pharmacists outlined how they used multiple ways of communicating findings and recommendations. They adapted the way they communicated these according to the preferences of the GPs and the service.

> *"I write very short reports because that's what the doctor's like. So that's how I've modified my practice over the years. Very short. I write straight in the clinical notes now because I used to have an attachment, but they found that was difficult and it got missed sometimes. So, actually writing the clinical notes like any other visiting service and then it doesn't get missed as much and we have intramail and all those different systems that we try and utilise to make sure that things don't fall through the gaps*." (Pharm01)

Another two pharmacists had asked doctors what they wanted and developed reports outside of the CIS. These reports were then emailed to reception to upload to the patient files; then it triggered a recall for the doctor. If it was urgent the report was emailed directly to the doctor.

> *"We do the report, but we do it as a Google document. It's just a report between us and the doctors. We sat down with the doctors at the start to…ask them what they wanted us to do. And that is what they wanted us to do. I think it is because they get lots of locums through as well." (Pharm07)*

One pharmacist noted that they needed more guidance on how to communicate findings and recommendations:

> *"I think that's an area too that… I found sort of hard in terms of the project. I guess maybe clearer guidelines around what to document in the notes what to put in a report, that sort of thing." (Pharm10)*

The majority of the pharmacists (n=20) felt that their recommendations were **taken on** by *"most"* GPs or that their recommendations were *"usually"* taken on board. Four pharmacists responded with a *"guesstimate"* percentage.

> *"So most of them agree, around 60 to 70 percent. When I review a patient and this is what I've said to them, I review everything I try and do it holistically. Sometimes pharmacists get so caught up on drug-drug interactions things like that and they don't look at things simply. … I try to do it holistically, but I try and do a good review of everything. And then I say to the doctor 'let's pick one or two things when they come in, then in six weeks' time we can do another two things'."* (Pharm02)

> *"In terms of the actual reviews then obviously I think the GPs have been quite receptive to any suggestions that I've made … they have not just dismissed them or anything.*" (Pharm06)

> *"And they're really receptive to the changes. Occasionally it it'll be 'yes let's try it'. And then next month it didn't work. We're going to try this instead. But we haven't had any huge objections or 'no don't be ridiculous that's a silly idea.'" (*Pharm11)

Some pharmacists noted that the readiness to take up suggestions depended on the GP, with some highlighting that some GPs were more accepting than others. Three pharmacists mentioned a GP at their respective health services that did not take up any of their suggestions.

> *"Most GPs I think would take on most of them. There is one GP I don't think has done any of my recommendations*." (Pharm21)

One pharmacist that worked in two of the services' clinics noted that it depended on the prescriber or clinic:

> *"I think I don't know maybe 60 or 70 percent of the time. Ok so in [name of clinic] zero percent of the time and I'm reconsidering going back there at all. But [in this clinic] … maybe 90 percent of the time at least one thing I've recommended will be actioned. Maybe half the time, all of that will be done, but that's generous maybe.* …And I don't think it's a personal thing. I think [that GP's] … will do bare minimum, [that's] the vibe is within the service." (Pharm16).

> *"I think everyone I think everyone. One doctor at the start was a little bit resistant …I found out that here, if another doctor did the change, she didn't want to interfere in that. She said she will sit on the fence and … didn't want to move from there." (*Pharm24)

Two pharmacists felt that most of the recommendations were taken on board, but they could not be certain as they did not always get feedback from the prescribers:

> *"I think of it like the doctors would have to do that but not all the times I've actually got feedback I don't know actually what happens. But the times that I got the feedback there was the changes that I recommended, they were made."* (Pharm05)

> *"I don't know because it's really hard to follow up with a lot of them when I'm not working all days and then [I've] been away and there's other things going on. It's hard to grab them in the hallway and say you know that report I wrote back for… so, I need to follow up on that. But I think yes they are."* (Pharm13).

In addition, one service discontinued the intervention phase of the project before the pharmacist knew if changes had been made.

> *"There were the nurses, they're really under pressure. And I think that's one of the reasons they [the service] pulled out because I created too much work. I reviewed 20 people each fortnight and then the doctors got 20 [patients] to review from my reviews. And [there is one doctor]. They've got all sorts of other calls on their time. In retrospect I didn't realize at the time … exactly the time requirement from the service. Even if there's changes in Webster Pak after I've left it's up to the nurses to try and explain that to the patients because they don't get that change before I come back again in six weeks' time. … I had a really good GP I could go and talk to at any time and discuss things but at the end of the day she had heaps to do and what she didn't get done, unfortunately was what had to happen was she had to leave notes for continuation of that."* (Pharm22)

Another pharmacist ascertained recommendations were found to have been accepted due to changes in the patient records:

> *"I would say it was very, very well received because changes were made in the prescribing history you know to that to the patients' records to the doses that were being prescribed at the time." (*Pharm09)

Two pharmacists discussed that whether changes were made depended on the way the recommendations were made; with face to face interactions more effective than reports or notes in the CIS:

> *"I think probably in just about all of the ones I've done so far, I've suggested a change or an addition or a reducing in dose, so I think and, or most of those have been taken out by our Prescriber. … She's quite happy to have input from pharmacy and said that she actually finds it quite comforting to know that someone is out there and can spend more time looking at the ins and outs of the medication for each patient where her role doesn't always allow that time. I feel like she's been quite accepting of the suggestions I've made. She hasn't accepted all of them obviously. So, a large portion of compliance issues out here I think are around metformin and its side effects and I'd like to try and say that we should cease it altogether, whereas she sometimes compromises and just reduces the dose. So yes, it's a working, in a working relationship."* (Pharm10)

> *"If I directly talk to them about it, it would be like 100 percent of the time. If I know that they have understood what I've written down and … they've taken on all of them. It's the ones where I've made recommendations but I'm not sure if they've seen it or if they don't agree… I haven't had that sort of feedback like 'Oh I didn't think that that was appropriate.'"* (Pharm19)

There were five actions that GPs took once they had received prescribing or other recommendations from the pharmacists: they recalled the patient; they made an appointment for the patient or they opportunistically saw the patient. Furthermore, if suggestions were made while the patient was with the GP, changes were made to medications straight away. GPs also contacted pharmacies directly to update medications.

Six pharmacists noted that GPs recalled patients. In addition, two pharmacists highlighted that GPs updated medications without seeing patients.

> *"..they will try to then get that client in, within the next week depending on how urgent the changes are that need to happen. And then I will come in and see the GP and they will have those changes instigated and new Webster Pak made or medicines dispensed or whatever needs to happen depending on the situation." (*Pharm01)

> *"They will either recall them in and see them, or they'll just update the chart and send it to the pharmacy*." (Pharm03)

Pharmacists outlined how they used the CIS to ensure that actions were undertaken and the next steps:

> *"And we've also been putting on a recall a month after we've submitted the report to check that the HMRs been claimed, that the patients come back and MMP is all in the file. Then we change that recall to the three month one to do our three-month post HMR review."* (Pharm11).

> *"So, we'll check it a few weeks later to see if they have seen it. If they've uploaded it. If they've claimed. If I need to claim and then we'll chase that up with the doctor if I need to do that. But generally, we'll see that they'll send the report back to the pharmacy once they have done the management plan and then we ... we use the defend system to record. So, we'll put HMR recommendation from pharmacists and then you'll get back from the doctor the report and then there'll be another history note [with] a change. 'Stopped this, started this something else'. So that's how we've been tracking it. And I think it is working."* (Pharm07)

"If I haven't heard anything from the prescriber within a week or so of me sending the reports, I generally just try to catch her in the hall and ask if she caught the email, so it hasn't been a specific formal process yet." (Pharm10)

Some GPs relied on the pharmacist to recall patients:

"They really rely on that having someone else [to do it] … which I'm [going to do] … because at the end of the day if it gets the patient where they need to be [it's good]." (Pharm02)

Four pharmacists stated that GPs followed up opportunistically when patients were next at the service. This was due to the number of patients who generally did not attend scheduled appointments. However, following up opportunistically was only done if the change was not urgent:

"I am guessing I probably don't even look at the report until the patient is next in. I mean if it was something urgent I would go on approach the doctor but most of it's not like it's about PPI use or something else." (Pharm13)

"A lot of it is opportunistically because of clients coming in and no shows." (Pharm04)

"So basically, once I've done the review, then when the patient comes in again and they do discuss that with you, with the patient and then they take whatever action needed. The only issues that I've got a few patients who just might not come back after the review." (Pharm06)

Two pharmacists noted that GPs would have an appointment booked with the patient. One pharmacist noted that this was more effective than putting them on a recall list:

*"So, they don't do recalls because they have too many recalls and they said they will never see them. So, once we have done the report and we send it to that email. We then or say let [Indigenous Health Worker] and reception know that we've done that. And then if they can book in the patient for the appointment with the doctor. **….** Otherwise … they've already got recalls that they can't even get to. So, if we've done the report, we make sure that they book the appointment."* (Pharm07)

Six pharmacists discussed how they had to use a range of strategies to ensure the patient would come and see the GP to discuss changes:

"They would follow them up opportunistically too because there were a number of those patients that have regular bookings. I recall patients would also make follow-up appointments themselves post HMR." (Pharm09)

"Well they try and recall but the recall system is not great. So, I guess a mixture of both. It's opportunistic. But we try, when we send the report to the GP, we also send a template email to the admin staff to try and get them to make a booking for that patient to see the GPs [to] get the medication review that we did." (Pharm14).

Actions undertaken were also dependent on the GP and on what was required:

"So, [it] depends on the GP. So, some of the GPs like to see them and it also depends on the recommendation as well. … to claim the item 900 also they need to see and discuss with the client as well. So, we've been booking clients in for the review and then they come back … that's when the recommendations get done. Otherwise we here … there's a duty doctor so sometimes when you've

got the client in the room and there's something that can be changed straight away you can just go and grab the duty doctor and then they can come in and change it change straight away if it's something that needs to be changed … it's been a process to try and find the most effective process." (Pharm21)

If the doctor was with the patient or the patient saw the doctor after the pharmacist, or if suggestions were made verbally, changes could be made straight away:

"The doctors now will come and bring them to us and say I've made these changes, and made that change, they're [going to] start this and going to do that so we look after them then and there, so [a] big, big difference as far as the clients are concerned. And that's been a big change." (Pharm17)

3.1.9 Induction

General Project Induction

All IPAC pharmacists reported participating in a general project induction program facilitated by the PSA. For the majority of pharmacists this was delivered over two days in a group setting in a central location (a capital city). For a small number of pharmacists, the project induction was delivered individually either in a central location or at their service, due to their start date being later, after the majority of pharmacists commenced. Content included details about the project, the ten core roles and cultural awareness training. Pharmacists were positive in their feedback about the induction training and felt they were prepared: *"It was good to have all the 10 aspects of the role explained and how it was to work. And it's good to have the cultural training as well because coming directly to [service] I wasn't really that aware of Aboriginal culture and all the history and everything. Yes, that was very useful"* (Pharm06).

However, it was recognised early that there was a lot of work to be done in the project and the amount of information was quite overwhelming:

"There was a lot of information especially with the core roles. It's like whoa! Where do I start with this and yeah, then just trying to get my head around the data entry that we get with what each role involved in terms of data entry that was a bit confusing" (Pharm14).

"It was great. I still was a little bit lost in some places at the end because the clinics are all different. So, it's probably just like an overarching education but even while we were sitting there you know jotting down not both had a page each and we chatted at [the] first lunch about it, you know how we're going to find patients" (Pharm11).

A benefit highlighted by many of the pharmacists who had attended a group session was the opportunity to meet the other pharmacists working in the project. Being able to '*meet and greet'* allowed for relationships to be developed and peer support to be provided to each other throughout the project. One pharmacist commented: *"and to know, to meet the other people that are in the same roles. So, I used that at the beginning when I wasn't quite sure what I was doing and I knew some of the pharmacists had already been working in services before. So, I was able to give them a call and question things and make sure I was doing what was right. And sometimes it's easy to talk to someone of the same level as you than asking the people who employed you. Am I doing this right type of thing, to bounce ideas off. So, I found that really good, the meet and greet."* (Pharm04)

General Cultural Training

General cultural training was a part of the general project induction facilitated for the groups of pharmacists and conducted by two external trainers. Feedback on the cultural training was positive. One pharmacist stated: *"The cultural induction especially, was excellent. Even if you had a week it wouldn't be enough, but [the facilitators] gave us enough of an insight to really paint a picture of issues we would likely face and the*

origins of attitudes we may encounter. My overwhelming feeling was sadness that despite growing up in country Victoria, I had never had this education or exposure until 33 years of age." (Pharm15)

Several pharmacists had participated in cultural programs previously and reported that it was interesting and a good refresher. One pharmacist stated: *"So it was actually quite interesting. I enjoyed it. [It] just built on what I knew. …. It wasn't new to me maybe it was just interesting getting more consolidation I guess"* (Pharm14). Another commented: *"I felt pretty good. But I think that probably had more to do with my experience with [Aboriginal people] already than the training, with the training and inductions."* (Pharm03)

For a couple of the pharmacists where the programmed cultural training was not provided due to their late commencement, a day was spent undertaking observation or 'shadowing' of an experienced pharmacist working in an Aboriginal Medical Service. This was a beneficial experience for these pharmacists. One stated: *"It was really useful day because I could see exactly how they [pharmacists] were involved."* (Pharm05)

Some pharmacists also mentioned completing the Royal Australian College of General Practitioners (RACGP) Cultural Awareness Online Modules which supplemented their induction. The cost of the modules was covered by the PSA. A pharmacist noted: *"they also provided me with training like a comprehensive training about the Aboriginal community. Which is a RACGP training. I actually did [the training] over a few days, … and they paid that for me ... There was a lot of support."* (Pharm05)

Local ACCHS Induction

Just over half of the pharmacists received a local induction to the ACCHS upon commencement. Of those who did not receive a local induction only one pharmacist identified that they were familiar with the health service already: *"From a clinic induction point of view I didn't really have one, but I think that's because they're like, 'Oh yeah, you know what you're doing'."* (Pharm01)

For the rest of the pharmacists who had no local induction one commented:

> *"I was just like dropped in it. It would have been nice to have a more formal [induction], introduced to everyone and their role and … even the computer system and all that kind of stuff. I was just kind of left to my own devices because, again, everyone was busy. So that would have just been a bit nicer."* (Pharm13)

When local induction to the ACCHS was provided it ranged from formal programs to informal activities. Activities generally included facility tours, meeting key staff, being set up on the IT systems and workplace, health and safety information.

Local Cultural Training

Just over half of the pharmacists received a local cultural induction upon commencement. The remaining pharmacists stated that they did not receive local cultural training. For some of these pharmacists it was not seen as a priority as they had either been working in the local community and/or had completed a local cultural training course previously. For the other half no local cultural programs were offered, or Aboriginal staff weren't available to do this. One pharmacist commented: *"There was also no cultural induction at all, there was nobody there to culturally induct you."* (Pharm18)

The majority of those pharmacists who did participate in the local cultural induction indicated it varied from formal programs, visits to important local Aboriginal sites, meetings with elders and designated time with the Aboriginal Health Workers within the health service. A few didn't receive the induction until much later after they had started: *"From memory the cultural awareness was much later, [it] did not occur for several months. The whole health service and I attended a one-day cultural awareness … that was a full day at [health service]."* (Pharm09)

Another respondent commented:

"Cultural induction had to happen, I had to [say] 'oh I need it'. So, it happened a couple of months after I started. It was great. It just didn't happen straight away. But the Aboriginal Health Workers here are incredible and outstanding and have supported me whenever… and wherever I needed it. Which is great…. It was one of the elders at the [name of community keeping place] … I was concerned about that because you know throughout [PSA] induction we were so well made aware of all of the barriers and cultural considerations that I was concerned and I felt like I wasn't prepared but then I kind of got here and was well supported by the Aboriginal Health Workers and the community." (Pharm02)

Feedback on the local cultural inductions was generally positive with one pharmacist saying, *"The cultural awareness one was really fantastic. …We had a [local] guy come and talk to us for a day and it was really interesting because he explained about the family structure and I had absolutely no idea that you could have an uncle who would then take over responsibility for your upbringing. And it was really interesting to see how the links are within the family structure… [The] local one was really impressive. I mean I did enjoy the one in [capital city] and it did sort of set me up to come and work. But the local one was just amazing in comparison."* (Pharm06)

Gaps and Improvements

General Project Induction and General Cultural Training

The IPAC pharmacists identified gaps in the induction training and areas for improvement. For the project induction facilitated by the PSA, the primary area where the pharmacists reported gaps in their knowledge was in the clinical information systems and the logbook.

A quarter of the pharmacists identified that they needed further training in Communicare or Best Practice. Issues were experienced in setting up their user accounts accurately, booking appointments, knowing how to put in recalls and how to run reports. However, one pharmacist noted, *"Communicare is the trickiest but they can't teach us everything about both Communicare, Best Practice and every clinical program that's out there so, we've been lucky we've had [staff] on site and they gave us a little induction on how to use Communicare, go into the test patients… so we can have a play with everything before we attack some poor client's file."* (Pharm11)

A handful of pharmacists would have liked more training in the logbook. There was uncertainty about where to record particular activities, and how to export data and run reports. One pharmacist commented *"I don't think everyone's using the workbook the same way"* (Pharm20). Another pharmacist stated *"I think it's very hard to go through the logbook stuff before you've actually tried to use it… [We] probably needed another session after everyone had been in and had used it a few times. …So maybe a refresher."* (Pharm21)

A few pharmacists would have liked more information on how it was expected that the role would work on the ground, although recognizing this would be different in different clinics. They also believed there was a gap in knowing the amount of time it might take undertaking the core roles, what their priorities should have been and the expectations in regard to patient follow-ups. Feedback from pharmacists included:

"I guess there was a lot of autonomy in what we were doing which makes sense because all the services are really different. But it also meant that there was not as much structure for the role and what we were trying to achieve …. I guess they did want [us to] make it our own but that was hard with all the different types of experience that people have already had. So I think there could bit more like support there." (Pharm19)

"I don't know so much that they didn't explain the role, I think it was more just that probably they didn't even know until we all got out into the clinic how that role would evolve. They certainly said these are all the things you're going to try and do. And then when you got out there, you're like 'Wow,

I'm going to spend most of my days trying to convince the staff of what a pharmacist does and then the rest of my day trying to convince the staff to try and convince the patient to come and see me.'" (Pharm10)

Another gap and suggestion for improvement made by a couple of pharmacists was the inclusion of information on how primary health care clinics work and the Medicare billing system. It was reported that some pharmacists had not worked in a clinic environment previously. Pharmacists said:

"The induction was poor if you hadn't worked in clinics before. [Because] I was sort of surprised at some of the things [another pharmacist] was asking and then realized that we know because we've worked in clinics. And I thought that they were poorly addressed. Looking back for [that pharmacist] because I remember in all of the breaks, she was saying 'What's this and what's this and what's this'. [There was] too much subject specific language and that really those inductions should have been divided into two groups." (Pharm23)

"I think in induction it would have been really handy, we did a tiny bit on Medicare billing, but even a section on how the GP clinics work day to day and even stuff that's not got anything to do with pharmacy, just be aware l this is sometimes the usual workflow is this, and these are different ways you might be able to integrate into there. Because I got here and was like OK, they'll be rearing to go and all but I have like get my head around that versus what I had to do. So maybe that would be handy." (Pharm16)

Two pharmacists mentioned they had been appointed a mentor who *"when I need help any time, they will be there for me"* (Pharm24). Several pharmacists noted that the support they received from the PSA Project Coordinators was valuable, *"[PSA Project Coordinators] have been such good support that you can just flick, an email, 'Oh how do I do this? or what did you say about this?' and they'll come back with the answers so they've got all the answers."* (Pharm11)

One pharmacist thought a follow up face-to-face meeting would have been useful to help all partners and pharmacists discuss the various aspects of the project.

"There's lots of communication [that] goes on but I think to get everybody together as a group would have been really valuable and I know in reality that probably would be very difficult because there were people starting [at different times] … right the way through until virtually December …. I think that would have been a benefit if there'd been a stage two and I think it would be extremely valuable to get everybody together in a team for JCU, PSA and NACCHO to understand what everybody as a group was feeling because speaking to individuals is fine. But I think sometimes the group will bring out different aspects of it and more." (Pharm22)

Two pharmacists made comments around possible improvements in the general cultural training. One suggestion was *"I think that you needed to involve actual patients…"* to *"help understand where the lack of health literacy is"* (Pharm23). The other suggestion was considering differences in the Aboriginal population living in remote areas. A pharmacist commented: *"It's sort of hard because Indigenous health is different across Australia. I'm quite remote, other places it's a bit different. So, I don't think that they fully grasp the remote Indigenous health concept sometimes, but that only applies to a small portion of the people in the trial."* (Pharm03)

Local ACCHS Induction

A few of the pharmacists made comments relating to improvements for the local induction to the ACCHS. The main suggestion was the need for induction to be coordinated and it was important to include introductions to people in key roles within the health service, *"I think any job that you walk into if you're not introduced to key people right away it's a bit scary."* (Pharm04)

However, this also raised the situation where it was perceived that some ACCHSs were not necessarily ready for the pharmacists, *"I just feel like the site was just a bit…they weren't prepared for the pharmacist"* (Pharm02). Just under half of the pharmacists made comments about the degree of readiness of the health service which presented challenges. Issues included key people weren't at the service when the pharmacist started, staff turnover, space, *'political chaos'* and other current priorities such as building new facilities. Pharmacists commented:

> *"They were really tight for space. They were building a new clinic up the road. They were really tight on time."* (Pharm22)

> *"It was a bad time when I started … the people who actually knew about the role weren't here that day. There was a sign up for me to come in, work here, so it was all hit and miss. HR didn't know I was coming in. That was scary when you walk into a job that no one knows who you are or what you are doing."* (Pharm04)

> *"I turned up to work and no one knew where I was under... definitely didn't know that I was going to be here. So, there was very little, if not, no understanding of what I was doing except for maybe up at the really high management who had said yes to the project and they had those discussions already in that introduction. So, it was really up to me to sort of introduce [the project] at things like the morning meeting or inservices and that took a long time because of the staff changeovers."* (Pharm19)

The majority of health services had no prior experience of the role of a pharmacist within the health service previously and this presented a challenge as the *"role hasn't existed, it's very hard to change the way people work"* (Pharm10). Another pharmacist commented, *"I think they hadn't really been inducted into what to expect from me either. It was a meet and greet …. I don't know where that miscommunication might have got on board, whether they weren't interested and just happy to give me a room and go for it. Or I don't think it was very clear that, … they still really don't acknowledge that they have to be an essential part of the success of it. I just can't do by myself, it needs workflow changes."* (Pharm16)

At one location the health service itself had only been established approximately 18 months previously: *"they're still establishing their role in the community. And people are just starting to sort of get used to the idea of what a health centre actually is and what it can do."* (Pharm07)

Recruitment and consent processes

The processes used to recruit and consent patients into the IPAC project varied between the health services. The IPAC pharmacists described different approaches that had varying degrees of success. For a few of the IPAC pharmacists they found it easy to approach patients themselves and sit in the waiting room and talk to the patients there. *"The way you approach them is very important"* (Pharm24). In regards to approaching patients, another pharmacist commented, *"I felt really comfortable, I don't think I had any issues. I tend to be very careful with what I say and what I do. Also, I have a little bit of experience so I know what could be culturally inappropriate. So, … I tend to be very careful."* (Pharm05)

Another pharmacist described how they approached patients in waiting areas, *"I would usually find somebody I knew and I'd go and sit with them … and you can see them [others] looking across …, [I'd say] turn your chair around have a listen because this might be interesting to you too. … Here's my little speech and then you can say yay or nay ."* (Pharm23)

Although feeling uncomfortable, another pharmacist attempted to approach patients: *"I felt very uncomfortable approaching patients but tried to put on a brave face! I don't know how many new/transient faces they've had in the clinic so I didn't know if they just thought I was another 'one of those' which is where an introduction would have been invaluable!"* (Pharm15)

However, a few of the IPAC pharmacists didn't feel comfortable approaching patients *"I don't personally feel comfortable going into the waiting room and asking patients especially if they don't kind of know me"* (Pharm13) and *"that cold, cold approaching people in waiting rooms did not work for me at all"* (Pharm16). Management at two health services made the decision that the IPAC pharmacists *"wouldn't approach people in the waiting room"* (Pharm10) and relied solely on referrals from other members of the primary health care team*, "[Health Service] didn't want us to cold [call] people or just wandering around in the waiting room. That was a real no go zone. So, we haven't been able to do opportunistic pick-ups which I'm fine with, and so [recruiting patients] has to be on referral"* (Pharm20).

Other Recruitment Approaches

Other approaches used to recruit and consent patients included referral from the clinical staff in particular GPs and Aboriginal Health Workers; identification and recall of patients with outlier biomedical readings relevant to the project criteria; and browsing the appointments list for the day and identifying eligible patients. These strategies were implemented at different services. However, referrals were a common strategy used at the majority of services. Comments regarding the success of referrals included:

> *"Originally the doctors had a list of people and would send me actually a referral type form and that has just kind of died for whatever reason. Because I think there was just too much. So now they send me intramail in Communicare 'hey I want you to see this person' and I'll follow them up. So they'll say 'Oh we've got a pharmacist. Do you want to talk to them about their medicine?' So that at the beginning [this] was working quite well. And then it slowed down a bit and we decided that everyone with the new GPMP [General Practice Management Plan] would have to see the pharmacist as well. And that was heavily reliant on the chronic disease coordinator and the individual health workers to make sure that happened on the day and that was relatively successful but has kind of now slowed down a bit."* (Pharm16)

> *"The GP. You don't get a lot of forms signed, which is fine. But they have a lot of patients that come through and they go 'Oh wow we could really do with a medicine review'. So, then they come over to me and say oh [IPAC pharmacist], have you met Mrs So-and-so. So it's kind of like a referral."* (Pharm02)

Some pharmacists noted that some health professionals did not refer patients to them at all:

> *"Some doctors actually helped me so much. And some doctors they didn't at all, so they refused to refer to me."* (Pharm08)

> *"I think the role of the GP or the readiness of the GP makes a big difference. Yes. That's how I see it. And this is hard because you know doctors change all the time."* (Pharm05)

> *"The staff very, very rarely referred."* (Pharm07)

Some pharmacists had more success with referrals from the Aboriginal Health Workers:

> *"The Aboriginal health worker actually succeeded in referring patients to me."* (Pharm08)

> *"The office that we had was in the same corridor as a health worker so it was just like we were part of a team, [patients] just went from health worker, to the doctor, to the pharmacist."* (Pharm17)

Pharmacists also reported that positive working relationships with the Aboriginal Health Workers facilitated word of mouth knowledge about their role through the community and this assisted with recruitment:

> *"I had meetings with the health workers and I had my champion Aunty [AHW] and there were even members of the community coming into see me going 'oh I was just waiting for you to ask me to be part of this project you are doing' because someone told someone who told someone and then they've*

come in to see me … for a follow up or whatever it was and then they've kind of been waiting." (Pharm01)

"I specifically tried to do some of the older ones [patients] who …were quite well connected within the community and then ask them 'Hey if you found this helpful and you know anyone who wants to have a yarn just you know tell them to book in with me'. And that worked quite well and now I think they're the biggest advocates. So, I think, [I was] welcomed relatively well but they definitely took the lead off the Aboriginal Health Workers here and once I got their endorsement (and I do), that really, really helped." (Pharm16)

A few pharmacists mentioned that other non-clinical staff also assisted in directing patients to see them including the receptionists and drivers. Pharmacists said:

"A lot of it at the beginning was people not having appointments with doctors, but wanted to ask him a question, so the reception will say 'The doctors are busy, but we've got the pharmacist here. She might be able to help you'. I found, that was really good. So once everyone understood well if it was medication related, I usually answer the questions for them or at least have access to the Communicare and their history that I could find out the answer if it's not easy." (Pharm04)

"There will be patients come in and say 'Oh I haven't got a script for this or for blah' and they can't get into doctor, but [the receptionists] said 'Oh we can book you in with our pharmacist why don't you go'." (Pharm13)

"The driver had, they had somebody come over, which is not unusual, from one of the other communities… for a funeral and [the driver] said 'I brought him in here because they need to see someone and, I know they won't be getting this service over in their community, so I brought him in to see [IPAC pharmacist]'." (Pharm18)

A few of the pharmacists ran reports within Communicare and Best Practice, the clinical information systems (CISs) to identify and then recall patients who met the project criteria or if they had outlier biomedical reading, for example, a high HbA1c reading. Patients were recalled *"by different means SMS messaging, mail and phone calls asking them to come in"* (Pharm08). At one site the IPAC pharmacist enlisted the help of the health services' driver to find and bring the patients in, *"and so I've been able to operate that [the list] at both places which has just been phenomenal, because it means that I can go okay we know this person is in a really bad way., I've given a list to the driver. If he sees any of these [patients [he'll] drag them in, and I've since also got the health promotion worker who's Aboriginal or [local tribe] and they go out and collect people for me or if they see people"* (Pharm18).

At one health service the IPAC pharmacists used a combination of strategies and identified eligible patients in the CIS and flagged them; so that when they next presented at the health service the clinical and non-clinical staff would see the flag and could consider referring them to the pharmacists. The pharmacist described this process:

"So in the very beginning [the IPAC pharmacists] would look at the appointment book every morning or the day before … [In] Communicare you can click on that patient, look at their patient summary to get an idea if there were any medicines that indicated they had one of those chronic disease states or if their health summary indicated that diabetic, heart or kidney problems. We went into bio-graphics and we put 'Potential IPAC client please bring the patient or alert [the IPAC pharmacists] that they're in the clinic'. That was the prompt because that pops up for every patient when the GPs, the health worker or the nurse opens that file that day potentially three people would see that message each time for that one person coming in today and admin would see it too. So that was initially [what we did] until we got to know people" (Pharm11).

A few of the IPAC pharmacists browsed the appointments list for the day and identified patients who might be eligible for the project and then approached them while they were in the waiting room. Potential patients were identified by: *"basically I looked at their medicines lists and if they were taking a few meds"* (Pharm19).

Pharmacists described how this process worked in their services:

> *"So, we identified patients or go out to the waiting room and chat to people and then usually bring them in to one of the clinic rooms and just go through the explanation of the project. And if they were happy to be a part of it, then [I would] sign them up"* (Pharm19).

> *"In Communicare you will see who is waiting for meds because sometimes they only come to pick up medications and would sit. So, I go instead of waiting and I just call the name if I never met them before"* (Pharm24).

Consent Refused

Six pharmacists representing four health services reported noteworthy refusal rates. It was estimated that approximately 20-30 people had refused consent to participate in the project and allow their data to be used after they had received the information sheet and briefing. Another larger health service had higher refusal rates indicating approximately 50-60 patients had refused. The remaining three-quarters of the pharmacists reported very low refusal rates and had five or fewer patients refuse. Several pharmacists did not have any patients refuse.

Perceived reasons for refusal were the patients' *"personal circumstances", "not being very well", "mistrust"* of the health service, *"nervousness of the computer, as soon as you mentioned data from the computer", "didn't want to sign a piece of paper," were sick of being "guinea pigs", "already had lots of appointments"* or were *"hard to engage anyway".* Comments from three pharmacists were:

> *"Some people had too much going on already. So, you already had lots of appointments, [they] didn't want an extra thing that they had to worry about and come back and see us."* (Pharm21)

> *"In my list I have five that I documented that said no after me explaining the project to them. It's hard to gauge that against the rest of the population because these are a group of people who are hard to engage anyway. So for some of them it was that they didn't want to come back to the clinic anyway, to see anyone, not necessarily that they didn't want to come back to the clinic to see me."* (Pharm10)

> *"I had one family who were the most educated family in the area, and I couldn't but quietly empathize with them. They said 'No, we are sick and tired of people like you coming here trying to do your studies and we are just the guinea pigs in this, and we've had enough over the years and we are not consenting.'"* (Pharm22)

Local issues and challenges

The IPAC pharmacists identified a range of local issues and challenges that impacted upon recruitment. Issues relating to the health services included staff not understanding and not valuing the role, renovations in the health service and blackouts bringing down the IT systems. There was also staff turnover, staff shortages and locums. Reputation of the health service and a lack of trust were also issues raised by a couple of pharmacists. Comments from pharmacists included:

> *"Just the communities... what would be the word... how they're feeling about [the health service] at the time. That there's been a lot of disharmony I suppose in the community in regards to the services that [the health service] were providing and how they were providing their service, which is why all of these changes have happened. So, I guess there's generally a lot less people coming in to the clinic. And then when they were here, because they weren't coming as often … they [staff] were already trying to do everything else. If they have already been here for three hours and then I'm sort of trying*

to tack on to the end of that, it was like 'do I have to?' And of course not. So, if there was an option there to leave, then they would definitely take it." (Pharm19)

"I found out that Aboriginal people go everywhere [to lots of different health services] they don't just go to the Aboriginal Health Service … there was a question why they go to everywhere, if they have a lot of services coming to them in the health service, but there was no answer ... They don't know. It might be because of the locum GPs." (Pharm08)

"The other thing that impacted, and probably still continues to impact to a slight degree … is the admin staff, they know to keep patients back for the nurse, they know to keep them back for the GP, but once they've seen a GP, if I'm with another patient they just let them go because they don't value pharmacy. The admin probably doesn't know what we do and so I have to literally go out there and badger them every day. And sometimes, at no fault of their own … I will say to [the GP] 'hey, I'm going to see that patient after you and then the [GP will] forget'." (Pharm02)

Patient-related issues included transience, language barriers, sorry business and being overwhelmed with appointments. Several pharmacists commented that patients moved around a lot including going to their homelands and to visit family. Comments from pharmacists included:

"There was no Aboriginal Health Worker. Nobody in the health service could speak more than a few words of the language." (Pharm22)

"Certainly, out here it's very complex but a lot of the population move in and out between [town] and their homelands. So sometimes they'll be in [town] for a bit and you might catch them, have a bit of a chat to them and hope to try and recruit them. The next time you see them and then they'll disappear off to the homelands for six months and then return a little bit later. So, the moving population has been quite hard. There's been long periods of sorry business and funerals. So out here when that happens the whole community often shuts down … unless it's an absolute emergency. On those days I think they've probably been the hardest things to navigate in terms of trying to recruit patients and certainly with the population aging, a lot of the people who are passing away whilst I've been out there have been quite significant, elders and that then requires quite long sorry business and mourning periods for them." (Pharm10)

"I get a bit of a vibe that there's appointment fatigue with some of these patients who get referred to every allied health and I'm just another one of those that they have to do. So, I think maybe that's definitely a factor and I actually don't have much success getting people here in the clinic to see me only. I have a lot more success tagging on to GP appointments or other allied health appointments." (Pharm16)

Other issues raised were the complexity of the consent process (considering low health literacy and English not being some patients first language), limited time in remote clinics and the IPAC pharmacist being part time and the effects of needing to prepare for cyclones. A pharmacist noted:

"That [consent] was a nightmare to say the least. There was a lot of information to give to a client. So many of our clients, so many can't read or write. And I guess I just explained it to them in the most basic English that I could, and no one denied it." (Pharm04)

"The time to communicate one on one with people that was difficult to have adequate time because you'd only go to one community, the nurses would stay a day. The nurses would be doing their thing. [As there was] one car and you're going around with them, you just grab those opportunities when you can. But it does limit you. It's none of this appointment system or I'll take this number of hours with somebody and then some hours with somebody else." (Pharm22)

Some pharmacists struggled with recruitment and felt that a lead up period would have helped develop relationships with staff prior to trying to recruit patients. One pharmacist stated *"the recruitment and consent parts been quite laborious. Even with concerted efforts from the staff and myself it hasn't always played out how we like."* This pharmacist went on to say *"that first part of the project really I felt needed to be longer. I think it felt like it was at least six months before the staff really got used to having you around and started to understand what the pharmacists could do. So, for me personally there was very little recruiting and patients going on in that time. It was really educating all the staff and trying to just chat to people to make them feel comfortable."* (Pharm10)

Another pharmacist commented, *"we also both [approached] the patients that we already knew. So, if we saw them in the clinic, we went 'oh you know we're here now on this trial. Would you help us out because it'll help keep us in the clinic, this is what happens.' So, having that 18 months of already meeting some people helped a great deal to recruit people."* (Pharm11)

A couple of other pharmacists also mentioned that they knew some patients beforehand which made consent for the project easier.

3.1.10 Feedback on the patient survey (N-MARS)

The patient survey, commonly referred to as 'N-MARS' was an eleven question tool used to assess medication adherence-related behaviour for Aboriginal and Torres Strait Islander patients. The majority of the IPAC pharmacists reported that they were the only person to implement the N-MARS patient survey. Of the handful of pharmacists who did have other staff members assist, only a couple did this ongoing throughout the project. One pharmacist *"got in trouble for doing that"* (Pharm02) because it was not seen as a part of the Aboriginal Health Workers' role. Another pharmacist said *"at the beginning we did a little bit but I found that …. They were just asking the questions without psych [thinking about it]. It wasn't quite right I guess."* (Pharm04)

One pharmacist enhanced the skills of their Aboriginal Health Workers to be able to implement the N-MARS patient survey *"at first I did, so I modelled in the beginning and before I handed it right off. So that by the time they were doing it, they'd seen it done two times. So, there was no kind of issue around that. So that worked quite well."* (Pharm01)

At another health service the pharmacist utilised other staff to assist with language barriers: *"Yeah I did have a couple of the girls in the admin, [they] would come in if I felt like there was some language barriers, or the health worker. But mainly just having someone from the office come in that knew the client and would chat with them more in their language and make sure that they were understood and stay there to help me ask [questions] and they would ask questions in a different way than I would ask questions. So, I did utilise that a lot."* (Pharm17)

Implementing the patient survey

Nearly half of the pharmacists reported that they had experimented with the delivery of the eleven-question tool and sometimes implemented it like a survey or quiz, and at other times they wove the questions into a conversation. Comments from the pharmacists included:

> *"So, I try to incorporate it into general conversation. It sometimes is a tick down the questionnaire but other times it's sort of like weaved into conversation just to make it less sort of study-ish."* (Pharm19)

> *"Once I'd done a few I pretty much knew all the questions. So I would just integrate it into the chat. I found it really easy to use."* (Pharm07)

"I've gotten practice with the N-MARS and I do ask the questions a little differently now to what I did in the beginning rather than to make them understand what I'm saying and remind them there's no right or wrong answer. I'm just trying to see where I can help you" (Pharm17).

"*when I first started to use [the patient survey] and I asked people the questions they kind of got a bit snappy and a bit 'judgy', so … if I said at the beginning look this is a survey, I have to do it for all the clients … then they were fine with it. And then sometimes I just did it as a chat and as we were generally chatting, I got a lot of the answers. So, then I did it that way."* (Pharm04)

Comprehension by Patients

Just over half of the pharmacists reported that the N-MARS patient survey questions were generally easily understood by patients. Pharmacists stated *"I don't think there was any dramas with them. They were really straightforward"* (Pharm07) *and "Yeah, they [patients] found it fairly easy to answer. There were no issues in terms of answering them"* (Pharm06). However, one pharmacist noted some further explanation or clarification may have been required for some of the questions *"It depends on the patient"* (Pharm06).

Other pharmacists didn't feel confident that the patients understood the questions *"sometimes they feel that I'm repeating myself"* (Pharm08) and *"I'll ask the next one, and they're like 'I just answered that'. So, they're not [understanding]…."* (Pharm02). In a couple of the more remote sites the pharmacists stated:

"And I struggled like crazy with the N-MARS questions because you've got somebody with very little English and you're trying to ask them a number of questions that are subtly different…." (Pharm22)

"I did find in this population that the language was hard for some people so it wasn't often that I could just read the question straight as it was on the page and have the person give me an answer. I did have to you know, not prompt, but go this is what it's asking." (Pharm10)

Several pharmacists also mentioned that while the patients may have understood what the questions meant, they wanted to give them the answer that the pharmacist were expecting and not get it wrong. Feedback from the pharmacists included:

"Oh, I think they understood it but that doesn't excuse the fact that they still wanted to get the answer right. Or no they wanted to give you the answer that they thought that you wanted to hear." (Pharm23)

"I try and ask those questions in an informal way but somehow sometimes you just have to be direct to get the answers. But I don't feel like the patient is going to be necessarily honest. I just don't find it that useful." (Pharm13)

One pharmacist mentioned that the survey was giving some patients the wrong messages as they were misunderstanding the intent of the questions. Consequently, time then had to be spent correcting those messages. The pharmacist commented:

"and then just I had to be careful with some of these [page 2] because when you say that to people. Some people would... I can't quite explain it but take it as that's what they were meant to do. So, when you say 'do you sometimes stop taking your medicines because you think you're okay'. They would kind of take that as, maybe because you're not saying what's the wrong or right answer for it. So, you're asking that question and then you're putting an idea in their head that that's maybe what they should be doing. So, some people would take that as what they should be doing and then you'd have to spend a bit of time saying, 'no it's really important that you carry on taking your medicines all the time…' You'd have to make it quite clear after that question what the right answer was so that they didn't think that that's something that they should be doing." (Pharm21)

Changes in Responses

Two-thirds of the pharmacists felt that the patients' responses changed, and they were providing more honest answers at follow-up encounters when their relationship had developed and they had better rapport with the patients. One pharmacist comment that patients had admitted to not telling the truth:

> *"There's been some where they told me they took them all the first time but when they've come back to see me the next time, [they say] 'I probably wasn't taking them all the time, I just told you that'. Now obviously they feel a bit more comfortable. They're like 'Well actually you know once or twice a week I do have this going on, on these days, and that's why I don't do it'. So, then we try to work through those issues."* (Pharm10)

A handful of pharmacists were not able to comment on changes as they had not seen any evidence of changes or had not been in the role for a sufficient amount of time to see patients on more than one occasion. These pharmacists may have resigned and were no longer in the role, or had commenced later.

Feedback on the questions

Half of the pharmacists provided positive and negative feedback on the N-MARS patient survey, the frequency of implementation and the wording of the questions based on their experiences of implementing the tool. One pharmacist said *"The N-MARS was a great tool. Even as an ice breaker to start with"* (Pharm15). A few pharmacists reported it *"It's a bit wordy. There are some questions that … are a bit funny. Double up with other things,"* (Pharm14) and it *"needs to be more abridged"* (Pharm08). Other pharmacists stated:

> *"Overall its way too long…. Some of these [questions] are good, and some of these are no good…. But I've liked doing it in that I think it triggers discussion and you pick up little things you might not have picked up otherwise. So overall, I think it's good, there was a compliance aspect to it"* (Pharm20).

> *"I think the theory behind it is good. I think a compliance check is definitely part of the pharmacist role. Whether or not asking a patient those exact questions three times throughout the project is going to make a difference, I'm not sure. I think that the information that you're giving patients in regards to their medicines is more important. For example, me just telling someone you need to take your tablets, that doesn't give them any motivation to take tablets just because I'm telling them. So, we need to find out why aren't they taking them, are they feeling sick, do they not know what they're for, are they at inconvenient times. How can we make the medicines work for them in a way that the medicines still work and do what they need to do?"* (Pharm19)

> *"I really enjoyed it as conversation starters especially in the first consult with the patients. I think they were really important sources of probing questions and things. I don't see as much value and I'm not actually seeing many changes so whether it's a good thing in doing it two or three times … because you then got a relationship with them and you going back to something kind of formal like this kind of breaks up. I don't know it can break up the flow of the consult a bit and people can get a bit like 'oh you're just quizzing me now'..."* (Pharm16)

Feedback on specific questions was provided by some pharmacists.

Q1. Did you forget to take any of your medicines yesterday?

In relation to question 1, three pharmacists provided feedback. Issues related to the local Aboriginal population not understanding the concept of time, the difference between 'forgetting' and 'choosing not to take' medication and including the medication names on the form. Comments were:

> *"So particularly people found the second question [question 1a] where it asks about how many days in the last week did you take your medication [difficult]. I find for the [Aboriginal people in this area] that's a difficult concept to them. I would have to explain it if I asked it to them they would just look*

at me blankly and I'd be well, 'this is saying if there... If for the last seven days' so I'd have to go right back to trying to explain what seven days was, because for some of them that wasn't, they didn't kind of get that out of the question. I'd be like over the last seven days in the week you know it's like Monday was the start of the week, as I'm seeing you on a Monday. Count back over those days. So, for them that was a really hard question to answer." (Pharm10)

"One of the questions is 'did you forget to take your medication'. Some patients actually choose not to take it. It's not forgetting. The reason why it is a good example a lot of people don't take their furosemide when they are going out because they have to go to the toilet a lot. So, they are not then forgetting, they're actually choosing not to [take it] so I think we need to differentiate that a little bit more about the forgetting versus choosing not to." (Pharm13)

"if I'm doing the assessments that adherence part, I should do that adherence part with the name of the medication. So, it should be because it gives understanding or why some of the indications get stopped and that and why some of them people get adherent to them. Yeah. So, the idea of just having a number for medication, it wasn't very clear." (Pharm08)

Q2. How many days in the last week have you taken this medication?
Q3. Do you know when, and how, to take your medicines?
Q4 Is it hard for you to take your medicines in the right way? (like the Dr/Nurse/AHW said)

One pharmacist mentioned generally that patients at their service were confused with questions 2, 3 and 4. (Pharm13). In particular question 4 seemed to raise the most issues. Comments from other pharmacists were:

"Like you know I think you could definitely have scrapped... [Question 3] 'Do you know when and how to take your medicines' because you kind of glean that from the HMR, it becomes pretty obvious but it's not terrible. So maybe I'll give that one an ok. That question [3] and that question [4] really that's just a duplication for most people… most people would just say well you've already asked me if it was hard, and I've already answered that it wasn't hard." (Pharm20)

"And then question 4 'Is it hard to take them the right way' and then they kind of [say] 'Well you've just asked me, you pretty much are asking that question why would you ask me that again'." (Pharm04)

"Another comment on Question 4 was 'it just seems a bit superfluous to me' and I've had a few clients comment like what, and one of them kind of right out said to me 'oh that question is silly'. They don't need that question on the form, they need to add this question instead. Some of them are quite forward in their feedback to what we should be asking and why we should be asking this and should be asking that and that sort of thing." (Pharm01)

"Most of the questions [are] ok. Some of them, one particularly always, no one really understood [the] first time. You always had to explain it. …, number four.... 'Is it hard for you to take your medicines in the right way'. They'd always kind of look at you." (Pharm21)

Q6. Do you sometimes take less medicine to make the medicine last longer?

Only one pharmacist commented on question six and queried the need for it: *"it sounds like it should make sense but it just doesn't make sense to people. Most people... Blankly stare at me and I say, 'sorry that's a tricky question isn't it'. Everyone goes 'yeah I don't know that one'. I'll say, 'that's okay'. And then I rephrase it something like... 'Some people that don't want to take their medicines every day, they just want to take them sometimes to make the pack last a bit longer. Do you ever do that?'"* (Pharm20)

Q9. Do you sometimes 'run out' of medicines because it costs too much or it is hard to get more?

One pharmacist mentioned that question 9 would have been better asked as two separate questions, one regarding *'cost'* and another on whether it was *'hard to get more' medicines:*

> *"I don't know whether it was misleading but a lot of my patients would say 'yes' to that but it was never the cost because they don't pay anything for their medicines or for the visit, …it was the latter part of it that they say that their lives got busy and it was hard to come to the clinic. I felt like that one some time when I was ticking a yes for that, I [knew] very well it's not the first part of that question. I felt like that needed to be two separate components, they are very different things."* (Pharm10)

However, another pharmacist commented:

> *"This one's not too bad. We don't have to mention cost really at [health service] because everything's paid for … basically I end up phrasing that 'is it hard to get to the pharmacy' or … is it hard you know, so that's not too bad and that can bring up good issues around transport or other stuff. So, it's pretty good."* (Pharm20)

Q10. Do you sometimes run out of medicines because you give them away or share them with other people?

Four pharmacists commented on question 10 and weren't sure that patients would answer this question accurately and therefore queried whether it was needed:

> *"Everybody laughs at question ten 'do you sometimes run out of medicines because you give them away or share them with other people' that always just gets like a total cackle. Which is good, so most people find that just hysterical which is good. I mean every once in a while, from the review if I have noticed something I'll be like 'oh you know you mentioned… maybe … the puffer' or a couple with Panadol or puffers ... I don't think many other people really share the medicine. It's kind of nice that people laugh at that one but in the interest of space you could probably scrap it."* (Pharm20)

> *"The sharing your medicines and I don't know that they are necessarily going to be completely honest."* (Pharm13)

> *"Some of the questions are very ambiguous, like 'did you give your medication to other patients' things like that. They won't do that. No one will do that."* (Pharm24)

> *"I haven't had anyone tell me that they do share their medicines … and that's what they've told me they don't share them, but I'm not sure if they would [respond] in that sort of direct question ……. I think patients know not to share their medicines, so they're not going to tell me that they're sharing them too because I'm asking."* (Pharm19)

Suggestions for clarification and other questions

Two pharmacists had thoughts on other aspects that could be considered in the patient survey. One was surrounding the patients' physical ability to take their medicines and the other was in relation to whether they take their medications when they drink alcohol. Comments from the pharmacists were:

> *"what would've been great to go on that, which didn't go on it is... Do you take your medications when you drink? Because many patients do not take their medications on the weekends or when they binge drink… And I think we've captured it though when you asked them how many nights a week [they take their medications] ... But there's not the reasons around it."* (Pharm02)

> *"Question 4…. if I know some[one] is having trouble with dexterity or physicality, can they get into the pack? Can they open the dosette box? So, for them, yes, it's hard for them to take it the right way. It doesn't really say that. And also, that's a bit of an omission there's nothing like 'do you have trouble*

opening you pack'... I had a guy who was completely non-compliant because he couldn't open his box but his answers on this all looked perfect." (Pharm20)

Foundation for education and adherence strategies

Several of the pharmacists reported that the N-MARS patient survey had provided the basis for conversations regarding education and around strategies for encouraging adherence. The *"N-MARS has been great to just open up that conversation"* (Pharm17) and *"when people responded it would often open up another conversation around something that hadn't come up yet"* (Pharm01). Other comments from pharmacists included:

> *"It's quite funny there was one young girl, and she just said, 'I haven't taken my medication I haven't taken any of it' and was like, 'No, oh I'm not going to lie or pretend that I did take it', she was quite open.... So that was at the second N-MARS that she hadn't been taking it. So, then I had to work out strategies to make it easier and make it fit into her life." (*Pharm06)

> *"I actually found that it led quite nicely into a discussion about what happens in the morning in their house and what things we could try and modify to make it easier for them to take their medication more frequently. I think this population is high because it's multipronged it's that the concept of health and disease is different. Their life is not like a normal western life. So a lot of the time some of the patients that I saw would tell me that they hadn't taken their medicines and they didn't take their medicine because they hadn't had any food and they thought that it had to be [taken] with food, in which some of them were on gliclaczide and yes they probably shouldn't be taking it when they haven't had any food or they'll get a hypo. … Some of them it was issues like 'well I don't eat in the morning because I go and hunt first and then I might have food around lunchtime when I've managed to catch something and my medicine [information] said to take them in the morning, so I just haven't been taking them'. So sometimes it was just simple re-education around issues like that. But sometimes it really was food security issues, and they weren't getting regular food. And yet then it became more of a discussion with the doctor about what [medication] was safe for them to be taking when they weren't having much food."* (Pharm10)

Impact on adherence

The N-MARS gave some indication of adherence and most pharmacists found the tool useful for this purpose, but sometimes it did not assist due to patient's previous answers:

> *"There was one patient … she wasn't understanding why she's taking all of the medications after [I] provided the first service and in the follow up I found out she's much [more] adherent. But usually the N-MARS score doesn't reflect that because [the patients] don't tell me in the beginning how un-adherent they are … they don't say anything, they just say 'Yeah I'm good with that and I'm good with that'. And my perception is ok … But when it comes to doing the second N-MARS I find that they are tell me that they have now been more adherent ... I have done a lot, a few follow-ups, but I've found that that's happening already."* (Pharm08)

DAAs

All pharmacists, but one, estimated the proportion of patients who were on dose administration aids at the commencement of the project. Their estimates ranged from 33% to 100%. The average was 71% across all services. Pharmacists believed DAAs were useful for the right patients: "*Where they're useful, they're very, very useful and I'm very pro Webster Pak or dose administration aids or whatever and you want to call them for people, where it definitely improves their ability and their ease of using medicines … that little reminder system ... But I think for others they can actually be a bit disempowering. That's my personal belief. So, I am not one of the people who want to put everyone on Webster Pak.*" (Pharm01)

Many of the pharmacists had positive feedback about the use of dose administration aids for their chronic disease patients including:

"We have quite a few clients that without those Webster Paks they just wouldn't know what medication to take when and their compliance would not be as good…. I don't particularly like the sachets because you're reading each sachet, you don't really know. I think using the Webster Pak is much easier to see where your doses are that you've missed or not missed. So, I think if you're actually reading the sachets. It's not that easy. Mind you I suppose if they move around a lot, with the sachets they're easier to just take the sachet with them." (Pharm06)

"Definitely I think they're useful." (Pharm13)

Another pharmacist commented that the DAAs helped people who travel a lot:

"*Yeah I think so for some people and they, a lot of people travel on as well. So, they need to be organized and get things packed before they go but it it's just easier because otherwise people don't, I don't know why they always seem to get rid of the boxes and they just sort of travel with pills popped out or just in foils. There are not even any labels, so you don't even know where they got it from. Whereas your blister pack you've got pharmacy details you've got a list of current meds. Yeah, I just think it's, especially for people that travel. I think it's good and efficient."* (Pharm07)

One pharmacist noted that the use of DAAs is limited: *"And also we need to be a bit cognizant of the amount of DAAs we have with regard to the caps and the amount of service provision we're able to access. So, there is that as well which is a confounder too."* (Pharm01)

3.1.11 Project promotional resources

A number of the IPAC pharmacists utilised the posters and brochures around their clinics which had been developed specifically for the project. The posters featured photographs of the IPAC pharmacist. The posters were used more widely and more successfully than the brochures, with pharmacists explaining they were used as a reminder for both the staff of their presence in the clinic, and for patients to become familiar with their faces.

"The posters, that was great because they put them up in all the GP rooms and they were constant reminder to utilise the pharmacist." (Pharm09)

"They do know our faces from the poster, the poster was wonderful and if you ever do it again I reckon put a bigger picture of the faces, as much as we might not like it, but a bigger picture of the faces because [patients] really go 'Oh I saw you on that poster', you know, so it's the posters [that were] great." (Pharm11)

Fewer services utilised the brochures, with several stating they felt the brochures were too complex and not appropriate or specific for the local patient demographic or community (for example, not being in the local language). Several other IPAC pharmacists reported they utilised the brochures mostly with the other staff in the clinic.

"You can explain to them [patients] and they'll understand. They don't need the stuff like that. They were probably a little bit too complex and too many words." (Pharm03)

"So, we did [use] the brochures and we have the poster up on the wall. And I'm not sure if we ended up getting the video to work. I think the thing with [the local Aboriginal] population is because English is not their first language it's quite different to other areas where people might speak English when they go into the shops or that sort of thing so if things are not in language for the local Aboriginal population, you know a lot of the time it's passed by." (Pharm10)

"No brochures are no good because nobody reads. They just don't read English. They'd have to be translated." (Pharm22)

"The flyers that I've printed out are quite useful because I actually use them when I was explaining the project to our team here and to the staff and I have handed little piles of them to different staff and different programs and said look if anyone you know like the women's health program and the elders group and different things that I go along and talk to… I say look if you're there and anyone's worried or has any questions then please you know tell them we'd love to have a chat and we can chat with them at home [or they] can come into the clinic whatever they like." (Pharm01)

A handful of the IPAC pharmacists used other resources with patients although not specifically to promote the project but for education purposes. A few pharmacists reported they had used resources they developed specifically for the project, but most did not develop their own materials with time constraints being quoted as a factor in this:

"I think I'd have liked to, but the time frame around my 16 hours has meant that it hasn't been really possible to do extra things above and beyond what I've been trying to get done on the project." (Pharm10)

"We did up another flyer all of our own which is loosely based around, as it turned out it was similar to … one of the other ones that was put up there and that was just a one-page flyer as much as anything else." (Pharm12)

"I've just done some signs that I've put around the clinic at [community] in [Aboriginal language] just saying if you are having any troubles with your medicine to come and see me." (Pharm18)

Very few IPAC pharmacists were aware of any feedback from patients regarding the effectiveness of the brochures. The main feedback pharmacists received from patients was about the posters. Comments were made about the pharmacists' photos that had been used: *"lots of people were laughing at the photo…. It's probably not the best one"* (Pharm12) – and recognition of their faces.

"Oh yeah a few have said yes I saw you on the posters and some people then knew my name because they'd seen me on the posters, got my name all over it. My neighbour said I saw your picture at [health service] today." (Pharm21)

Not all participants were asked whether the video clips were used in their ACCHS. For a couple of the IPAC pharmacists, utilisation of the video in the clinics was hindered by technical issues.

"The videos I used but it wasn't going via the stream and I just used it just for one or two weeks." (Pharm08)

"The videos they weren't compatible, so they haven't been able to use those which is a shame. They did put them on their Facebook page though … they are working on it and they're hoping before the trial actually ends that they'll be able to get them on [the TVs] but there was some technical reason why they couldn't play those." (Pharm17)

"I know you have like the video to play in the practice, but I don't know how useful the video is either because apparently, we have a company that looks after what we're allowed to display, and a lot of their videos are very short. The one that was produced for IPAC was so long… I actually sat in the waiting room one day and I noticed that the volume wasn't so loud anyway so half the time you can't hear what they're saying... So, in my particular practice it wasn't useful I think." (Pharm06)

A number commented they felt word of mouth was the most effective way to promote the pharmacist and the IPAC project, either through the staff in the clinic, or from patients sharing their experience with others in the community.

"I think the biggest thing is getting the word [out] through other Aboriginal people" (Pharm18)

Clinical resources for the pharmacist

The majority of IPAC pharmacists also commented that they had access to clinical resources which was considered extremely valuable:

> *"The clinical resources we've used have been wonderful. AMH [Australian Medicines Handbook is open every day. eTG [electronic Therapeutic Guidelines] open every day, and I've had the APF [Australian Pharmaceutical Formulary] open a couple of times as well for different things that we've had to look up. So those online resources have been wonderful."* (Pharm11)

> *"I use them all the time and I wouldn't be able to do what I am doing without them. The therapeutic guidelines, AMH, and MIMs, [the health service] up until recently … they had access to therapeutic guidelines, but no one knew that they had access, so I was the only one that had access to it. So that's been really good. And I don't think you could do it without access to those resources and I think that all the clinics should have them."* (Pharm19)

> *"The access to clinical resources was invaluable and without which would have been difficult to complete our roles."* (Pharm15)

3.1.12 Project in General

This section presents responses from the IPAC pharmacists when asked what worked well and what were challenges in implementing the project. See section 3.6 for a more comprehensive account of all enablers and challenges.

What Worked Well

The IPAC pharmacists were asked what they felt had worked well with regard to how their project operated at their site. Many of the pharmacists reported that support from the health service in general and other members of staff, in particular support from the Aboriginal Health Workers, was of immense benefit to the success of the project. 'Support' included their enthusiasm for the project, welcoming the pharmacist into the primary health care team and the community, and assisting with recruiting patients into the project.

> *"I think if you've got a good health worker working with you – and I had, well I still do have an excellent health worker working with me at [health service] – the sky's the limit, because this health worker has immediate rapport with people. She is brilliant at starting, even if she's never seen them before, she can get a conversation going and they'll feel there's a relationship there and I can feed off that too to get my own relationship and just join in."* (Pharm22)

> *"I think what's worked well is having people really excited to make it work. I think without that it would be really difficult. I'm very lucky to have that situation whereby some of the very senior members of the team here have been very pro the program and pro me being here regardless."* (Pharm01)

> *"Lots of things worked well, the communication and engagement with the Aboriginal workers and stuff like that as well."* (Pharm05)

> *"Just having [ACCHS support person] and the staff, if [ACCHS support person] is away there's a few other staff members that work with us and just … having them on board has really helped us reach a decent number of consented patients."* (Pharm14)

> *"They encouraged me to go to the elders' group when I first started. So that was probably the best thing, because by going to the elders, if they accept you, they will spread the news and gossip like*

there's no tomorrow. So, I think being encouraged to go to that and going with me to introduce me to those key people. Definitely helps that situation to get into the community" (Pharm04).

IPAC pharmacists who felt accepted as part of the team, which included participation in meetings, invitations to social and community events, being provided with a uniform, were all factors identified by different pharmacists from different sites as things that worked well for the project.

"Being in the clinic where we were really included in being able to come to the meetings, being included in the staff social events, because we definitely got more of a rapport in that clinic than what we do have at the other two." (Pharm17)

"I think just being integrated into the team's worked really well, and just making the medication reviews part … of chronic disease management." (Pharm21)

"Man, it makes a big difference having the shirt. You are part of the team, you're one of the good guys. It's really good." (Pharm20)

"The day to day, it's just wonderful. I think that they've been so receptive, and I guess [IPAC pharmacist] and I must've done an okay job and be able to talk to people and people must be happy with us to come back and be confident enough to share their patients with us. And we're just slowly, slowly with people – we didn't come in and bound and take over we just kind of worked away in and then got people to trust us. So, I think that's worked." (Pharm11)

Cultural induction, both the general training provided by PSA during the induction for the project and that provided locally by the ACCHS, was identified by a few of the pharmacists as being very important for the project to operate successfully.

"Following the cultural safety training provided by the IPAC project team in August 2018 as well as similar course by a consultant on behalf of the [local primary health network], I feel much better equipped to start to understand some of the issues facing Aboriginal and Torres Strait Islander people. I felt disappointed that I had not had this education sooner, as an Australian health professional." (Pharm15)

"Cultural induction had to happen. I had to really kind of be like 'oh I need it'." (Pharm02).

Developing and strengthening relationships with external stakeholders, especially with community pharmacists, was felt to be important for the continued success of the project.

"I do spend a lot of time liaising with our community pharmacy…. I chat with the pharmacist there and problem solve with them every day I'm here… I'm kind of the translator between the doctors and the other members of the team and the community pharmacy because I speak 'pharmacist' and I speak 'doctor' so I kind of translate in that role a little bit and smooth out any issues." (Pharm01)

"Just, just being able to liaise with the community pharmacists has really been beneficial for this project something that really, really significant part of the project." (Pharm14)

"The benefits have definitely been on the ground level with the staff. I think in engaging that understanding and encouragement about it and, and the communication with the pharmacy in helping people like in ensuring they didn't run out of their medications and there was trying to limit the amount of clients going in to get their pack and finding out they had no scripts left and then they'd be sitting in the waiting room waiting for a doctor. So those kinds of basic things, we've tried to improve the most and I find that's quite successful." (04)

> *"I think the main thing that we've really … is the conduit between pharmacies, community pharmacies, between hospitals, between doctors, between clients."* (Pharm17)

Many of the pharmacists who had access to their own space within the clinic identified this as something that worked particularly well and enabled them to perform their role more effectively.

> *"We were given our own space which I think was very important. I don't know how it would have worked if we didn't have that space. I know that some of the others didn't and …people knew where to find us. We'd come back, if we were away you know we'd come back and there'd be a HMR referral or something left on our desk. One of the doctors would have come through and just left a note or left some scripts or whatever and they knew where to find us if they had a client to see so that was very important."* (Pharm17)

> *"And the rooms that we are in have a lot of equipment basically, blood pressure monitors and glucometers as well, even like a haemoglobin machine. So, we've been able to use that."* (Pharm14)

A few of the pharmacists commented on the support they received from the PSA Project Coordinators throughout the project, identifying this as something that worked particularly well for them to successfully complete some aspects of their role:

> *"Support and training from the PSA team was excellent. With provision of extensive resources, thorough training before the project started and facilitating networking with the other IPAC project pharmacists via the discussion forum, monthly conference calls and WhatsApp group, the PSA representatives gave me every opportunity to clarify, ask questions, seek guidance on any matter."* (Pharm15)

> *"I loved it, to be honest, in general. There were no challenges from my job as such in the sense that I feel completely supported from [PSA Project Coordinators]. I know when I stuff up, JCU's there to clean up my data collection list. I think the core roles are set out. I think the logbook is great. It's very user friendly and it's not overly time consuming."* (Pharm02)

> *"[PSA Project Coordinators] have been such good support that you can just flick an email, 'oh how do I do this' or 'what did you say about this' and they'll come back with the answers, so they've got all the answers."* (Pharm11)

Having access to the ACCHSs CIS was another factor identified of being of great benefit to the IPAC pharmacists being able to undertake their role effectively. This is explored in great depth later on in the results section.

Benefits

When responding to the question regarding enablers and challenges, the IPAC pharmacists identified a number of benefits resulting from the project. These included increased numbers of HMRs for patients and consequently financial benefits for the service through increased numbers of HMRs conducted:

> *"So, in terms of improving the number of home medication reviews it's definitely improved."* (Pharm06)

> *"The number of claims for [item] 900 has gone up dramatically. So just another financial benefit to the health service."* (Pharm21)

Increasing the knowledge of the GPs and saving them time by quickly responding to medication related queries or undertaking patient education was perceived as a benefit by the pharmacists:

"I guess just that other stuff there that you see GPs can pop in. That's happened heaps today [during observation/field work]. Things like clinical questions, that's always fabulous. It's just to help with things … that doctor that just knocked on the door needs some help with some S8 scripts. ... Doctors asking everything from antibiotic spectrums and which antibiotics to use and resistant patterns, to just, what else do we have this week… What laxatives to use in renal impairment. I think the doctors have seen it. I think that's great. And having a face to face suits a lot of people." (Pharm20)

"I mean I just think having the capacity to really talk to people about the medicines in the clinic or at home, like giving people that choice of where they want to be seen, you know, being able to provide full education at the end of the day. … you can be the smartest pharmacist on the planet, you can do the best HMR report in the world. I mean the bit that matters to the patient is obviously different to the bit that matters to the GPs. I think you'd have to almost answer that question two parts. The bit that matters to the patient I reckon is they've got someone here that takes the time to explain the tablets... It's just it's so satisfying to have time to sit down and go through all of that, and I think for the GPs it's probably super because you know once you are here and they start using you, it was great for them to have other people to ask and it's learning for me too." (Pharm20)

Challenges

The IPAC pharmacists identified a range of challenges which they encountered during the project. Several have been mentioned earlier. One of the challenges a substantial number of the pharmacists experienced was a lack of understanding or lack of awareness of their role by other staff members, and how it differed to the role of community pharmacists and other members of the primary health care team. This was an issue particularly at the start of the project for many. A few pharmacists perceived a lack of support from some of their colleagues impacting on their referral numbers and thereby recruitment of patients to the project:

"Then they had, seemed to have no idea at first. Same for [clinic site]. There was confusion as to what I was doing, why I was there. They didn't even know I was going to be there." (Pharm18)

"And even the staff in the clinic weren't very welcoming in the beginning to the idea of having a pharmacist among them and they didn't know what I am doing and that's why it took me from the beginning to just educate them and let them know about my role" (Pharm08)

"But you know I'm not getting referrals... I'm getting referrals from the younger doctors, because I'm not really getting referrals from the two doctors that have been here for quite some time. They just do their own thing." (Pharm13)

"Staff engagement in the project – as a new face within the health service, I relied heavily on referrals from the long-term clinical and support staff. I requested help on many occasions to increase referral numbers but due to time constraints and lack of understanding about the project, it never really improved. I understand that staff are already time pressured to complete administrative tasks so adding an extra request may have been onerous." (Pharm15)

Workforce issues, such as shortages of GPs in some services and staff turnover, including locum GPs coming in and out of services, presented further challenges. In addition, some of the IPAC pharmacists found it difficult gaining the GP's time to be able to discuss patients and follow up on recommendations. This was particularly challenging for IPAC pharmacists who were part-time and only present a limited number of days per week in the ACCHS:

"I mean it's been really hard ... with staff changes for one and then restructures and different people coming in, I feel like I'm explaining what I'm doing weekly if not more. And I think that's been a bit of a barrier to the success of the project because there's just been not enough consistency in it." (Pharm19)

"I think I said it in the middle of it I believe that main challenges there was having locum GPs and having the pharmacist two days per week." (Pharm08)

"What has been challenging. I think getting access to doctor time is a little bit challenging in terms of being able to turn the recommendations into improvements for our clients." (Pharm01)

"Not being able to be more involved with what the GP does. So, we haven't had that proper GP collaboration, not what we would like." (Pharm14)

"Staff turnover; I believe this issue is not isolated to our service but the nature of our GP coverage in the service means we have four part-time GPs and had a change in registrar during my stay." (Pharm15)

In addition to staff issues and attitudes, it was also the observation of a couple of IPAC pharmacists that they felt their health service wasn't ready to be involved in such a project due to internal organisational issues:

"I just think that maybe I think it would have been nice if the health service had come to the party more and provided it a go to person or a mentor …... But the problem is in this particular instance the health service was in chaos. There was just a lot of internal things going on and it was difficult for them as well at that particular point in time." (Pharm09)

There were a number of patient-related factors which also posed a range of different challenges for quite a few of the pharmacists. These included a more mobile patient population in some places, patients attending the health service opportunistically and not showing up for booked appointments, sorry business, and language barriers.

"I think the difficulties out there being the staff turnover and the sorry business and the moving population and shortness of clinic space. that's probably been the biggest barriers to try and overcome to see it be successful." (Pharm10)

"Given the number of clients, I was allocated a 0.2 FTE equating to only one day per week. This limited the number of clients I was exposed to. I found that booking appointments ahead of time didn't work well, with a number of people not attending these pre-booked appointments." (Pharm15)

"There was no Aboriginal Health Worker. Nobody in the health service could speak more than a few words of the language" (Pharm22).

Whilst all IPAC pharmacists had access to their services' CIS, a few pharmacists experienced IT issues which impacted their access to the CIS and patient data:

"The main barrier was IT because at the start I had, I had the Communicare issue and then even now half the time the server drops out. The IT just drops, you just lose Communicare, you lose Internet and it's just really hard to do things like you just got to chase it up the next week and then hope it's all good and doing the same thing. But that was probably that's one of the biggest issues we've had and not having Communicare offsite. Because if I had Communicare offsite I could do so much, so much more." (Pharm07)

"Another barrier was just having limited access to Communicare at the site. We were putting all our data into Communicare. Also, technology has been a bit of an issue is just this technology issues such as the Internet going down so we can't access anything. Communicare plays up quite a bit. I've had a good working relationship with the IT guys trying to fix all my computer issues." (Pharm14)

A number of the IPAC pharmacists also found it challenging to manage the different requirements they had to fulfil within their role, particularly the logbook requirements during busy clinic days, and especially for those who were part time:

> *"In terms of the role I think the hardest part has been time frames for actually doing all of those things. So being out there for 16 hours a week by the time I've run around and popped into some consults and counselled some patients about their inhaler use and caught a couple of patients to try and recruit and conducted the N-MARS and then run around chasing up some medicine reconciliation between the hospital pharmacy and the local pharmacy and answered a few medicine information questions then actually finding the time to sit down and do the med reviews on top of that and then adding into that drug use evaluation and the liaison plan. I think I feel like the time frames for actually getting all that done in a day or at least in a part time position has been very difficult."* (Pharm10)

> *"Challenges have been having enough time to write up the logbook because the day is just go, go, go and even yesterday I tried to close the door and like this morning people still knocked and wanted to know. So, it's really hard."* (Pharm11)

> *"You know I still don't think we catch it all [in the logbook], especially in those early days because it was just so overwhelming. Trying to find spots to put stuff in I found was hard because it was a lot of stuff that we were doing that I couldn't really find"* (Pharm17).

Clinical information and data access

The IPAC pharmacists reported unanimously that access to the CIS was invaluable to being able to perform their role effectively, providing the pharmacist with a more comprehensive and contextual insight into the patient, allowing them to leave notes in the patients' file, manage their own appointments, and saving a lot of time for both the pharmacists and the GPs.

> *"Essential, …you couldn't do it without it. I already had access. And that was something that the clinic actually was kind enough to give me right from the early days… obviously I understand that that's not something given to a lot of visiting people particularly not pharmacists or pharmacies doing HMRs and I very much value that. The GPs very much in return value the fact that I didn't have to ask banal questions like have you checked their lipids. It just meant that I could just go in and look for stuff and see have they checked their lipids and were they appropriate. Or had they checked their renal function and was it reasonable. All of that sort of stuff. It just really expedited the process and I could give them the three key points that they needed to focus on for the client rather than 27 questions which is what you have to do to kind of cover all bases if you don't have access to the information that you need to make recommendations."* (Pharm01)

> *"I don't think you could really do the project without access to the clinical software. Certainly, for the purpose of gathering all the information that you need to do the med reviews. It's sort of been invaluable."* (Pharm10)

> *"Oh immeasurably. So, when we were volunteering [at the service], we didn't have access. So, the difference in being able to read through someone's history have a look at when the medication was ceased or started, look at blood tests, look at letters from the hospital, the mental health specialists' letters, just gives you such a bigger picture of the patient and sometimes the patient can say 'oh I don't remember who started that' or the doctor will say 'why are they on this', and even though they had the access they've got that limited time I guess and they don't have time when the patient's with them and five patients waiting just to be able to take that time to scroll through and see what's happened and get a picture of that person's clinical life, makes so much difference. Before we were working blind, really, we had an HMR referral and that was it. And if we were lucky enough and the doctor did attach the bloods then that was fantastic. But more often than not they didn't. So wonderful."* (Pharm11)

A couple of the IPAC pharmacists did note however that some of the clinical information software is challenging to use effectively so orientation to the clinical software is important. They also noted that some guidelines on what information to leave in the patients' files would have been useful.

> *"The induction was okay in terms of how to actually use all the parts of Communicare. I don't think Communicare is particularly easy to use. It often requires a lot of searching through progress notes to try and find bits that relate to medicine changes. It's not always easy. I feel like the orientation process on how to use it was good. I just possibly could have done with a clearer project guideline from the project point of view. What to put in and what not. Like you know clearer guidelines around leaving a note every time that you go in there and what those notes should say and that sort of thing."* (Pharm10)

> *"I was able to access it straight away but there wasn't much training provided for it and then there was no one here who was, who had the time I suppose to give me information about it so I've been learning a lot of that as you go."* (Pharm19)

Travel and work outside hours

Travel requirements and travel logistics varied at different locations, depending on the size and remoteness of the communities, and how many additional sites or locations from which the ACCHS operated. For this reason, the impact of travel on the pharmacists' roles varied:

> *"[From my home] … it's about an hour and a half each way."* (Pharm07)

> *"The other pharmacist that's been doing this clinic has been going even further out, so to their [community name] and [different community name] clinics which require charter flights to get to, so the logistics around it are quite hard."* (Pharm10)

> *"It limits the time you get to see people when it's with [community]. With [different community] it's fine. I'm two weeks there so I'm flying on a Monday morning and I'm there by 10 or 11 and leaving sort of 3 o'clock on Friday so there's plenty of time there. [First community] is a bit different. Again, you're not there very often, not there for very long, just because of the distances and then you're limited to who's there at the community. And if there is a ceremony or a funeral going on then you're likely to have very few people there."* (Pharm18)

For many, however, the communities or towns they worked in were quite small, and they were able to travel more frequently to conduct home visits, usually with a health worker or nurse, which was noted to be beneficial in trying to chase up patients who hadn't or weren't able to present to the clinic for follow ups.

> *"I've got a notebook with all my follow up people particularly the IPAC people that I need to get back to or follow up … so I've always got lists of people that I'd like to see. We'll often, with Aunty [name], we'll often just do drop ins. And then she'll go and knock on the door and go 'hey is it okay to have yarn with [pharmacist]'. And then if they're home, often they will say 'Yeah, no problem'. It's trying to catch people which sometimes is a bit of time that we waste driving around community trying to find people, particularly if there's events on or sorry business or there's something else happening in community or payday or, you know, insert other reason… The driving around community from one end of [the town] to the other is probably about 20 minutes. So, it's not that big"* (Pharm01)

> *"Today it took just over an hour and there were probably about 10 packs to deliver, by the time you have a chat with each client and make sure everything is going okay, it's good."* (Pharm04)

> *"Yeah so [health service] has different clinics all over so they do have one in town and they do have one in a very close community called [community name], and the one that I've been going out to is one of their clinics called [different community name]. It's about 20 kilometres away, so it's not a huge*

drive out there. Yeah certainly for a population of people who generally don't have cars the [local] people, unless they get on the bus, spend most of their time out there." (Pharm10)

There were just a handful of pharmacists who did not do any home visits or travel away from their clinic, which was not necessarily without trying:

"I didn't end up having to travel for activities in the service. I attempted to go on a couple of HMRs but couldn't find a willing staff member to attend or the patient cancelled." (Pharm15)

Approximately half of the IPAC pharmacists reported they had access to clinic fleet vehicles to undertake community visits, whilst others had to use their own car, which was the main contributor to out-of-pocket expenses:

"There's a few clinic vehicles but they're often already being used so quite often if I was travelling around the community, I'd just go in my car, but I'd have one of the other nurses with me or something." (Pharm10)

"Most of the time I've been pretty lucky, and I can get a clinic car but there's definitely been probably like maybe six to ten, six to a dozen times I've had to use my own car when there just hasn't been a clinic car available. I'm happy to do that." (Pharm20)

At one site the IPAC pharmacists used the community pharmacy car which was reported to have benefits, particularly in relation to being recognised whilst driving around the community.

"We did do home visits with the pharmacy car. And it's good because it's they can tell who it is because it's got the logo on it, a big blue Hilux. We have actually … been driving around, and people start waving us down now. So that's been really good. They want to have a chat to you, so they just wave you down." (Pharm07)

"Everyone knows our big blue work car with our signage so they see the car come into the community and they know the pharmacist is there. That's a positive." (Pharm14)

A few IPAC pharmacists reported they did have to do some project work outside of their contracted hours. Reasons cited included the need to meet logbook and data entry requirements, or because of travel required during clinic hours.

"Not a hope. Not a hope. I had to do [logbook and data entry] outside allocated hours." (Pharm22)

"I know at the start of the project we were under the impression that travel should be included in our time. But I was just finding it was so tight, I was so time short out there, that by partway through the project I just stopped including that [travel time] and just … stayed out there longer beyond that time to try and catch up on stuff that I was falling behind on… by the time that [I was] answering medication information questions and jumping into consults and that sort of thing. That's when I stopped allowing the travel time to be part of my hours because it wasn't practical." (Pharm10)

"I do [some work outside hours] … I might come home if I take an hour off the clinic or something like that. I keep track of the hours I do with the manager and everyone. I tried to do the logbook at the clinic but just got interrupted. HMR report writing and a lot of the logbook entry I do at home. So just the printing like a print HMR referrals at home, I print N-MARS at home. I print consents. You know I go out and do HMRs on non-IPAC days. I take a consent, and N-MARS and stuff with me, so I do a lot of that organising at home as well. So, I suppose I do quite a bit time-wise out of pocket." (Pharm17)

"I think sometimes I've been a bit flexible with my IPAC hours and my [clinic] hours. I think I have been using the logbook sometimes on my non-IPAC days … so there's a bit of flexibility there." (Pharm21)

Data entry experience

After some initial confusion, many of the pharmacists reported that they found the logbook and data entry quite straightforward once they were familiar with it, and a useful way to reflect on what they had done that day:

> *"Very straightforward and so simple. You just you answered the question that guides you to the next one to from you answer. Yeah I find I find it so easy."* (Pharm05)

> *"Just a little bit of getting used to it, then once you know you've done it a few times it's fine."* (Pharm09)

> *"I think that the logbook has been good in that it makes me try to do it before I leave the clinic at the end of the day even if that means I'm still sitting here later than I should be because once I walk out that day, it's very hard to remember, that particular thing is it's going to be a couple of days before I'm back in the clinic at best. So, I really try and get that data entry in, but it makes me reflect on what I actually did during the day which is probably a good thing."* (Pharm01)

> *"I had only one minor issue with data entry which was resolved within several hours, I found the logbook user friendly and I suppose time consuming, but I can't think of a faster way to enter the essential data."* (Pharm15)

The main issues quite a lot of the pharmacists found with the logbook however, was it was often a time-consuming task. A few also commented that they felt it took time away from more useful work they could have been doing instead:

> *"The logbook I think has been quite laborious and has perhaps sometimes taken away from time that I could have spent you know being more useful in the clinic."* (Pharm10)

> *"I think it takes a lot of time compared to when you when I could be doing actual work."* (Pharm19)

> *"It takes a bit longer than I was expecting. I think the biggest issue is the fact that I'm not in a room all the time so I don't, although when I come in I log in on my computer but I'm in a shared area and I only have a clinic room sometimes, and when I'm in a clinic room it's a different clinic room each time so I don't always even have it open… I'm sure I forget things, so I apologise for that. I'm sure there's data and things I've done that I haven't recorded… And when I look at the log book I'm like oh I wonder if you just think I'm not doing anything all day, when I've been really busy doing stuff, but some things I'm not sure where to put. Some things I'm not sure if I can actually log appropriately even though I'm busy doing project work."* (Pharm01)

> *"It's just a bit tedious, you have to be super organised. I do cross reference because I have an excel list of who I've signed up and what I've done with them. So, I just every now and then check like 'have I actually entered that into the logbook' and just the ambiguous things like medication information and the pharmacy liaison. I mean I could talk to the pharmacy five times one day and then remembering 'have I spoken with them and have I put it in the logbook?' Yeah, it's just time consuming but it's not hard."* (Pharm03)

Quite a few IPAC pharmacists also reported a lack of clarity about where or how to enter certain information, including if they were completing the logbook before having the opportunity to follow up on recommendations they had made and actions that had been taken as a result:

> *"So, I think when [PSA Project Coordinator] came around it was useful because she had ways of entering more stuff on the logbook that I kind of didn't really enter because I didn't know where to enter it."* (Pharm06)

"Most of the time but there are some questions that were confusing like… 'Did you have any recommendations?' Yes, I have recommendations. 'Did you speak to prescriber?' Sometimes I didn't. I recorded it before speaking to the prescriber. So, this part the answer was a bit funny but other than that it was ok." (Pharm08)

"Some of the other areas that are part of the core roles like the preventative health I've found, while I discuss it every time I'm having a consult with a patient, it feels like there isn't a spot to necessarily put that in the logbook as a separate entity… Whilst I'm doing it because I am talking to everyone about their diet, exercise, smoking, alcohol, all the rest of that on a one-on-one basis. I'm not sure how that meshes up with the logbook like whether that represents anything in the log book." (Pharm10)

A couple of pharmacists also commented about the potential for inconsistencies in the way things may have been entered and recorded by different users:

"I feel like you're going to find there's going to be some differences in a recording attached to personnel… Maybe they could have they could have probably tried to just make it more obvious what goes where in the workbook. And also, we have got conflicting advice sometimes over things in the in the [logbook] and it seems like it's morphed a bit over time… Just having that consistency across the users probably would be my main comment." (Pharm20)

One IPAC pharmacist reported issues with tracking patients where data was documented in two different logbooks due to a job share role.

For several IPAC pharmacists finding space in the clinic and access to the computers, particularly if they were working at remote sites away from the main clinic, was also a challenge with regard to the logbook and data entry.

"I had no office. I had the team. I got myself a couple of boxes. The [photocopy] paper boxes that I kept my paperwork in, and I just shuttled that round the tea room in which there were two computers at one end. Those computers had to be shared with one or two of the nurses as well, these two computers. Because I was trying to put stuff into the JCU log book I was trying to use one of their computers and on a table away, I had to then set my laptop up which was where they tried to sit to have a cup of tea. There was no other space so I just did the best I could." (Pharm22)

"It becomes quite tricky when we're doing other things with patients and running around in here and liaising with staff. So that's been the tricky bit trying to get it all into the computer system. I mean we tried to get remote access to Communicare, but we weren't successful." (Pharm14)

Support from Affiliates

Most of the pharmacists had not had any contact with their respective State or Territory NACCHO Affiliate. Only a handful of IPAC pharmacists had had direct contact or received support from their Affiliate and it was quite minimal when it did occur:

"He was good, he rang, and we talked about things. He was going to come up in a couple of weeks but it's not going [to happen] now. I think he's just going to do phone support. I feel like I've got a heap of support between everybody between [PSA Project Coordinators] and [NACCHO Project Coordinator] and [Affiliate Representative]. I think that it's heaps of people there that I can call on." (Pharm18)

"Yeah [person's name]'s been in contact a couple of times checking you know making sure thing is going okay." (Pharm04)

"I don't know that I had a lot to do with them. I know they had the [Affiliate] support person come on board at some point. I think for me personally I've sort of felt that I'm so time [constrained] doing everything else that I didn't actually really have time to liaise with someone else. I wasn't sort of clear what they would be able to offer me anyway. Because they are not in-person out here anyway, they're I think [State capital city] based. So, I didn't actually end up catching up or liaising with the [Affiliate] person. I know that he did try to email me." (Pharm10)

Practice Outside Role

A number of the IPAC pharmacists also worked concurrently in a range of other jobs outside of their IPAC role, including shifts at the local community pharmacy or hospital on the days they weren't working in the ACCHS, performing HMRs or RMMRs for other medical practices or nursing homes, and teaching positions.

"I have my own HMR business and I work at the hospital part time." (Pharm09)

"Depending on the week I do one or two [days] and one or two nights in the community pharmacy but I also do medication reviews in the nursing homes in the area as well." (Pharm12)

"I'm doing IPAC three days a week and I'm lecturing two days a week … They've kind of put me in charge of the QUMAX program as well." (Pharm13)

"I spend my other three days a week teaching their colleagues medical updates, I think that all gives me a bit of credibility that I'm not sure if everyone else just walking into an AMS as a pharmacist would have off the bat." (Pharm01)

"I'm at the [town] Hospital, so I live in [town] and I am commuting out here." (Pharm16)

"Four days' full time in community pharmacy outside the IPAC role. Sometimes I do the [remote area] visits. Monday to Friday and some Saturdays as well. But then obviously Friday is my IPAC day." (Pharm07)

3.1.13 Future Recommendations

A role for non-dispensing pharmacists

All of the IPAC pharmacists answered unanimously, and definitively, that they feel there is role for non-dispensing pharmacists in ACCHSs.

"Yeah absolutely, I think it's quite a useful role. I think the more that the teams get to realise the support service that you can provide them more they start to utilise it." (Pharm01)

"There's definitely a role. It is very exciting. I'm very happy to be a part of it." (Pharm06)

"Yeah I think there really is. It's just a matter of how it gets funded. That's all." (Pharm12)

"Absolutely. Yes. All GP clinics should have them. Absolutely, and community health services." (Pharm13)

"I absolutely think this role is worthwhile in the ACCHS setting." (Pharm15)

A number of the pharmacists reported receiving a lot of positive feedback from both staff and patients about their presence within the clinic and the benefits their role has provided and expressed concerns about who will fill the gap they will leave when the project finishes.

"It scares me to think… It hasn't scared patients but there's a lot of them have gone 'what do you mean November!?' Because you know [GPs have said] 'here you can deal with that'. What happens after November, like who is going to do it?" (Pharm02)

"We've been so beneficial there already. I think they would miss us there. And there's no one else going to go in and do that role. I think we've seen the benefits; people have told us the benefits. We pick up interventions that would have been missed if we weren't there. And that happens all the time. There's a real benefit to that role. So, if it continues then yes [I would stay in the role]. If it doesn't continue, I think we would still probably do something anyway just to keep that service up." (Pharm07)

"Oh absolutely. I hope there's some funding to make it worth the while so even if we go back to volunteering half a morning a week then at least [the] patients will know we go in on this day and you can get someone to help you, and then that's fine. But I think if there's a way of finding funding to keep someone in there's certainly health benefits for the patients from my point of view hopefully the data says the same but just the voicing from the patients, the feelings you get and the comments you get from the doctors and the nurses is that you know people are learning more about the medicines or being able to ask someone who knows…. [there is] definitely a role." (Pharm11)

A couple of IPAC pharmacists highlighted just how well a non-dispensing pharmacist fits into the model of care of Aboriginal community control, and how culturally-safe and culturally-competent care is when pharmacy services are embedded within an ACCHS.

"Even what the patients were saying yesterday [during observation/site visit], like 'don't take this away from us!' We've got this this fabulous resource here now and I think I think it fits in really nicely with the whole ethos of community-controlled health care like having access … for patients to medicines information in a clinic that they're already coming to, that they're comfortable in, where you don't have issues around confidentiality like you might have in a community pharmacy. Obviously, you know I'd always say our community pharmacy colleagues do a great job but it's a different environment, they're busy, it's a shop, its people standing over your shoulder. People can come into the clinic room here and have a yarn and I think that's so important for people. Continuity of that sort of service and having it all being a bit of a one stop shop…You can see the GP, you can walk in, you can see me, I can then duck back and ask something we can get some bloods done by the AHP, it just makes much sense. So, I think it all fits in perfectly with the ethos really." (Pharm20)

"I think it's really valuable to support the clinicians, so they really appreciate our support and help … just to provide that service of culturally appropriate medication reviews because we're within the health service that are trusted. I think it's hopefully therefore more culturally competent than the community pharmacist going out and visiting them at home. So, I think it's just the whole being able to offer more of, the health service offers more of a holistic service." (Pharm21)

The reasons why the IPAC pharmacists felt a non-dispensing pharmacist role is needed in health services were similar. Many pointed out the clear and direct benefits to patients in having a member of the primary healthcare team with the unique knowledge and skills that pharmacists have, particularly in reducing medicines-related incidents, and having the time to provide essential education to patients around their medicines.

"When I was there, I could see how a pharmacist would be beneficial. Integrating a non-dispensing pharmacist … has knowledge that some other health workers or you know other staff members working in the clinic, they don't actually have [that knowledge]. And they can benefit the doctors in lots of ways that are currently not available. I see a big role for a non-dispensing pharmacist in GP clinics in general, and of course in Aboriginal health services in particular given there is more needed there." (Pharm05)

"We really need pharmacists working in the Aboriginal health service, especially in remote and rural areas. Because the medication management part is very essential there, and without it there is a lot of incidents happening. People get admitted a lot to the hospitals. We are … losing people because of this mismanagement." (Pharm08)

"Definitely. I am very happy with the work that I am doing. I'm happy with the progress that I've made so far, and I think that there's still heaps of work to be done. And I just think it's super awesome for pharmacists to be expanding their scope of practice into these kinds of roles. I think it's really good for patients because they're getting someone who is focused on medicines and knows about medicines in their health care team which hasn't happened before. I think it's good for the service to make sure that they are having quality use of medicines. I just think it's awesome." (Pharm19)

Opportunities to expand the role and become involved in additional areas that weren't covered in the 10 core roles of the IPAC pharmacists were also highlighted.

"There is a definite need for it and we're filling that need, and I can only see it growing and becoming more of a role … as we progress in time. Like I said, there's a lot of areas that I'd like to get more involved in, like the homeless hub, but time constraints and core roles sort of prevented [that] at this time." (Pharm17)

Skills required for the role

The vast majority of the pharmacists identified good communication skills were essential for working as a non-dispensing pharmacist in an ACCHS. Many of the pharmacists noted that to work effectively in the role one needs to be able to communicate and work well in a team, and be able to adopt different communication styles for different health professionals within the team, and for patients who may come from backgrounds with varied levels of health literacy, education and for those whom English may not be their first language.

"To be honest I think your clinical skills are very, very important no question. But I think that your communication skills are far and away more important. The way you can explain things to people, the way you listen, your storytelling. I guess negotiation skills both with the clients and also with the doctors in terms of this is why I think this is important which can sometimes come a little left field for where they were coming from and being able to phrase it in a way that doesn't put anyone off but still gets the importance of your point across without creating any problems or making anyone feel like they've [in trouble] you have to be quite delicate when sometimes you're sitting in with someone questioning what they've done." (Pharm01)

"You have to be an understanding person and understanding in how to communicate with doctors and that that it's something's not going to happen at the drop of the hat and that it will take a fair bit of time and commitment to get something done… And I think you have to have good English and good understanding with clients as well and being able to communicate with people who sometimes can't read and write and haven't been to school." (Pharm04)

"Definitely communication and teamwork good clinical knowledge. I think that collaborative practice being able to work in a team is really important. And being respectful of other peoples' roles." (Pharm13)

"Great communication skills. Respect for the culture and where the patient [come from], respect for the client's life. I guess their socioeconomic background the literacy background and what other things are impacting on their health. Other than just the fact that they've got health problems, there's lots of other things that are priority in their life as well as a good knowledge of what medicines are around and how they work." (Pharm11)

A couple of pharmacists also pointed out specifically that listening is a crucial aspect of communication, and a particularly important skill to have when working in an ACCHS.

"I think as long as you, I think that the [local Aboriginal] population doesn't respond well to being talked at. So, they say [language] that's us, the white people, do too much talking and not enough listening. So, for me personally I've found you can tell when people are switching off. So, when you've spoken to them about one thing and they've started to look away you're like 'all right, how about we talk about this at the next [visit]'. The person probably needs to not go in with their own predetermined agenda and be there solely just to hear what the patient has to say. Probably don't need a pushy person; you need a person who has good listening skills but also that feels confident enough to have medicine related discussions with doctors." (Pharm10)

"You've got to be able to shut up a lot because that's been my hardest part is because you've got to have the gaps in the conversation. It's very different from if somebody is not talking to you. You just sit there for five minutes before someone comes out with something. I find that that's the bit I find hardest. I've got to stop myself a lot." (Pharm18)

Flexibility, adaptability, open-mindedness and willingness to learn about culture, and other social determinants of health, were also mentioned by several of the pharmacists.

"I also think cultural skills are very important. And that's like I said, I thought I was quite [aware], I've grown up around here and the kids have grown up around here. But since starting the project my eyes have opened even more in that area. So, culture a definite one." (Pharm17)

"I think you have to want to understand the culture. I think that, I don't know about other areas but up here culture's really vital. I think we could all do with a lot more knowledge on poverty and the impacts it has." (Pharm18)

Strong clinical skills and prior experience working as a pharmacist were also identified as important attributes.

"I think you have to have some sort of clinical background because, I think if you came straight out of uni with a degree in pharmacy, you'd be a bit lost. You have to have a holistic approach. It's not just about 'well, put these patients on a beta blocker, that's a heart medication' like you've got to have that clinical background and be able to relate it back. You've got to have a very good understanding of your conditions." (Pharm02)

"Probably the biggest is just experience as a pharmacist. I don't think you can throw in a newly registered person… I just think it's that experience to be honest. I [think] all the skills that you develop being pharmacists are important even the dispensing part of it, you have to understand how medicine is supplied." (Pharm03)

Many of pharmacists felt it was important to be accredited to conduct HMRs. Whilst a couple commented that even without being accredited, they still possessed valuable skills and knowledge, others observed the value for the clinic in being able to conduct HMRs and attract the additional income through Medicare.

"I think you need to be accredited in HMRs. There's a lot of knowledge that you need from that which is, I don't think I would have had before I did that training." (Pharm04)

"I mean I think being HMR accredited probably is pretty important. I know not everyone on the project is, but I feel like, A) it just means you're more comfortable with your clinical recommendations and B) it does help that the health service can bill for our work. I know it's not the be all and end all but until pharmacists have Medicare billable numbers it's the only one we got. And I think that that's just a nice extra thing for the health service to be able to do." (Pharm20)

"So not being a HMR accredited pharmacist I think has been probably one of the hardest parts for me… I think for me I probably would have felt more competent if I had already had the piece of paper. But I think over time I've realised you know that you can develop those skills in other ways. And while it has been probably a disadvantage to the clinic in that they haven't been able to claim those HMRs, certainly my clinical skills were still adequate for the job." (Pharm10)

"Not being HMR accredited is a disadvantage for me at the moment…but I think once I am HMR accredited it would be a real asset to the service to offer both in-clinic and just HMR-affiliated reviews." (Pharm16)

Suggested changes to the role

Several pharmacists could not identify any specific changes they felt needed to be made to the IPAC pharmacist role for future non-dispensing pharmacists in ACCHSs. A couple of the pharmacists explained they felt the ten core roles of the IPAC pharmacist were quite broad and did not limit them in any activities they performed within the service.

"I think anything you do can be tied in to those ten core roles. And at the end of the day I don't think those ten core roles limit me doing anything here, because I did whatever was needed to be done." (Pharm12)

"I think over time [the role] will develop. It'll change over time to what it needs to be. And it's probably different in every health centre as well." (Pharm07)

"You know I think that's pretty encompassing. I mean there's a few times, as I said, that I've probably stepped outside of [the ten core roles], but I think they're general enough that I think it is pretty reasonable. And my understanding is that the different clinics are able to utilize those services in different ways in the way that's going to work best with the way that that clinic currently runs their staffing etc. So, no I don't think so." (Pharm01)

Expanding the role to focus on quality use of medicines for other patients in the clinics, rather than solely focusing on those with chronic diseases, was mentioned by a number of pharmacists.

"Definitely we would do a review on every patient. But how repetitive that is or how much follow up and all that sort of stuff, it's not that I don't want to follow up, but you know I have to see the patient again for the trial to be worthwhile, whereas yet I could be focussing on more patients." (Pharm03)

"I think it's probably really individual depending on what the clinic needs are but ultimately it would be nice for it to be so embedded in the practice that it is second nature for everyone to just send everyone on to the pharmacist after they finish with them. If they're not acutely unwell it would be nice for the role to evolve into that and I think we've made steps towards making that happen." (Pharm10)

"I wouldn't have it just specifically for chronic disease management. I think it should be quality use of medicines, anything related to medicine." (Pharm13)

"We can expand. There's more that we can do but there's only so many hours in the day. There are just endless possibilities really. I think you can get involved in the families as well. But you know we haven't even touched that side of it, it has pretty much been all chronic." (Pharm17)

One pharmacist suggested in future the role could include greater involvement in systems and organisational-level work, particularly in terms of policy and procedures.

"More organisational… They have started approaching [name of other IPAC Pharmacist] and I to do more policy and procedure type work to help with them re accreditation. We're happy to extend

that…. more organisational, setting up systems and to be able to improve team-based collaborations." (Pharm14)

There were a couple of pharmacists who offered different opinions regarding whether there was a need, or benefit, for the pharmacist to also do some dispensing in the ACCHS. One pharmacist commented *"I think staying away from dispensing and supply of medicines in our role is a good thing. A couple of times, the doctors have said 'do you have a code for the pharmacy?' No, I don't. And I actually don't want it because then you spend a lot of time doing admin documentation work that a nurse can do quite well here in the clinic. And you're not using your medication knowledge to benefit a client because you're busy doing ordering or something so I think if it stays as a non-dispensing, non-administering type of role, then it's wonderful."* (Pharm11)

However, one pharmacist felt having some dispensing rights might help strengthen relationships with patients, "*I would say the dispensing part might help in some areas… Sometimes it might be useful for the pharmacist there to dispense medications, if they can, because that might increase the relationship between the pharmacist and the client.*" (Pharm08)

Days of the week actually required

The number of days per week the IPAC pharmacists felt were required for the role varied considerably depending on the size of the ACCHS. The number of days the GPs were present at the health service was also a factor. Some pharmacists suggested splitting days to be available for busy time-periods in the clinic and for meetings, when the GPs were working, and to be able to potentially capture more patients.

> *"Well to be honest I've been thinking about this because I've had a few quiet weeks [when] I haven't had an awful lot to do. Because their client base isn't as big as I thought it was, I'm not sure we really need 2 full days for [the role]. Possibly one day, but possibly have [the role] on different days because if you did the same day you catch the same people all the time."* (Pharm06)

> *"Well probably two days at this particular service. A bigger [service] would probably benefit more from a full-time pharmacist. If there is a possibility for a rotating pharmacist for example this one and other ones close by. Then maybe one or two days here, one or two days there if [it is] a drivable distance."* (Pharm05)

> *"Rather than doing two full days it would probably make more sense to do three or four half days but mainly because there's always GPs here in the morning and usually two of them, whereas in the afternoon it quietens off… I have one bloke I've been chasing for six months now and either he decides he is not coming on the days when I am here, or the days I am here he won't come in anyway. The size of the clinic [is important], in all reality and if I started again and you said what do reckon I should do, I'd have said two mornings, I would have said two mornings or something like that, that would have been about perfect."* (Pharm12)

> *"Days per week would depend on the site and GP coverage. I would think that every weekday for at least a few hours on site then [undertake] HMRs around that."* (Pharm15)

A couple of pharmacists suggested there may be differences in how many days they felt were required, compared to what the ACCHS wanted.

> *"If you ask the clinic, they'd want me here every day. I think there's pros and cons. The two days a week is great. If I was here more often, … I think that the doctors certainly would make more use of particularly drug information, the kind of quick questions and things like that… However, I think three days would probably be great. So, then there's only a day in between if follow up is needed."* (Pharm01)

Many pharmacists seemed to feel that it was a five day per week position, if not full-time, particularly given the challenges in following up with patients and the need to be available opportunistically.

> *"Some days I see lots of patients and some days I don't. So, I mean you could do it in three days. But I think being here for the five days, Indigenous health is very unpredictable. You can't set days so being full time really allows me to have a bigger scope."* (Pharm03)

> *"So, for me personally, I like the three days, but I think they could do with someone there five days because the patients just don't come in on those particular days or whatever and it's opportunistic. They want to grab me. And when you're trying to follow up with stuff and then you're not back again until the Wednesday that's hard. I would only want to do the three days, but I think they could benefit from having someone full time."* (Pharm13)

> *"It needs to be a full-time job. And I guess even though mine is three and a half days, I'm always accessible. I have probably worked more than three and a half days."* (Pharm23)

For one pharmacist working in a very remote community, despite its relatively small size, it was suggested that more time was required more frequently to be able to build relationships and effect change.

> *"I don't think that a day or two is enough. Maybe a week a month rather than two weeks every two months. The trouble is the expense of getting someone out there, for if they are not actually living in [name of town] would probably preclude that in reality… I would like to see more but I would I think that because it's so remote and has so many issues in the way the model works back to front from the normal model, you could probably have done with at least half as much time again to achieve no more than what was asked of us to achieve. Because the trick is to revisit and revisit until you can slowly get a bit of understanding coming, that basic understanding coming into what you're doing working with people."* (Pharm22)

Advice to others

The pharmacists were asked what advice they would give to someone who was considering taking on a role as a non-dispensing pharmacist in an ACCHS. The suggestions were quite broad. Being involved with the community outside the clinic was advice that was repeated by a few of the pharmacists, as well as participating in cultural training and developing relationships with the other members of staff, particularly the Aboriginal Health Workers.

> *"To be able to mingle with the community itself on different occasions, not just to stay inside the clinic."* (Pharm08)

> *"Meet your elders, understand who the key people are in your community and build a respect with your doctors and Aboriginal Health Workers."* (Pharm09)

> *"Do their cultural training, come and speak to health workers to get a feeling for what types of things they talk to the clients about and how to talk to clients."* (Pharm11)

> *"I would just say build the relationships with the staff because that is your foundation for making a difference and to try wherever possible to get out there and be involved in local community events or things because you that you've seen your face becomes recognised and accepted."* (Pharm10)

> *"Get out into the community. Get outside the clinic side of things and put away your biases."* (Pharm18)

Others advised being open to new experiences, be patient, and be flexible, and to make the most of the opportunity if it is presented.

"I suppose throw yourself in it and then be flexible and do whatever needs doing and you just get more out of it, working with everyone." (Pharm06)

"Be really open to new experiences and just be really empathetic. This is a different demographic of health. You just have to be really open sympathetic, empathetic and understanding." (Pharm03)

"Just do it. Well you know if you're qualified …I would tell anyone to do it. I would... if you want to make a difference in health … I'm so passionate about this, I could start crying. You know when you get to 90 and someone goes to you 'what have you done in your life?' I know that I can sit there and go, 'well I've definitely helped to close the bloody gap'." (Pharm02)

A couple suggested shadowing a pharmacist already in the position and attempting to obtain as much information beforehand as possible would be ideal steps to prepare for the role. It was also recommended to maintain contact with others working in similar roles, particularly if working remotely.

"I would say stay in contact with the other people in the same type of role. I would get in contact with some other remote pharmacies because they often have ideas that you haven't even thought of, or like they've got exactly same problem that you might have and don't really know how to deal with it. I think that's really important. Don't give up because your computer doesn't work for six weeks. It will eventually. It's just how it is. You have just got to work with what you got. That's about it, and they will appreciate you. People appreciate you so much." (Pharm07)

Preferences for the Future

All of the pharmacists who were asked if they would stay on if their role was continued within their health service stated that they would. Overwhelmingly, the most common reasoning for this amongst the pharmacists was the enjoyment they got out of the job and personal and professional satisfaction in the service they were providing.

"Because I mean it's not a job to me. …well I do come to work to pay the bills but also well if I wanted an easy job, I'd work in a community pharmacy 10 minutes from my home. You have to love what you do, and you have to feel like you make a difference. I feel here you can. There is a spot in Aboriginal health that is lacking. There is a huge medication management hole." (Pharm02)

"I love the job and I love the patient contact and I love solving problems and I love teaching." (Pharm23)

"I think it has made me a better pharmacist. I'm probably a much more understanding person than I was before. And it's just better job satisfaction than dispensing all day." (Pharm03)

"I can see the benefits of having a pharmacist there and I enjoy it. I enjoy, just having a bit more variety in my pharmacist role in a community setting. I can see the benefit for the patient, and I can see that the community have really embraced it. A lot more than I expected." (Pharm14)

"Oh. I'm loving it. I think it's one of the most satisfying [roles], I do love a lot of my jobs that I've been in, but this one I'm in no hurry to go back to doing what I was doing before.... I feel like I'm just starting, I'm not ready to go yet." (Pharm17)

3.1.14 Conclusion

Overall the pharmacists participating in the IPAC project were prepared for their roles and generally positive about their experiences. Participation in project induction and cultural training prepared them well prior to commencement in their local ACCHS. Local induction to the ACCHS and the local Aboriginal community was not provided to all pharmacists and this presented some challenges initially. Pharmacists did not have the opportunity to meet key contacts and were unfamiliar with the local facility and processes.

Many ACCHSs had not had a pharmacist role within their service prior to the project. Some IPAC pharmacists felt that their ACCHS was not ready for their role. . They felt that health service staff did not all understand or value their role.

The majority of pharmacists felt accepted and were able to integrate into the primary health care team by the time of their interview (six months' post commencement), although many were required to educate the staff on the value of their role and activities in which they could contribute. ACCHSs and staff supported the pharmacists through provision of consulting rooms, uniforms, promotion of the role and patient referrals.

The pharmacists felt they had been effective in their roles and described changes in their health services and positive impacts for patients and staff members. Pharmacists reported that patients were feeling better, their management of their conditions had improved, they were more adherent to their medications and their test results had improved, particularly HbA1cs. The IPAC pharmacists completed medication management reviews, provided medicines information to GPs and other staff, facilitated formal education and input into clinical meetings.

Different approaches were used in the recruitment of patients for the IPAC project in the different services. Posters helped raise awareness of the project and aided the pharmacists to be recognised as a member of the team. All pharmacists felt there was a role for a non-dispensing pharmacist within ACCHSs. The IPAC pharmacists were keen to continue in an IPAC-type role and reported personal and professional satisfaction in the holistic services they were providing.

3.2 GP Surveys

3.2.1 Demographics

Thirteen GPs commenced the online survey for the IPAC project, eight males and five females. The median age of participants was 41-50 years (n=4). Three GPs were aged 30 years or under, three were between 51 and 60 years, two were aged 61 years and over, and one was between the age of 31-40 years.

Ten of the GPs worked as clinical practitioners within their service, with three working in combined clinical and management roles. Eleven GPs identified they were working in five different ACCHS. Six of these GPs worked for the one ACCHS.

The length of time GPs had worked within their current ACCHS ranged between 6 months and 12 years, with an average of 3.7 years. GPs worked an average of 36.7 hours per week; with one outlier of 8 hours per week, the range was otherwise 34-50 hours per week. Eight of the thirteen GPs (61.5%) had worked in an ACCHS prior to their current employment, ranging from 6 weeks to 10 years with an average of 2.7 years' prior experience.

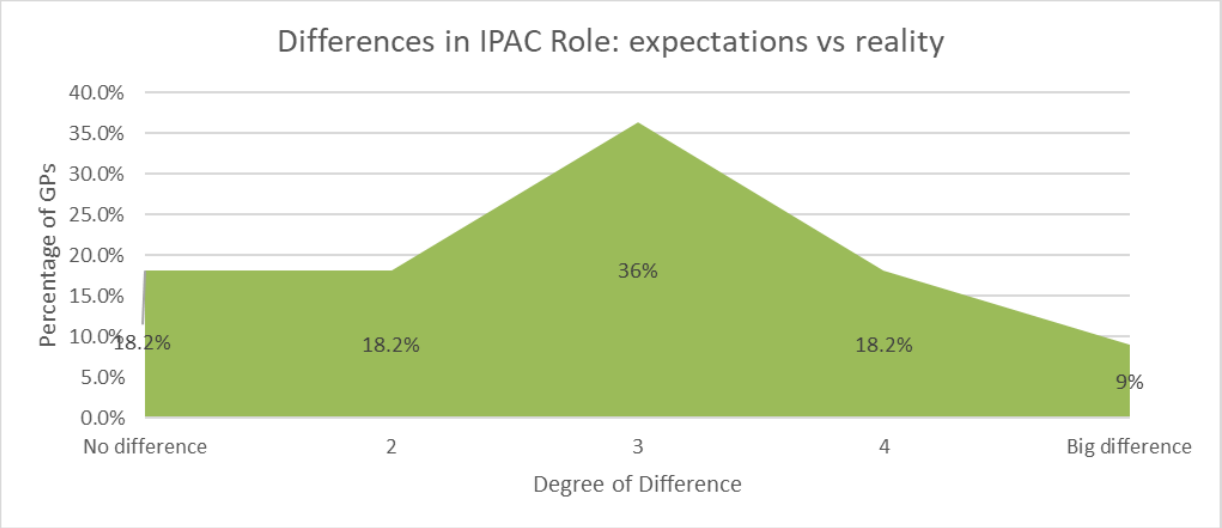
3.2.2 Clarity of Roles and Responsibilities

At commencement, GPs reported having an average understanding of the aims of the IPAC project, and the roles and expected activities of IPAC pharmacists. On a rating scale from 1 (not clear) to 5 (very clear), GPs rated their understanding at 2.9 in relation to their understanding of the IPAC project and its aims, and 3.8 in relation to the roles and activities of the IPAC pharmacists.

Just over half of the GPs responded that there was a moderate or large difference between what they expected the IPAC pharmacists' role would be, and what it actually was in practice (see Figure 2). The vast majority of the reasons for the differences in expectations described by the GPs were because the IPAC pharmacists' scopes of practice and their involvement in patient care had been far greater than what they had expected.

> *"I didn't realise it could be so adaptable to the needs of my patient cohort."*
>
> *"The pharmacist was actually more engaged with clients and took a very strong role in client care, much more than I expected, but very pleasing."*
>
> *"I had a limited understanding of what IPAC would entail but thought it would mainly be HMRs and medication education to patients which is what it largely is at our practice."*

Figure 2. Differences in GPs expectations the reality of the IPAC role.

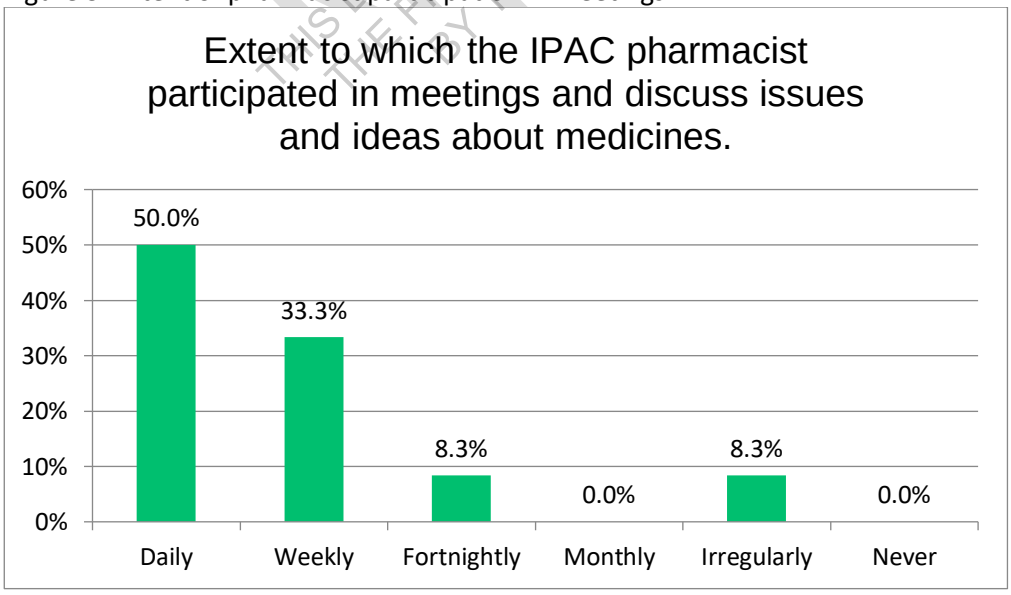


Clarity regarding the difference in roles between the IPAC pharmacists and GPs and nurses in the clinic was clear or very clear to the vast majority of survey respondents. The difference between the roles of the IPAC pharmacist and community pharmacists was also clear to the majority. Using a rating scale of 1 (not clear) to 5 (very clear), GPs rated their clarity about the difference between the role of the IPAC pharmacists' and that of the GPs and nurses an average of 3.8, and between community pharmacists as 3.4 (n=12).

Over half of participants identified 'champions' or leaders within their organisation who facilitated the pharmacists' integration into the primary health care team. The specific role of this individual varied between the different services, and included senior medical officers, clinic coordinators, health workers and even the diabetes educator, *"I observed that our pharmacist travelled with our experienced diabetes educator to communities initially, which I feel oriented her to remote work and living much more quickly"*.

The IPAC pharmacists were reported to be very much involved in meetings and discussions regarding issues and ideas relating to medications (see Figure 3). Fifty percent of the GPs reported this occurred on a daily basis, with a third of the GPs reported it occurring at least weekly.

Figure 3. Extent of pharmacist participation in meetings



The topics of meetings and discussions the IPAC pharmacists were involved in were broad and varied, and included medication safety, Continuing Quality Improvement (CQI) activities regarding compliance and

timely review of medications by staff, involvement in clinic staff meetings, client handovers and chronic disease case conferences, and communicating with stakeholders.

The most useful aspects of the IPAC pharmacists' role described by the twelve GPs covered similar themes in their responses and included counselling and education for patients about their medication use, timely access to the pharmacist's expert advice and knowledge about medications, and facilitating links with the community pharmacists. Comments included:

> *"The ability to access there and then when client was here. Their ability to look at a broad range of pharmacy issues with experience."*
>
> *"Excellent one on one with the client and client's family. Good discussions with GPs about medication combinations."*
>
> *"Ease of accessibility as a clinician. Great source of feedback and link to mediate with the local pharmacists. [IPAC pharmacist] has been a great advocate also for our patients in improving understanding, and access to correct medications, supports with our community pharmacies."*

Eight of the GPs also provided comments on barriers they identified that they felt had impacted upon the IPAC pharmacist's ability to fully implement their role. Whilst one pharmacist was described as a *"pocket dynamo who broke down any barriers with gusto"* and even *"carried dog food to feed savage dogs, so she could visit her patients at home"*. Other barriers identified included individual personality factors related to the GPs and pharmacists "*some GPs were a bit stand offish and maybe not willing to listen to a pharmacist", "[the pharmacist] did not integrate well into the clinic… seemed to work outside of scope of practice".* Lack of understanding of the pharmacists' role by other members of the clinic team and limited patient numbers were also identified as barriers.

Using a rating scale between 1 (not integrated into team) and 10 (fully integrated into team), the GPs rated the IPAC pharmacists' integration into the primary health care team at average of 8.3 out of 10 (n=12), with nine GPs giving a score of 9 or 10 (out of 10). One GP rate their pharmacists' integration at a one. Comments were not collected from GPs regarding degree of integration.

3.2.3 Relationships and Cultural Appropriateness

The effectiveness of the IPAC pharmacists' communication with patients was rated an average of 8.5 out of 10 (n=11) by the GPs based on their observations, with a score of 1 representing 'not effective' and 10 being 'very effective'. Similarly, using the same rating scale, the pharmacists received an average score of 8.8 out of 10 (n=11) for their ability to develop a rapport with patients. GPs also rated the cultural sensitivity of the pharmacists very highly with an average score of 9.3 out of 10 (n=9). Examples of positive communication and relationships between the pharmacist and their patients were provided:

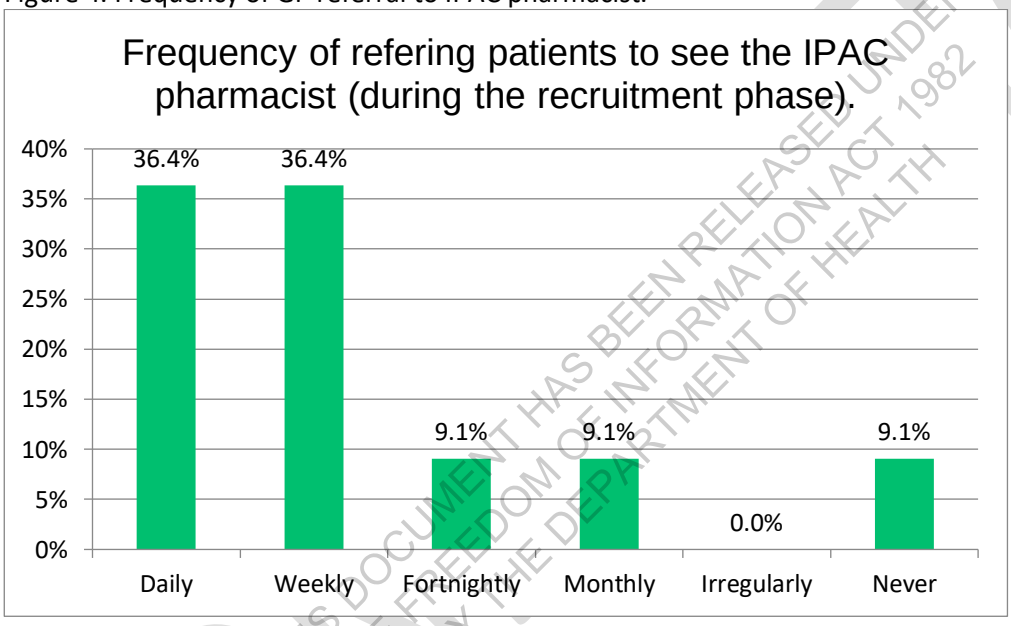
> *"There were many examples of disengaged clients who were identified through pharmacist-lead CQI activity as being at risk; the pharmacist proactively engaged with these clients with the guidance and assistance of a local health worker and facilitated their re-engagement with the clinic, thus providing improved follow up and safety for some quite complex medical issues."*
>
> *"Patients have reported on helpful and positive interactions with [IPAC pharmacist] during her time at [health service]. Becoming a fixed long term role within our clinic I envisage her ability to further nourish the trust patients place on her knowledge, reliability and her willingness to advocate for them. Patients have disclosed information on their medication compliance with [IPAC pharmacist] more readily than they have with myself. Only some of the fruitful examples of her role within our team."*
>
> *"Patients liked the pharmacist, they were enthusiastic about taking medication after speaking with her."*

The willingness of patients to see the pharmacist, and the acceptance of the pharmacists by the patients was also rated very highly, at 8.5 (n=11) and 9.3 (n=9) respectively. One GP observed *"[IPAC pharmacist] has participated in all [ACCHS] events, and all cultural celebrations, workshops with great interest and respect. Passionate about improving the health and understanding of all our staff and patients. In my observation, she has always been culturally sensitive in her approach to all patients. A great asset to our team"*. Another GP also commented *"This project has highlighted a key gap in primary care that community pharmacists don't provide. Integrating pharmacists into the ACCHS model helps address medication safety and complexity, CQI activities and provides a more holistic approach to health care by allowing timely and relevant access that is culturally safe and of course, independent."*

3.2.4 Patient Recruitment Processes

The process for referring patients for enrolment in the IPAC project was rated highly by the GPs, giving an average score of 9.3 out of 10 (n=10), with 7 GPs giving a rating of 10, reflecting that the process was 'very easy'. The vast majority of GPs reported referring patients to see the IPAC pharmacist, during the recruitment phase of the project, on a daily or weekly basis (n=10) (see Figure 4).

Figure 4. Frequency of GP referral to IPAC pharmacist.



Ten GPs indicated referral processes to the IPAC pharmacist worked well. The most common comment from GPs was the informal referral process to the pharmacist that most had adopted, worked successfully, including direct face-to-face discussion with the pharmacist in the clinic, sending emails, phoning the pharmacist or simple referral letters placed in the pharmacist's in-tray. The availability of the pharmacist to see the patients on the same day as the referral was also reported as enabling the referral process. Conversely, another GP commented that formal bookings with the pharmacist allowed the pharmacist to use their skills most productively. The ability for any clinical staff member, including nursing staff and health workers, to refer patients to the pharmacist was also a positive process, as well as allowing patients to self-refer, with one GP stating *"building upon existing internal pathways for HMR referral and strengthening and varying other means of access such as self-referral was a noticeable improvement for us".*

Readiness to refer and influencing factors

Just over half of the GPs reported that they referred all eligible patients for the project. However, there may have been some confusion around this question. GPs actually appeared to interpret the question as "what factors influenced you to refer to the pharmacist", rather than the GPs "readiness" to refer. For the remaining GPs who answered that they did not always refer eligible patients, the reasons they gave for this included their busy workload in clinics, not wanting to burden patients who were already seeing multiple different providers with additional appointments, and patients who despite meeting the eligibility criteria the GP felt

they would not gain much benefit from seeing the pharmacist due to their good health literacy levels and existing knowledge of their medications.

One GP reported that knowing the IPAC pharmacist position was time-limited was a factor that impacted negatively on the referral process, stating *"I am aware [the pharmacist's position] will only be to end of this year and so that impacts on our decision to refer or not. Out remote if we have a position for one year only, it never really gets traction. So why sign a whole lot of people up to that when then that role just disappears"*.

Comments regarding how the referral process for enrolment could have been improved included timing the pharmacist's arrival with community events to introduce and welcome the pharmacist to the community *"…I feel community being able to put a face to the name and role improves compliance with appointments"*. Ensuring the staff have a good understanding of the pharmacist's role and simplifying the participant information sheet so that it was easier for patients to understand were also noted as areas for improvement.

3.2.5 Consent Processes

Only one GP was aware of there being any patients who had refused to consent to be part of the project. Comments as to what GPs felt had worked well in relation to gaining consent from the patients included the use of the health worker during the consent process and explaining to patients why and how participation in the project could help improve outcomes.

The majority of GPs reported they had not personally consented any of the patients into the IPAC project, this task was mostly left up to the pharmacist. The GPs who provided comments on how the consent process could have been improved suggested the use of an electronic form with yes and no options, and simplifying the consent form for the patients by making it 'less wordy' and easier to understand, while others commented that the consent process was not clear to them, with one GP stating *"awareness of the consent process would have been good."*

3.2.6 Training on Recruitment and Consent Processes

Only three GPs out of 11 reported receiving briefing or training in relation to the IPAC project and the referral and consent processes for enrolling patients into the study. Two of those reported their training had come from the IPAC pharmacist, whilst the third could not recall who had provided their briefing. The effectiveness of this training was scored an average of 8.7 (n=3), with the scores ranging between 7 and 10, with 10 considered as 'very effective' and 1 as 'not effective'.

One GP commented *"I received written information about this project prior to completing this survey, it would have been good to get that information at the beginning of the trial, prior to this, all information I received was verbal and informal, I did not get any training."*

3.2.7 Patient Recruitment

Of eleven GPs who answered the question, two reported that they were aware of health service or system issues that impacted on patient recruitment. The issues described related to the practice software used (specifically Communicare), recruitment of new practitioners after the project had commenced who *"needed to be orientated to the project and the philosophy behind integrated pharmacists"*, and not having all members of staff aware of the pharmacists' role and the potential benefits to patients at the start of the project.

Only one GP reported that there were any local community issues impacting on recruitment, which they attributed to fluctuating numbers of people in the community at any one time due to different cultural commitments.

3.2.8 Working with the IPAC Pharmacist

Over half the GPs (54.6%, n=6) had daily contact with the IPAC pharmacist, with 27.3% (n=3) reporting weekly contact. One GP each reported fortnightly and monthly contact with the pharmacist. Opportunities *"to*

discuss individual patient therapies" and *"ask for information about medicines"* were work processes which had increased the most significantly after the IPAC pharmacist started in the health service; GPs reported a 'significant increase' in these two areas with rating of 4.7 each out of 5 where 1 indicating a 'significant decrease' and 5 represented a 'significant increase' (Table 1).

GPs reported there were no decreases in work processes, however three reported that *"Item 900 claims for a Home Medicines Review"* had remained the same.

Table 1. Extent of change in work processes for GPs following the commencement of the IPAC pharmacist.

Work processes	Average Rating	Total Responses (N)	Don't know or not applicable
Opportunity to discuss individual patient therapies	4.7	10	1
Availability of the IPAC pharmacist for a Home Medicines Review	4.6	10	1
Item 900 claims for a Home Medicines Review	4.0	7	4
Assistance with updating medication lists	4.6	10	1
Opportunity to ask for information about medicines	4.7	10	1
Follow up of medication supply with Community Pharmacy	4.5	10	1

Using a rating scale between 1 and 5 (1 being not at all effective, and 5 being very effective), the GPs rating the IPAC pharmacists' effectiveness in regard to their ten core roles of the project (see Table 2). Pharmacists' effectiveness in all roles was rated highly overall, with ratings ranging from 4.3 to 4.8. The two core roles which received the highest rating in terms of the pharmacists' effectiveness were *"Conducting medication reviews outside the home (non-HMRs)",* and *"providing patient education",* in which 10 of the 11 GPs who answered gave the pharmacist a rating of 'very effective'.

One GP remarked *"the pharmacist performed exceptionally in all regards"*. Another commented that *"Supporting transitional care impacted a little by access to medication charts post discharge from hospital"*, which might explain in part the lower overall rated average of that core role.

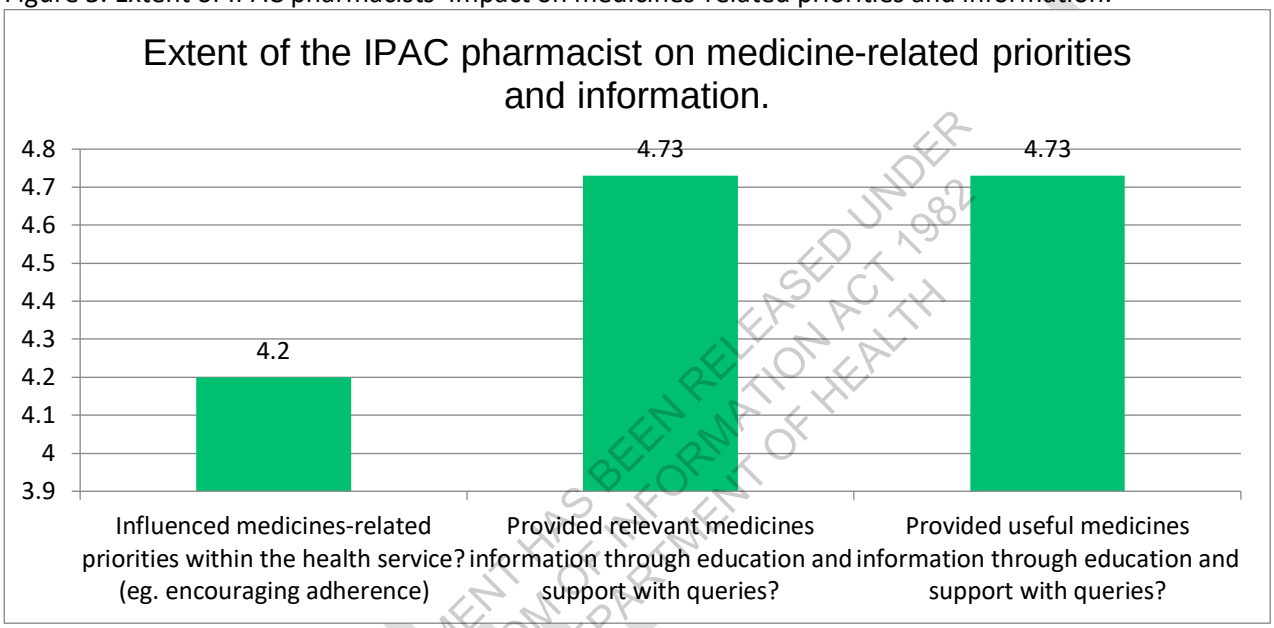
Table 2. GP rating of effectiveness of the IPAC pharmacist role around the ten core roles.

Role	Average Rating	Total Responses	Don't know or not applicable
Conducting Home Medicines Reviews	4.8	8	3
Conducting medication reviews outside the home (non-HMRs)	4.8	11	0
Reviewing the appropriateness of medications and assessing for prescribing omissions	4.7	11	0
Addressing medication adherence issues	4.4	10	0
Participating in team–based meetings/activities	4.6	11	0
Quality assurance with the use of medicines (undertaking drug reviews)	4.6	11	0
Providing patient education	4.8	11	0
Providing staff support and education	4.7	11	0
Further developing relationships with community pharmacists	4.5	10	1

Providing a medicines information service	4.6	11	0
Supporting transitional care (e.g. checking medication list after patient discharge form hospital)	4.3	11	0

GPs were asked the rate the pharmacist on the extent to which they influenced medicines-related priorities within the ACCHS, provided *relevant* medicines information through education and support, and provided *useful* medicines information through education and support, using a scale of 1 (not at all) to 5 (great extent). Overall the pharmacists were rated at 4.7 out of 5 for provision of relevant and useful medicines information (see Figure 5). Of the GPs, 81.8% of (n=9) reported the pharmacists provided relevant and useful medicines information to a 'great extent'.

Figure 5. Extent of IPAC pharmacists' impact on medicines-related priorities and information.



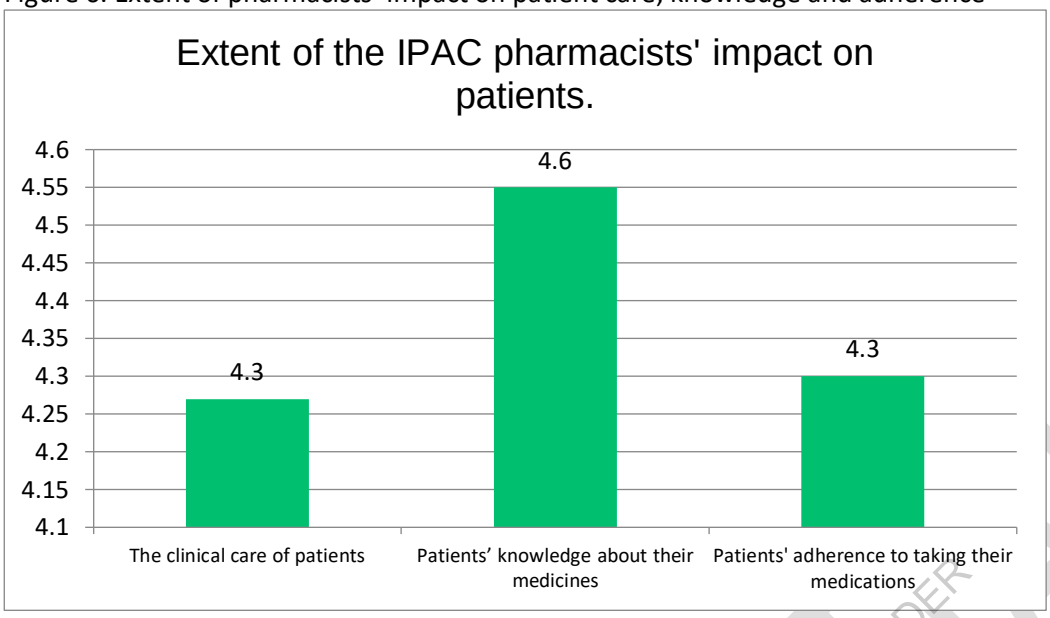
The GPs rated the impact the IPAC pharmacists had on the clinical care of patients, patients' knowledge about their medications, and patients' adherence to taking their medications, again using a scale from 1 (not at all) to 5 (great extent). Sixty-three percent of the respondents reported patients' knowledge about their medications had been impacted to a 'great extent' (average score of 4.6 out of 5). The impact on patients' adherence to their medications, and the overall impact of the pharmacists on the clinical care of patients was also rated highly, with average scores each of 4.3 (see Figure 6).

One GP commented *"review of medications has provided opportunities to reduce pill burden and improve understanding mostly for why their medications are required and hence adherence"*, and another stated *"I was quite astounded at how some patients seemed to want to stay in the clinic and spend time with [the pharmacist]"*.

In the interviews one GP commented:

> *"Incredibly effective. I think that [the pharmacist] has improved my medication knowledge. It's also improved, I think it has improved communication with the rest of the team. I think a lot of us have been in that situation like a lecture where the lecturer asks the question to everyone sitting there and it's just dead silence until someone starts talking and there's a conversation then all these other people pop up and start communicating as well. I think [IPAC pharmacist] has done that for our team as well. We talk more."* (Urban GP)

Figure 6. Extent of pharmacists' impact on patient care, knowledge and adherence



GPs were asked to describe the proportion of their time they felt had been saved by having the IPAC pharmacist assist with managing patients and their medications using a sliding scale from 0% to 100%. The average score given was 21% (n=8) with a wide range provided, between 3% and 41%. One outlier value of 90% was excluded from analysis.

3.2.9 Feedback on Medication Reviews

HMRs and non-HMRs

All GPs (100%, n=11) unanimously reported that the pharmacist had made suggestions regarding changes to patients' medications after undertaking a review, including reviews undertaken both within and outside the home. GPs reported that the IPAC pharmacists' communicated their suggestions using different methods including written reports (81.8%), notes recorded in the patient's records (72.7%), via direct discussion with the GP (90.9%) and/or via case conferences or team meetings (63.4%). The appropriateness of the pharmacists' recommendations was rated using a scale from 1 meaning 'not appropriate' to 10 meaning 'very appropriate'. The average score given to the appropriateness of recommendations was 8.5, with seven of the GPs allocating a score of 9 or 10.

GPs frequently acted on the pharmacists' recommendations. They rated how often they acted on recommendations from 1 (never), to 'always' (10), with an average score of 8.5 (n=10). The scores ranged between 7 and 9.

Eleven GPs identified the actions they took as a result of the recommendations made by the pharmacists (Table 3). The vast majority of GPs reported they would follow-up with the patient opportunistically at their next review (90.9%, n=10), and many also reported they would contact the recall the patient for an appointment (81.8%, n=9), and/or change/update the patient's medication list (81.8%, n=9). Another action identified by one GP was that they updated the community pharmacist. One GP commented that there was no formal HMR program within clinic.

Table 3. Actions taken by GPs following pharmacists' recommendations (n=11).

Actions taken	N (%)
I contacted and recalled patient for appointment	9 (81.8%)
I telephoned the patient to provide information	1 (9.1%)
I sent a letter to the patient to provide information	2 (18.2%)
I visited the patient in their home	1 (9.1%)
I arranged for another health professional to visit the patient at home	4 (36.4%)
I followed-up with the patient opportunistically (next time they presented)	10 (90.9%)
I changed/updated the patients medications list	9 (81.8%)

Assessments for Medication Appropriateness and Potential Omissions

Almost all the GPs responded that the IPAC pharmacist also made suggestions or recommendations as a result of undertaking an assessment of medication appropriateness, or potential omission of medications, with 90.9% (n=10) of respondents answering 'yes'. These ten GPs provided details on follow-up strategies. In 90% of cases the pharmacist would communicate the recommendations directly with the GP, 80% provided a written report, 70% left notes in the patient's record and 60% would communicate their recommendations in case conferences or team meetings.

The appropriateness of the pharmacists' recommendations relating to medication appropriateness and potential omission of medications were rated 8.8, on a scale from 1 (not appropriate) to 10 (very appropriate). Nine out of the 10 GPs (90%) who responded gave a score of 9 or 10. An average score of 8 was given in regard to how often the GPs acted on these recommendations by the IPAC pharmacist, using a scale of 1 (never) to 10 (always).

Overall the GPs felt the recommendations by the IPAC pharmacists were 'good', with one GP commenting *"recommendations were balanced, and evidence based with a thorough understanding of not only the pharmacological reasons behind the changes but a deep understanding of the individual patient factors that influenced their suggested changes."* Others commented on some contextual factors as to why recommendations were not always acted upon:

> *"Recommendations were valid and acted upon. Even if this was a review of client and discussing matters with them. It isn't always appropriate to change medications even though they may have beneficial effect."*

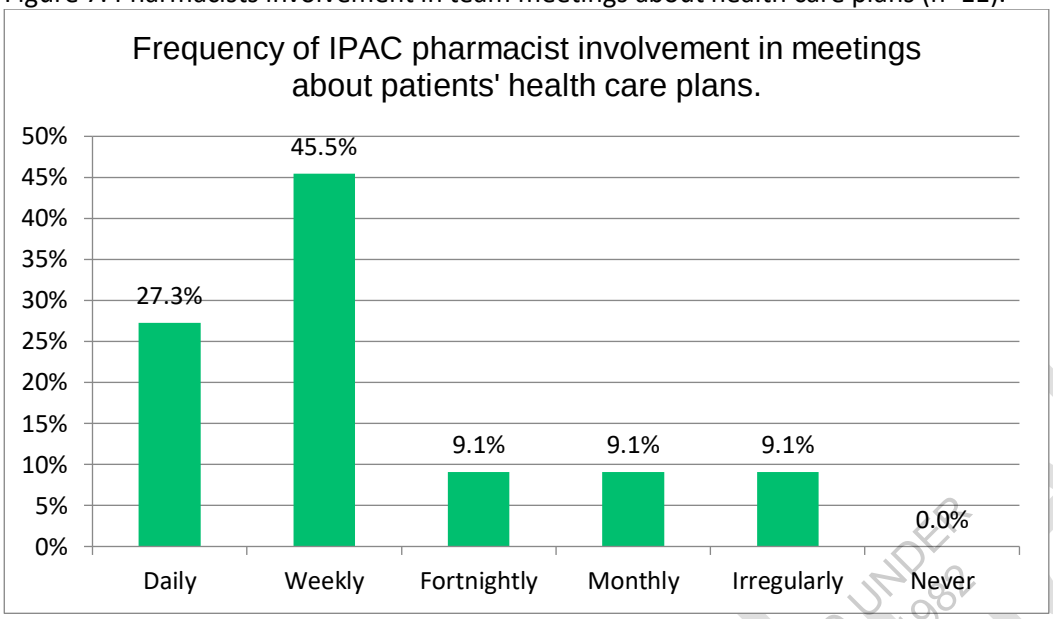
> *"The recommendations accorded with the evidence however they did not accord with contextual factors relating to the patient. For example, the pharmacist recommended review for a steroid inhaler for a very elderly gentleman who used salbutamol (badly) occasionally for when he felt short of breath. He did not really need the puffer that much and he was in his nineties. Changing medications would have been confusing and inappropriate."*

3.2.10 Collaboration

GPs rated the communication between themselves and the IPAC pharmacists at an average of 9, using a rating scale of 1 (not effective) to 10 (very effective) (n=11). Eight of 11 GPs (72.8%) reported the pharmacist was involved in team meetings to discuss patients' health care plans on either a daily or weekly bases (see Figure 7). One GP reported this occurred on a fortnightly and monthly basis respectively, and another reported that this occurred irregularly.

The input pharmacists provided at these meetings was rated very highly with an average score of 9.2 (n=10), with a score of 1 representing 'not valuable' and 10 'highly valuable'. Eight GPs provided a score of 9 or 10, and the remained two gave a score of 8.

Figure 7. Pharmacists involvement in team meetings about health care plans (n=11).

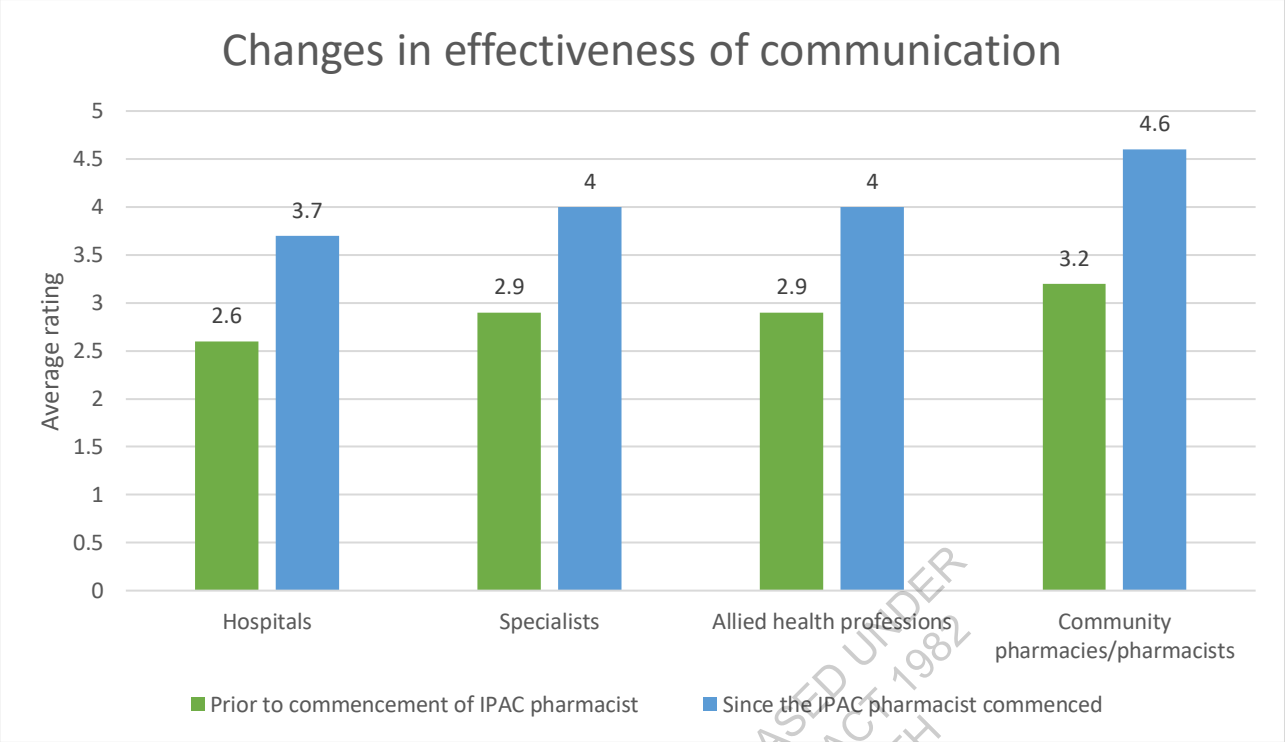


GPs were asked to rate the communication between their health service and hospitals, specialists, allied health professionals and community pharmacies/pharmacists respectively, both prior to and after the commencement of the IPAC pharmacist, using a scale between 1 (not effective) and 5 (very effective). Communication was shown to have improved with all 4 categories of stakeholders after the IPAC pharmacist commenced working in the health service (see Figure 8), with GPs reporting that communication had improved the most with the community pharmacists, scoring this an average of 3.2 prior and 4.6 after the IPAC pharmacist had commenced. GPs commented:

> *"The lines of communication markedly improved. More formal set up of who can be contacted within our service for medication changes. The community pharmacies all know whom to discuss concerns with if unable to contact relevant GP."*

> *"Improved communication between the state-based health services around medication challenges, not just tertiary hospital and outpatient based but also our local emergency department have improved and processes developed to streamline these information systems."*

Figure 8. Changes in effectiveness of communication with other health care providers rated by GPs (n=11).



3.2.11 Effectiveness of the IPAC Role

Ten GPs rated the extent to which they were able to fully utilise the IPAC pharmacists' skills and expertise on a scale of 1 (not utilised at all) to 10 (fully utilised). The average rating given was 8 out of 10, with a range from 6 to 9.

GPs reported a very high degree of confidence in the IPAC pharmacists' professional capabilities. Rating them on a scale of 1 (low confidence) to 10 (high confidence), the average rating was 9.1 (n=11). Eight GPs provided a score of 10 (out of 10). However, one GP rated their confidence in their pharmacist at a 3, resulting in a range of scores between 3 and 10. This GP stated:

> *"I had difficulty with the role. Initially one of my patients was told to come and see me so that I could prescribe some "supplements". I wasn't happy with this and had a chat with the pharmacist about not doing this. I thought I did this politely but the pharmacist did not appear to take it well and then stopped consulting me about patients. This then resulted in a patient becoming very unwell with acute renal failure. The pharmacist did not notice that the patient was becoming unwell. I realise this was outside her scope of care but her presence gave me the impression that the patient was being well reviewed. This turned out to be incorrect. I think if roles are more clearly defined this could have been avoided."*

Overall, the GPs rated the effectiveness of the IPAC pharmacist role at 8.6 out of 10, with a range from 4 to 10 (n=11) on a scale of 1 (not effective) to 10 (very effective). Eight of the GPs gave a score of 9 or 10. Comments from GPs included:

> *"I see this as an invaluable addition to our team that I would hope could extend into the future. There are tangible improvements to our service with their integration that would be sorely missed should this project not lead to ongoing funding. It is a recognition of the complexity of ACCHS-based care and the multitude of challenges medications in a remote setting provide. Having an integrated pharmacist as opposed to relying on hospital-based or community pharmacists means you are obtaining relevant and contextually nuanced advice for your patients, an advocate to communicate with those external pharmacists to expedite communication and improve accuracy of medication records, prescribing and dispensing."*

"Great concept, I'm very hopeful [health service] can retain the skills and support provided by [IPAC pharmacist]. She is an invaluable part of our clinical team and markedly improves the quality of care provided to our patients."

3.2.12 Project in General

Ten GPs rated overall how well they felt the IPAC project was implemented using a scale between 1 (not well at all) and 10 (very well). The average rating was 8.4, with a range between 4 and 10. Using the same scale, GPs rated how well the IPAC pharmacist role met the requirements of the ACCHS, with an average score of 9.6 (n=8). Aspects of the project that worked well included:

"To my mind all aspects have worked well."

"The presence of a readily accessible pharmacist has been invaluable."

"Pharmacist's ability to engage with patients."

"I did appreciate the evidence that was presented, and the review of medications however given that the pharmacist did not want to talk to me and went through the senior medical officer most of the time, I did not really get the full benefit of this."

Several GPs also provided comments on some of the challenges experienced in implementing the IPAC project:

"Late start to the program meant less time to experience the benefits overall."

"Getting staff to first understand the role and how to refer, also appreciate the benefit of a pharmacist on site for our patients and clinical staff."

"Remoteness, changing of all staff"

"Enrolling an adequate number of patients in the project."

The GPs were mostly unsure how much support their health service received from their State or Territory NACCHO Affiliate in relation to the implementation of the project, with 5 of the 9 GPs who answered responding 'not applicable or don't know'. The remainder of the GPs reported that a small amount of support was provided, with an average of 2.5 out of 5 on a scale from 1 (none at all) to 5 (a great deal).

GPs reported their service had also participated in other initiatives that may have impacted on the work of the IPAC pharmacist (60%, n=10). Four of these GPs indicated that their service had been involved with the Health Care Homes (HCH) initiative. However, one GP further stated *"Health Care Homes overlaps to some degree with community pharmacies. In saying that I feel the IPAC pharmacist has had a greater role in education of clients and staff. I do not believe the role has been diminished by the HCH model. To me they are a separate demographic at times".*

3.2.13 Future

All GPs but one answered that they would like the IPAC pharmacist role to continue in their ACCHS beyond the conclusion of the project, and also felt there is a role for an IPAC-type pharmacist within ACCHS in the future (90.9% n=10). The single GP who answered 'no' for both questions provided the following reason for their answers *"There was no trust developed between the clinical staff and the pharmacist. Having too many people involved in a patient's care can also be problematic. If roles were clearer and the pharmacist received more appropriate cultural training it might be really helpful"*.

The remaining comments were very positive. Comments provided by the GPs supported the IPAC pharmacist role in their health service and in ACCHSs in general, beyond the completion of the project:

> *"Hard to imagine this place without our IPAC pharmacist, it has been helpful for clinicians like myself and patients in equal measure and the whole clinical team really appreciates their work."*
>
> *"Provides a culturally safe place for access to experience of medications for staff and clients."*
>
> *"Very helpful resource to improve patient outcomes."*
>
> *"Important part of a fully integrated team. Great link between patients, clinicians and community teams also, in my opinion another important piece to improving the quality of care and minimising harm to our patients."*

The majority of the GPs felt that their health service required the professional services of an IPAC-type pharmacist on a full-time basis, with 7 out of 10 GPs stating it was required 5 days per week, with a range from 2 to 5 days per week.

Eight GPs responded that they did not believe there were any changes required to the IPAC role, and 3 others responded that changes to the role were required, providing comments that it needed to be *"expanded to cover a greater core of clients"* and should include help with pharmacy ordering for the clinic, whilst one remarked *"make it a permanent funded fixture, and create an MBS item for the work attended i.e. time based"*.

Whilst one GP in their final comments questioned *"I would be interested to know if you considered the potential negative impacts of this study before it was implemented"*, the remaining final comments were very positive:

> *"Really keen to see this role become a fixed part of the ACCHSs space. Scope of practice is wide and varied, and in the short time of the project yet to be fully utilised or appreciated. Thank you for allowing us to be a part of the project and for the benefit is has provided our community in such a short time frame."*
>
> *"It has been a great experience to see this role integrated into AMS functions. It has delivered positive results both which are able to be quantified by data and by the general vibe of clients and staff."*

3.2.14 Overall Findings

Overwhelmingly nearly all GPs who participated in the online survey supported the continuation of the IPAC pharmacist role in their health services beyond the project. Some GPs responded that there was a moderate or large difference between what they expected the IPAC pharmacists' role would be, and were pleasantly surprised that the IPAC pharmacists' scopes of practice and their involvement in patient care was far greater than what they had expected. The IPAC pharmacists had integrated well into the primary health care team and were involved in clinical meetings and staff education. GPs identified benefits for both patients and health service staff. The IPAC pharmacists saved the GPs time by responding quickly to medication queries and undertaking education with patients. They provided quality assessments of patients' medications through medication reviews and appropriateness audits. The uptake of recommendations from reviews was high. GPs reported patients' knowledge about their medications had improved as had adherence to their medications.

GPs referred eligible patients to see the IPAC pharmacists and commented that simple referral processes in their service worked well. Only a few GPs had received training about the project and referral processes. There was some reluctance to refer some patients who had good health literacy levels and existing knowledge of their medications or patients already busy with multiple appointments. Other challenges were the busy workload in clinics and knowing the IPAC pharmacist position was time-limited.

Communication with external agencies had improved since the commencement of the IPAC pharmacist, particularly with community pharmacists. The majority of GPs felt that there was a role for an IPAC-type pharmacist role in their health service and more broadly within ACCHS in the future.

3.3 Health Service Manager Surveys

3.3.1 Demographic Characteristics

Twelve managers (two males and ten females) completed the online survey. Just under half of the participants (n=5) were between 51 and 60 years of age, three were 31-40 years old, two were 41-50 years old, and one each were 30 years or younger, and aged over 61 years. Managers represented eight of the participating ACCHSs. Two respondents did not identify the health service in which they worked.

Three practice managers, two CEOs and two senior medical officers / clinical directors responded to the survey. The remainder of respondents held other managerial positions within the health services. Managers had spent varied lengths of time within the health service, ranging from 1 to 12 years, with an average of 4.5 years. Managers worked an average of 39.4 hours per week.

Over half of the managers (58.3%, n=7) had worked in another ACCHS previously. The length of experience working in ACCHSs previously ranged from 2 to 12 years with an average of 7.1 years.

3.3.2 Clarity of Roles and Relationships

At the commencement of the project, managers' reported having a good understanding of the aims of the IPAC project, and the roles and expected activities of IPAC pharmacists. On a rating scale from 1 (not clear) to 5 (very clear), managers rated their understanding at 4.0 in relation to their understanding of the IPAC project and its aims, and 3.6 regarding the roles and activities of the IPAC pharmacists. Only a few managers provided comments. One manager stated that there was, *"lots of potential for different areas of role depending on pharmacist strengths and interests."* However, another manager stated there was a "*lack of clarity around what the service is responsible for, and we don't manage the pharmacists so cannot have any say over the role and long hours etc."*

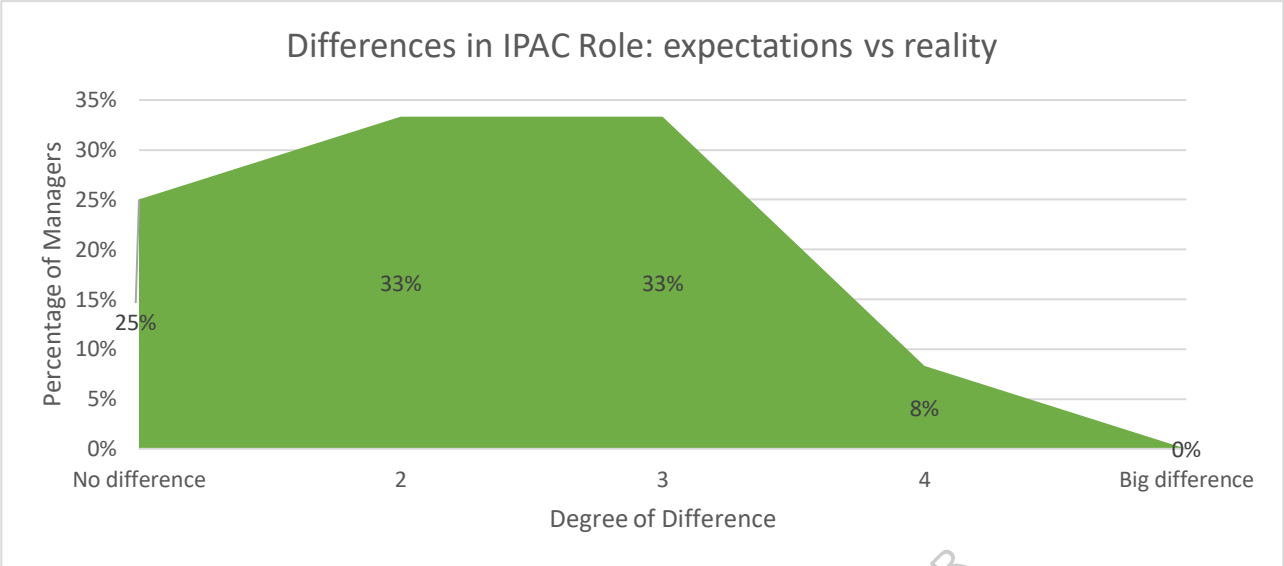
There were a range of changes and improvements that managers were hoping to achieve through participating in the IPAC project. The most common changes identified were education for staff and patients and improved patient outcomes. Other expected benefits for participation in the project included improved communication about medications and relationships with patients, improving compliance and access to medication reviews and improved quality use of medicines. One manager stated they were hoping to achieve, *"Improved medication prescribing, improved patient understanding, improved patient medication compliance, improved health outcomes. Ultimately hoping to prove that every ACCHS needs a resident pharmacist."*

From the interviews with managers, expectations of participating in the project were described as follows:

> *"It's about seeing whether it's sustainable to be able to have a pharmacist that's going to add value to our service and what the outcomes are with the patients to see if there is something that we could add in if it was possible or if funding's available."*
>
> *"The main reason was the opportunity for clients to understand their medicines better and to be supported in adherence which is a very complex area in any population. And of course, when you've got a lot of chronic complex illness, medicines sometimes seem like the only thing, so we were cautious in that, in that if we have, if we focused on pharmacists are we just saying take your pills and nothing else. And so … that's one question we asked really early about the role and were reassured that that was very much in the context of all the changes that people can make."*

The majority of managers reported that there was generally no difference in role of the IPAC pharmacists in reality to what was expected (see Figure 9). One manager stated differences had been positive and the IPAC pharmacist had *"achieved these things and more"* while another reported there was, *"much improved communications between community pharmacies and the service; far better knowledge transfer from pharmacists to staff; ongoing improvement in relationships with hospital pharmacists."*

Figure 9. Differences in expectations versus reality of the IPAC role perceived by health service managers.



Over half of the managers' (n=8) reported being clear or very clear on the roles of the IPAC pharmacist in comparison to the roles of GPs and nurses within the service. Managers were also clear on the IPAC role in comparison to that of community pharmacists. On a rating scale from 1 (not clear) to 5 (very clear), managers rated the clarity of roles highly at 4.0 in relation to both groups. One manager stated, *"interestingly the health workers really responded to the pharmacists, for a few reasons; one, they asked what health workers wanted to know, and two, they explained things really clearly and demonstrated (e.g. puffer technique). Skills transfer has been great."* However, initially a few managers reported some staff were not clear on the distinction between the roles:

> *"I think this role requires clarity especially for the nursing staff to understand the role and responsibility of the pharmacist."*
>
> *"Very little clarity at the start, and as stated before, we don't manage the pharmacist so difficult to make changes."*

Managers rated the communication of the pharmacist with them about their role on a rating scale from 1 (not clear) to 10 (very clear). The average was 8.6 with responses ranging from 6 to 10.

3.3.3 Integration in the Primary Health Care Team

The majority of managers (85%, n=8) reported that there was a champion or leader who facilitated the IPAC pharmacists' integration into the primary health care team. Three managers reported that other managers were the leaders and another three reported Aboriginal Health Workers or Practitioners were key in assisting the IPAC pharmacist integrate into the primary health care team. Another manager stated it was themselves, *"I ensured they were introduced to staff, got them added to our electronic record and did a business case to get them laptops, kept up regular troubleshooting/improvement meeting times. The clinic managers were also very supportive with flexible days of work and home visit support."*

Other support was provided by the health service to assist the IPAC pharmacist (see Table 4). All managers reported that a room or space was allocated for the IPAC pharmacist and that they were promoted in the ACCHSs newsletter or through social media. Only 60% of managers reported providing the pharmacist with an ACCHS uniform.

Table 4. Support provided by the health service (n=10).

Type of support	N (%)
Allocated a room or space	10 (100.0%)
Uniform provided	6 (60.0%)
Promoted in newsletter and/or other media	10 (100.0%)

Five managers outlined other strategies implemented to support the IPAC pharmacist. This was predominantly involvement in staff or clinic meetings, and allocation of staff to support their work. One manager stated, *"Health Workers were allocated to the pharmacist to conduct home visits. Staff was allocated to assist the pharmacist with recalls."*

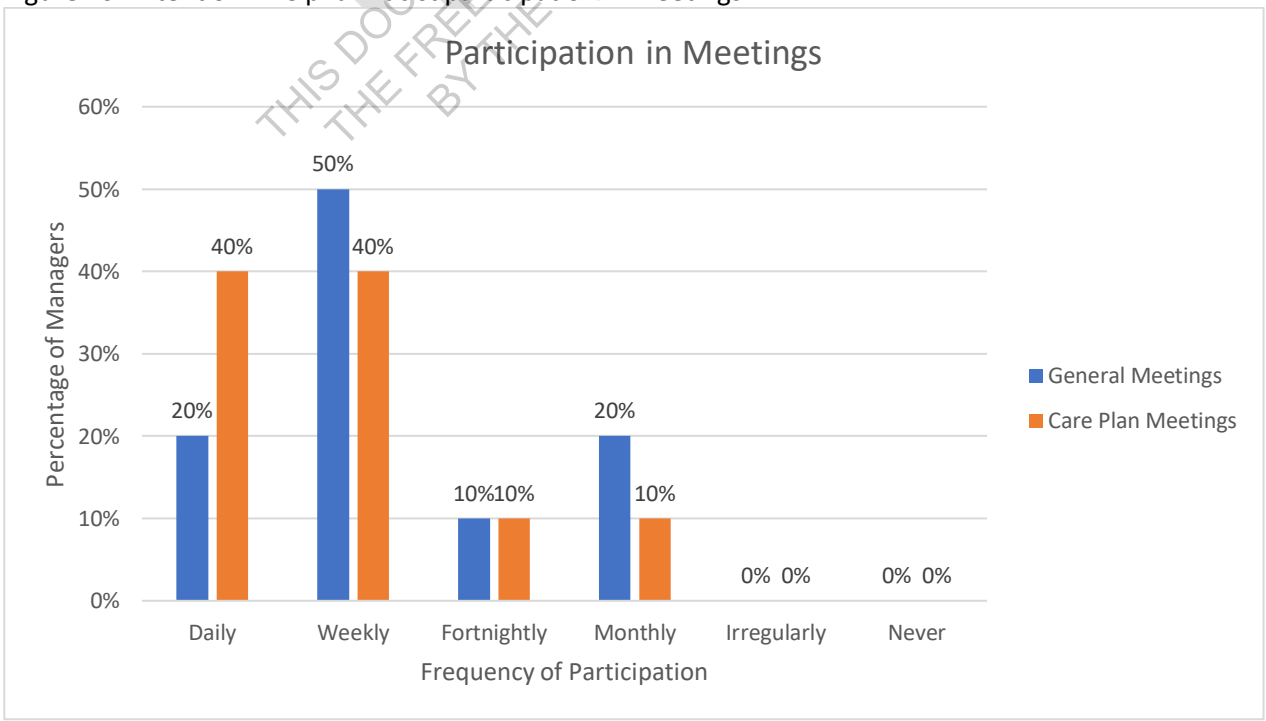
All respondents (100%, n=10) confirmed Aboriginal Health Practitioners or other staff members at their service supported the IPAC pharmacists. It was reported by one manager that, *"This worked well. The AHP was able to provide communication between the pharmacist and the clients to build a rapport with community people. The AHP was able to provide information and instructions in the local language."*

Managers reported the IPAC pharmacists were regularly involved in meetings (see Figure 10). At half of the services participation in meetings was weekly (50%, n=5) and at two services participation was daily. Topics covered in meetings included referral processes and staff education on *"Interactions of medications, proper use of inhalers and strategies to increase compliance"* and *"puffer technique, CTG, Webster Paks, QUMAX, they also asked what staff wanted to know about which was great."*

IPAC pharmacists were also involved in discussions with other health care team members to talk specifically about patient care plans and case conferencing. For 40% of services discussions about care plans or case conferencing happened daily (n=4) and for another 40% of services participation occurred weekly (40%, n=4).

The majority of managers felt the input provided by the IPAC pharmacists was valuable with an average rating of 9.2 out of 10 (1 being not valuable and 10 being very valuable). Responses ranged from 7 to 10.

Figure 10. Extent of IPAC pharmacist participation in meetings.



At the time of the survey (approx. six months after the IPAC pharmacists commenced), managers were overwhelmingly positive about having the IPAC pharmacist in their service and reported that their staff felt similarly. Comments included:

> "*So valuable and an important part of the team, it completes our health service team. It allows us to cover all areas of the services we provide to community as well as within the service and provided important information to staff about their client's they are working with."*
>
> *"It is an awesome start but eventually there needs to be a pharmacist attached to every ACCHS in Australia."*
>
> *"Overall a positive experience, it has been useful people having a good understanding of their medication, [IPAC pharmacist] is hard working and I think with some changes at the start of the project and if we had the ability to be more involved this would have helped the project run smoother in our region."*

Managers rated the IPAC pharmacists' communication with other staff members highly at 8.6 out of 10, where 10 was very effective. Managers identified that there had been workload changes for other staff since the IPAC pharmacist started.

On a rating scale from 1 (not integrated into team) to 10 (fully integrated into team), eight managers rated the IPAC pharmacists' integration into the primary health care team highly with an average of 8.9 out of 10 (n=8). Six of the eight managers rated the IPAC pharmacists' integration at a 9 or 10 (out of 10).

3.3.4 Beneficial Aspects and Challenges

Ten managers identified the most useful aspects of the IPAC pharmacist role were the provision of medication reviews (including HMRs), education for patients and staff, following up patients and improving compliance, improving relationships with stakeholders, and having access to a medicines expert. Comments from managers described the useful aspects of the role as:

> *"expertise in understanding pharmacy challenges, advocacy for community with local pharmacies, time devoted to community and follow up as needed."*
>
> *"Team based collaboration, how approachable the IPAC pharmacist was, the education sessions provided, medication management reviews."*
>
> *Assistance with explanations to patients about their medications and also their knowledge transfer to AHWs and AHPs."*

During the site visits one manager stated that the IPAC pharmacist had been instrumental in data recovery after an IT crash:

> *"I think when we had a few data issues at the start of the year she was like Jesus when it came trying to sort out the medications, current medications and that sort of stuff and helping out the GPs in that instance."*

Nine of the managers also identified challenges that impacted upon the IPAC pharmacists' role. While one manager stated, *"only our imaginations!!!"* other challenges included space, information technology, lack of cultural awareness training locally, pharmacist was not HMR accredited, recognizing the value the pharmacist could bring, pharmacists' expectations of the service and language issues. The workload associated with recording data for the evaluation and lack of clarity in relation to expectations of the project were also issues. Comments from the managers included:

"New concept, different for community to have a pharmacist interested in them when that engagement happens over the counter without privacy and/or with low health literacy."

"Lack of [pharmacists'] confidence when travelling distances to communities, not willing to drive herself. Increased paperwork and working extreme increased working hours that we don't have any management over for self-care. Lack of clarity at the start of the project meant we were unsure of who was responsible for what, meaning we were not 100% sure how the project would work. We were not involved in recruitment."

"Building rapport with clients and engage more with community such as not contacting clients directly instead send letters. Expecting the clinical staff and GPs to take clients to her when finished consultation instead of monitoring the appointment book."

3.3.5 Cultural appropriateness and relationships

Nearly all managers reported that a local cultural induction was available for the IPAC pharmacist (90%, n=9). Cultural induction was generally provided by service staff usually the cultural liaison officers or Aboriginal Health Practitioners. At a couple of services, the IPAC pharmacist visited a culturally significant area or group. One manager reported, *"[IPAC Pharmacist] had participated in the cultural day here at [the ACCHS] and went out with new workers on country and experienced the traditions and what happens with community."*

Ninety percent of managers also reported that a local cultural mentor or person was available to support the work of the IPAC pharmacist (n=9). They reported that this process worked very well and they were generally staff members. One manager noted, *"they always had access to health workers and Indigenous managers"* and another commented that it worked, *"very well - but it was really a team approach and the pharmacist was an open and receptive person who was instantly greatly liked by the staff and the community."*

Managers rated the cultural sensitivity of pharmacists at an average of 9.3 on a scale of 1 (not sensitive at all) to 10 (very sensitive) (n=9). Eight of the nine managers rated their pharmacist as a 9 or 10 on the scale. One manager commented, "[IPAC pharmacist] *works really well with community and staff to provide culturally appropriate care."*

Based on their observations, managers rated the IPAC pharmacists' communication and ability to develop rapport and trusting relationships highly at 9.1 and 8.8 respectively (see Table 5). However, they rated the willingness of patients to see the pharmacist lower at 7.4, and acceptance of the pharmacist by patients at 7.6. This indicates there was still some resistance from patients. Although the average rating for managers personally recommending others to see the pharmacist was 8.2. Results for this question had a larger range, with one manager not making recommendations very often with a rating of 3. Four managers reported making recommendations to others encouraging them to see the pharmacist very often with a rating of 10.

Table 5. Manager's observations of relationship building.

Criteria	Scale of 1 (lowest) to 10 (highest) measuring…	Average	Range	Number of respondents
Communication with patients	effectiveness	9.1	6-10	9
Developing rapport (trusting relationships) with patients	effectiveness	8.8	6-10	10
Willingness of patients to see the IPAC pharmacist	willingness	7.4	6-10	9
Acceptance of the IPAC pharmacist by patients	acceptance	7.6	6-10	8
Personally recommend patients, family or friends to see the IPAC pharmacist	frequency	8.2	3-10	9

Examples of positive communication or relationships were described by the health service managers. These are presented in Figure 11.

Figure 11. Examples of positive communication or relationships.

"One of our older doctors noted a wonderful outcome of our pharmacists liaising with hospital community pharmacy and us to get constantly changing discharge medications and communication for a patient with malignant hypertension correct"	"Patients were ringing to book with the IPAC pharmacist without needing recall and happy to engage on every visit."
	"The Pharmacist has been able to change some quite non-compliant patients to compliant patients with clear communication, rapport, and technical prowess."

3.3.6 Recruitment and Consent

On a rating scale from 1 (very difficult) to 10 (very easy), managers rated the referral and consent process just above average with a rating of 6.3. Responses ranged from 2 to 10. Managers reported that various roles were involved in both the recruitment and referring of patients, and also in obtaining formal consent, including signing the consent form (see Table 6).

Patients were referred by GPs at nine services, nurses at eight services, and at seven services by Aboriginal and/or Torres Strait Islander Health Practitioners. The IPAC pharmacist was also able to approach patients at seven services.

Table 6. Roles who were involved in recruiting or referring patients, or consenting patients (including signing the form) for the project (n=10).

Role *	Recruited or Referred N (%)	Consented N (%)
IPAC Pharmacist	7 (70%)	9 (90%)
Reception staff	2 (20%)	0 (0%)
GPs	9 (90%)	3 (30%)
Nurses	8 (80%)	5 (50%)
Aboriginal and/or Torres Strait Islander Health Practitioners	7 (70%)	5 (50%)
Liaison officers	0 (0%)	0 (0%)
Other ACCHS staff members	1 (10%)	0 (0%)
Specialists	2 (20%)	0 (0%)
Allied Health professionals (community-based)	2 (20%)	0 (0%)
Other (please specify)	0 (0%)	0 (0%)

* multiple options could be selected.

The managers reported that, *"Clients accepted the recommendations of the clinicians*" and another said the process that worked was, *"Referral from many sources, consent by pharmacist."* At another service the process was described, *"The pharmacists developed a referral info letter very early which not only educated people about the service but ensured they knew the process and what their own role was (looking at all meds including OTC [over the counter] ones)."*

Responses identifying areas for improvement in relation to referral or consent processes focused on the consent and the need for shorter, simplified consent processes. Feedback included *"less paperwork," "maybe shorter forms"* and *"it needs to be less wordy."* One manager also commented, *"seems [the IPAC pharmacist] was spending very extended hours doing paperwork and working far more than she was paid for, potentially the referral process was difficult for her to keep up with?"*

Some managers were aware that some patients were not referred for participation in the IPAC project (40%, n=4). The main reasons identified was that these patients did not come in to the health centre or that they had refused to see the pharmacist. Managers commented, *"these were clients who do not come in to the health centre."*

One manager interviewed during a site visit said that some patients are not particularly engaged and don't want to be, *"Yeah they come in, just want to come in, get their script and get out the door."*

Managers from only two sites reported that patients who had been referred for participation in the project then refused to consent. One manager noted*, "they refused; they pharmacists were able to put pop up notes in each eligible patients' notes (e.g. if on a lot of medications). Some patients felt this meant the service thought they were not up to managing their own meds; sometimes when the purpose was explained better, they then consented, but not all did."*

Three managers (30%) identified local service or systems issues within the ACCHS that impacted on patient recruitment for the IPAC project. Issues included participation in Health Care Homes, not utilising the quality assurance system until towards the end of the project (using PenCAT to assist identify patients) and challenges in completing the consent process in a busy clinic.

The majority of services did not report any local community issues that may have impacted on patient recruitment for the project (90%, n=9). The manager at one service identified *"sorry business"* as a local issue that impacted patient recruitment.

Seventy percent of the managers (n=7) reported receiving training around the recruitment and consent process. This was provided by the IPAC staff (from NACCHO or the PSA). Five managers rated the effectiveness of this training at an average of 8.4 out of 10 (10 being very effective). Responses ranges from 8 to 10.

Final comments were made by managers of five services on the recruitment and consent process noting the positive outcomes and areas for improvement. Positive comments included that the process was *'straight-forward'* and *"In the end I believe we obtained the right fit for this organisation." One area for improvement was suggested, "maybe an overall training process for all staff involved."*

3.3.7 Impact of having an IPAC pharmacist in the service

The majority of managers had weekly (40%, n=4) or daily (30%, n=3) contact with the IPAC pharmacist. Two managers reported contact monthly (20%) and one on a fortnightly basis (10%). Overall managers felt that there had been a significant increase in some work processes (see Table 7). Work processes that had increased most significantly were the *"opportunity to ask for information about medicines"* rated at an average of 4.9, and "assistance with updating medication lists" rated at 4.8, out of 5 (on a rating scale where 1 indicated decreased significantly, to 5 = increased significantly).

Table 7. Extent of change in work processes following the commencement of the IPAC pharmacist.

Work processes	Average Rating	Total Responses (N)	Don't know or not applicable
Opportunity to discuss individual patient therapies	4.6	10	0
Availability of the IPAC pharmacist for a Home Medicines Review	3.9	9	1
Item 900 claims for a Home Medicines Review	3.4	8	2
Assistance with updating medication lists	4.8	10	0
Opportunity to ask for information about medicines	4.9	10	0
Follow up of medication supply with Community Pharmacy	4.7	9	1

Managers rated the IPAC pharmacists' effectiveness around the ten core roles on a rating scale from 1 (not effective at all) to 5 (very effective) (see Table 8). The managers who responded rated the IPAC pharmacists' effectiveness highly in all roles with ratings from 4.2 to 4.9 out of 5. Aspects rating 4.9 included: reviewing the appropriateness of medications and assessing for prescribing omissions; addressing medication adherence issues; quality assurance with the use of medicines (undertaking drug reviews); and providing patient education.

Only a few comments were made which may explain the respondents selecting 'don't know or not applicable'. Comments included *'the limitation was that the HMRs could not be billed by GPs to the MBS"* and *"IPAC Pharmacist not yet a credentialed HMR Pharmacist."*

One manager stated, *"they were simply wonderful."*

Table 8. Effectiveness of the IPAC pharmacist role around the ten core roles

Role	Average Rating	Total Responses (N)	Don't know or not applicable
Conducting Home Medicines Reviews	4.3	7	2
Conducting medication reviews outside the home (non-HMRs)	4.2	9	1
Reviewing the appropriateness of medications and assessing for prescribing omissions	4.9	10	0
Addressing medication adherence issues	4.9	10	0
Participating in team–based meetings/activities	4.5	10	0
Quality assurance with the use of medicines (undertaking drug reviews)	4.9	9	1
Providing patient education	4.9	10	0
Providing staff support and education	4.6	10	0
Further developing relationships with community pharmacists	4.8	8	1
Providing a medicines information service	4.4	9	1
Supporting transitional care (e.g. checking medication list after patient discharge form hospital)	4.6	9	1

3.3.8 Influence in the Health Service

Managers rated the extent of influence the IPAC pharmacist had in particular areas within their health service on a scale of 1 (not at all) to 5 (great extent). All managers (100%) rated their pharmacists at a 4 or 5 out of 5 (see Table 9). The IPAC pharmacists influenced medicines-related priorities with the health service, communication processes between health staff, regarding patients' medication or treatment and positive clinical care outcomes for patients.

Table 9. Extent of influence the IPAC pharmacist had (n=10).

Area	Average Rating
Medicines-related priorities with the health service (e.g. encouraging adherence)	4.4
Positive clinical care outcomes for patients	4.4
Communication processes between health staff, regarding patients' medication or treatment	4.5

One manager commented *"a lot depends on the pharmacist and their willingness to get involved and active"* whilst another commented, *"they were quiet achievers in this area. Both had different strengths; for example, one had fantastic input into our quality use of medicines policy (with a nurse and a doctor this was completely overhauled) the other dealt with updating the templates they designed into Communicare."*

3.3.9 Influence with Patients

Managers also rated the extent of influence they thought the IPAC pharmacist had had in relation to their effect on patients on a scale of 1 (not at all) to 5 (great extent). Managers felt that the pharmacists had a great impact on patients' knowledge about their medication and also their adherence to taking their medications and gave a rating of 4.1 out of 5 (see Table 10). They also rated the patients' confidence to ask more questions about their medicines at 4.0 out of 5. One manager commented, *"the diabetic patient support group at [the] clinic invite the pharmacist regularly to speak to them; they call her the 'Medicine Woman' and are loud in her praises!"*

Table 10. Managers perceptions of patients' knowledge, adherence and confidence (n=10).

Area	Average rating
Knowledge about the role of an IPAC pharmacist	3.7
Knowledge about their medicines	4.1
Adherence to taking their medications	4.1
Confidence to ask more questions about their medicines	4.0

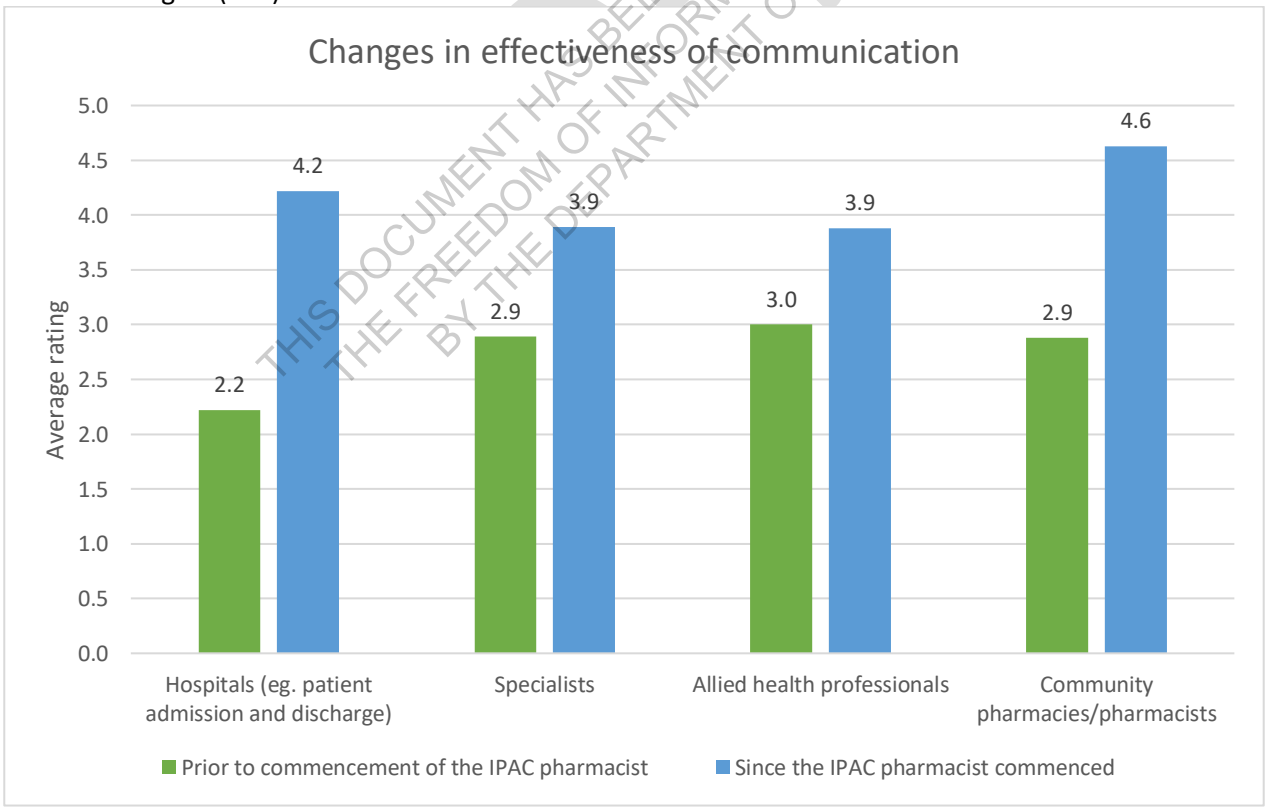
3.3.10 Collaboration with Key Health Care Stakeholders

Managers rated the effectiveness of collaboration with other health care agencies prior to, and following the commencement of the IPAC pharmacist on a rating scale from 1 (not effective at all) to 5 (very effective). Overall managers reported the effectiveness of communication had improved with all health care agencies since the IPAC pharmacist had commenced (see Figure 12).

One manager said, *"More structured channels of communication have been put into place"* and another stated, *"[The IPAC pharmacist] has helped to be the middle person and communicates with the pharmacy on our behalf when in the health centre."*

From the site visits one Registered Nurse stated, *"she's [the IPAC pharmacist] got a lot of connections all over the place. So it's really good. We struggle with the hospital…. She's got her connections."* This was validated by the Medical Director who stated, *"Yeah she is pretty handy with her hospital connections."*

Figure 12. Changes in the effectiveness of communication with other health care providers, rated by health service managers (n=9).



3.3.11 Resources

Managers rated the effectiveness of the IPAC project promotional resources on a scale of 1 (not effective) to 5 (very effective) (see Table 11). The posters were rated at 3.7 (n=9), the brochures at 3.6 (n=8) and the video clips at 4.0 (n=2). Whilst the perceived effectiveness of the video clips rated the highest, six of the managers were not able to comment on these. One manager stated that they, *"could have done more with*

video clips once TV in waiting room sorted. Social media perhaps easier sometimes." Another said that it, *"was great and pharmacists got recognised from their posters which was reassuring for patients. Also having a [health service] uniform was a great 'in'."*

When asked which resources worked best for patients, two managers noted the posters. However, it was noted by three managers that talking and face-to-face communication generally worked better due to low health literacy of patients. One manager commented, *"talking - many cannot read or write - and most people like to be engaged in a conversation."*

Similarly, six managers reported that patients had difficulty with the resources, in particular with the brochure, again due to low levels of literacy. One manager stated patients had difficulty with the *"brochures due to language barrier and the inability to read."* Another manager again stated, *"Resources can be lengthy so verbal communication seemed to work more effectively."*

Table 11. Effectiveness of the IPAC project resources

Resource	Average	Total Responses (N)	Don't know or not applicable
Posters	3.7	9	0
Brochures	3.6	8	1
Video clips	4.0	2	6

3.3.12 Implementation of the IPAC Project

Nine managers rated the extent to which the health service was able to fully utilise the IPAC pharmacists' skills and expertise on a scale of 1 (not utilised at all) to 10 (fully utilised). The average rating was 8.4 out of 10, with a range from 5 to 10.

Nine managers rated their confidence in the pharmacists' professional capabilities on a scale of 1 (low confidence) to 10 (high confidence). The average rating was 9.1 out of 10, with a range from 5 to 10.

Managers rated the overall effectiveness of the IPAC pharmacist role at 8.8 out of 10, with a range from 5 to 10 (n=9) on a scale of 1 (not effective) to 10 (very effective). One manager stated, *"having the pharmacist on site has made an impact on clients' medication knowledge and compliance. Communication slightly improved with local pharmacy and hospitals the lack of communication has always been an issue, doesn't reflect the role of the IPAC Pharmacist."*

Overall eight managers rated how well the project was able to be implemented at 8.5 out of 10, on a scale of 1 (not well at all) to 10 (very well). Responses ranged from 6 to 10. Managers rated how well the IPAC pharmacist role met the requirements of the health service at 8.7 out of 10 (n=9). The range of responses was 6 to 10. Feedback on aspects of the IPAC project that worked well included:

> *"All of it worked very well- even the board noted that HMRs were up and that the positive stories about the pharmacists' contribution had spread amongst them also (several had had one through the service!) Unexpected pluses were: the information stands they did at our NAIDOC celebrations, the popularity and skills they had with staff and patients for upskilling; the overhaul our imprest and meds management procedures got from them."*
>
> *"Having the same pharmacist on site for each visit. This allowed the clients to become familiar with the pharmacist and allowed the pharmacist to get to know the community."*
>
> *"Integration into the primary team and greater ACCHS team, especially in regard to clients with complex, chronic conditions."*

"The engagement and communication between clients and provider also the communication with the local pharmacy. [The IPAC pharmacist] worked really well in the area."

Nine of the managers identified challenges to implementing the project. Communication was the key barrier. Other barriers were IT, understanding of the role and the IPAC pharmacist not being HMR accredited. Comments regarding barriers included:

"Challenges with implementing the IPAC project was educating staff/clients on what exactly was the project and how it worked. Also how clients were to access services. Getting everyone on board with the process."

"The Pharmacist at our site not being eligible to bill the HMRs"

One manager made a comment about the recruitment of the pharmacist, *"we were not involved in the recruitment and have not had any management over [the IPAC pharmacist] which has posed some challenges for us."* However, one manager stated, *"get a new concept out there, just kept plodding away at it."*

In the interviews another a manager said they "*weren't involved in the recruitment process either"* and *"you can look at somebody's experience and qualifications and all of that kind of stuff. But the important thing you need to factor in … for AMSs is organizational fit."* (Director of Health Services)

3.3.13 Support for Project Implementation

Managers reported receiving some support from the NACCHO affiliates in the respective jurisdictions in relation to the project. The quantity of support was rated at 3.6 out of 5 on a scale from 1 (none at all) to 5 (a great deal). One manager stated that support was, *"effective regarding the project."* Another manager stated, *"There may have been some but I don't remember any? We have a good relationship with [State Affiliate] and they help us a lot but it was NACCHO that mostly we dealt with. Sophie was also helpful in commencing the project."*

The quantity of support received through the NACCHO support network was rated 3.8 out of 5 (n=9) on a scale from 1 (none at all) to 5 (a great deal). Several managers stated that support was *'great'* and *'quick'* and that it *"clarified the role of the program."* However, one manager found the support network *"of no use"* and another stated, *"only one visit. I have only been in the role for 6 months."*

3.3.14 Impact of Other Initiatives

Of the managers who responded to the online survey, two reported that their service was participating in the health care homes initiative (22.2%). They were unsure if there was any impact on the IPAC project. None of the managers identified any other initiatives that they were participating in that might have had an impact on the work of the IPAC pharmacist.

3.3.15 Future

Overwhelmingly the managers wanted the IPAC pharmacist role to continue in their health service beyond the project (100%, n=9). The IPAC pharmacists had become part of their local teams and benefits were received by both patients and staff. Comments from managers included:

"They are a valued part of our teams now and will be really missed by staff, patients, community and hospital pharmacies."

"As previously mentioned, has assisted the clients immensely with knowledge of their medication and reducing medication errors which has increased compliance."

"It would be good with some change in structure, but overall a very positive experience."

Similarly, the managers overwhelmingly also believed that there was a role for an IPAC-type pharmacist role more broadly within Aboriginal Community Controlled Health Services in the future (100%, n=9). One manager commented, *"It is vital to quality prescribing, information matching between services and hospitals/ community pharmacies/ aged care facilities and other sites. It is also a vital compliance enhancement tool and will ultimately improve the health outcomes of Aboriginal and Torres Strait Islander Australians."*

Five managers felt the role of the IPAC pharmacist, based on the 10 core roles, was acceptable. Three managers thought there needed to be changes made. One felt that HMR accreditation was necessary stating they *"require a credentialised HMR Pharmacist."* Another stated that they *"need to be allowed to do as many HMRs as the ACCHS needs done."* The cap is a limitation through the Australian Government Department of Health.[66] The third manager felt the role should include *"dispensing and the ability to do Webster Paks."*

Six of the nine managers indicated they would like to have the services of a non-dispensing pharmacist full time. A couple of services indicated fewer days. The current pharmacists' FTE in the project and size of the health service was not collected in this survey.

Eight managers provided their advice for other health services who were going to introduce an IPAC-type pharmacist role. They were generally very positive saying, *"don't hesitate," "do it, worthwhile"* and *"embrace it with open arms."* Another manager stated, *"I would encourage the role of pharmacist within health services as we provide so many wrap around services that a pharmacist would provide quality and safe care in regard to medications and education of patients."*

One manager responded from the perspective of participating in the IPAC project saying, *"ensure staff and community are fully aware of the project and the outcomes the service is trying to achieve. Explaining the benefits of the project." Another manager added, "put them on as direct staff members - caused some issues with EMR access and uniforms initially - both of which really helped to embed them in the roles."*

Another manager commenting in the interviews stated, *"I think it's about the person that you get in because I think that if you've got a young pharmacist who's never been out in the community, it would be very difficult for them and they would sit in their room. So I don't think you'd get the benefits from that. Whereas with [the IPAC pharmacist] who has been with us for quite a while and understands that it's about getting out and talking to people that you get the most work done."*

Final comments provided by the managers recognised that the IPAC project was exploring a new concept and supported the continuation of the role.

> *"It is a wonderful project and we really hope the roles continue."*
>
> *"We definitely need Pharmacists within our services to provide quality care to community."*
>
> *"This project is a "toe-in-the-water" initiative. It needs to become a fully-fledged deep dive and swim."*
>
> *"Thank you so much for the work at every level to get this project up and running."*

In the interviews managers were also highly supportive of the role and wanted to see it continue: *"I don't think an AMS can work without a pharmacist."* Another manager was also keen for the role to continue for two reasons *"One is that we think it is valuable… It's really interesting space. I really like the idea of the combine public health and clinical. I think that it's a really good mix particularly in terms of quality use of medicines with the GPs… very much about quality use of medicines and the client stuff and I think that it could, the position could be really nice mix of those two things. And so that's one reason. The other one we just haven't had it long enough to see what the potential is from a, from particularly from a client education and an adherence point of view."* (Clinical Director)

3.3.16 Overall Findings

Overwhelmingly health service managers supported the continuation of the IPAC pharmacist role in their ACCHSs beyond the project. The group also believed that there was a role for an IPAC-type pharmacist role more broadly within ACCHSs in the future.

The role resulted in benefits for both patients and health service staff. The IPAC pharmacists influenced medicines-related priorities with the health service, communication processes between health staff, regarding patients' medication or treatment and positive clinical care outcomes for patients. The most useful aspects of the IPAC pharmacist role were the provision of medication reviews (including HMRs), education for patients and staff, following up patients and improving compliance, improving relationships with stakeholders, and having access to a medicines expert. Managers felt that the pharmacists had a great impact on patients' knowledge about their medications and also facilitated patients' adherence to their medications. Managers reported the effectiveness of communication with all health care agencies had improved since the IPAC pharmacist had commenced.

Challenges were identified that impacted upon the IPAC pharmacists' role including space, information technology, lack of cultural awareness training locally, lack of HMR accreditation held by the pharmacist, staff not recognizing the value the pharmacist could bring, pharmacists' expectations of the service and language issues. The workload associated with recording data for the evaluation and lack of clarity in relation to expectations of the project were also issues. Managers rated the effectiveness of the IPAC project promotional resources as average. Conversations and word of mouth were suggested as more effective communication strategies as some patients had low literacy and English was not their first language.

Overall most managers felt the health service was able to fully utilise the IPAC pharmacists' skills and expertise and were confident in the pharmacists' professional capabilities. Managers rated the overall effectiveness of the IPAC pharmacist role highly.

3.4 Community Pharmacist Surveys

3.4.1 Demographics

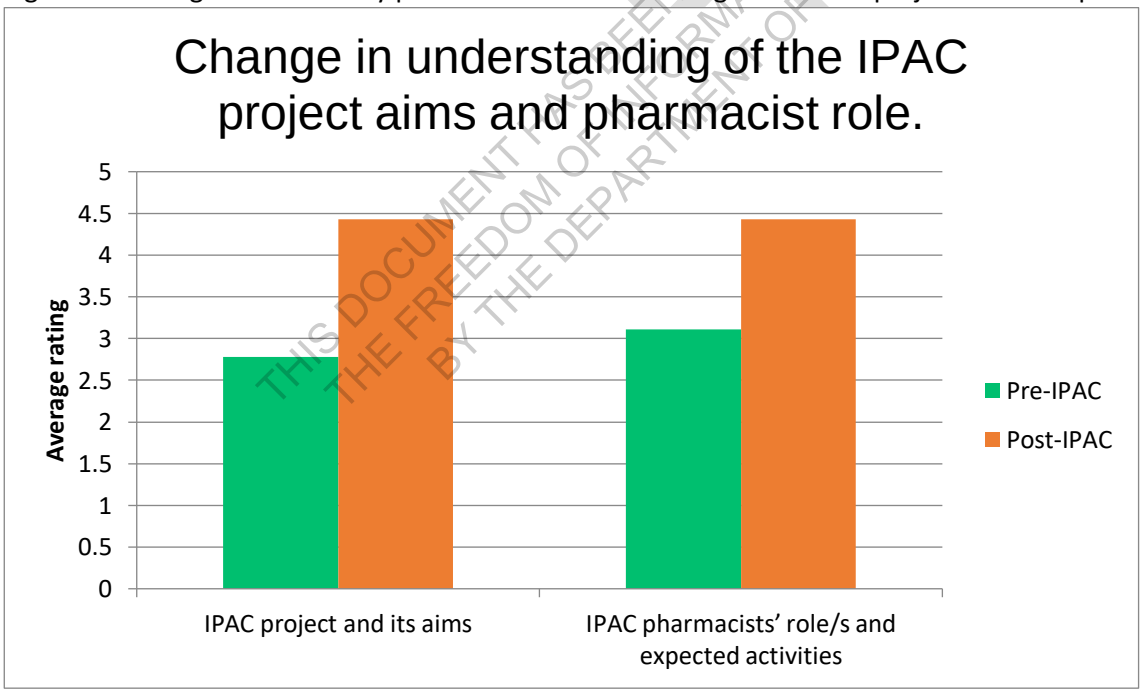
Ten pharmacists (six males and four female) from ten different participating health services completed the online survey. Half (five) of these pharmacists were between 31 and 40 years of age, two were 30 years or younger, two were 41-50 years old, and one aged 51-60 years. Most (six) of the pharmacists were owners, half (five) also managed their pharmacy, and two were pharmacist employees. These pharmacists had varied levels of experience in their pharmacy, ranging from 2 to 23 years, with an average of 7.9 years of practice. Similarly, the number of hours per week spent at these pharmacies differed, ranging from 8 to 65 hours, with an average of 33 hours per week. Most (six) of these pharmacists had not previously worked in or with a local ACCHS previously. Of the four that had previous ACCHS experience, three had roles in performing QUMAX site visits, and one undertook Section 100 visits.

3.4.2 Clarity of Roles and Relationships

There were issues at the commencement of the project relating to community pharmacists' understanding of the aims of the IPAC project, and the roles and expected activities of IPAC pharmacists. On a rating scale from 1 (not clear) to 5 (very clear), at commencement seven community pharmacists scored 3 or less for their understanding of the IPAC project and its aims with an average of 2.8, and five scored 3 or less for their understanding of the roles and activities of the IPAC pharmacists with an average of 3.1.

By the end of the project the community pharmacists reported having an improved understanding of the IPAC project and its aims, and the roles of the IPAC pharmacists. Both ratings increased to an average of 4.4 out of 5 (see Figure 13).

Figure 13. Change in community pharmacists' understanding of the IPAC project aims and pharmacist role.



Similarly, the clarity between the roles of the IPAC pharmacist compared to community pharmacists was seen as lacking. Six pharmacists scored 3 or less on this 5-point scale, with an average score of 2.9. One pharmacist stated, "*the structure of the IPAC project whereby pharmacists were recruited independently of the community pharmacy which had worked with the AHS [Aboriginal Health Service] for many years did not facilitate any relationship between the community pharmacy and the pharmacist recruited for the project.*" Another stated "*I think the IPAC pharmacist should be utilised for more specialised services. Medschecks and HMRs are community pharmacist roles*." As a result, the expectations of the community pharmacists of the IPAC pharmacists' role was unclear, with one pharmacist stating, "*I wasn't sure what to expect*", and another indicating there was less autonomy than what was expected.

3.4.3 Patient Referral to IPAC Pharmacists

Half of the community pharmacists referred a patient to an IPAC pharmacist. Barriers to referral of eligible patients included patient time constraints and opening hours of the clinics. For those that did refer, the process was considered easy, with an average score of 4.4 out of 5 on the 5-point scale. Of those that referred, two referred an estimated 5 patients, two referred ten, and one over 50 patients.

Through the referral process, the community pharmacists expected that patients would benefit from an increased understanding of their medicines and/or improved compliance, through one-on-one interaction with a health professional they were familiar with, with all respondents providing positive statements such as "*They seemed to understand their medicines and when to take them better*", and "*Improved understanding of their medications and better compliance. Also, they would appreciate seeing a familiar face when discussing medication issues*". Patients were also willing to be referred to IPAC pharmacists, with community pharmacists scoring their average willingness as 8 out of 10.

Community pharmacists also had trust in IPAC pharmacists in their ability to develop rapport with patients, scoring an average of 8.7 out of 10. Examples of effective relationships between patients and IPAC pharmacists and patient benefits from the community pharmacists' perspective included "*clarifying device use such as puffers, etc. was very efficient, and the IPAC pharmacist's role in getting patients to enrol and adhere to Webster Paks and other compliance building activities was fantastic*", and "*often I would have community members ask if she was in today to see her and also mention her name when talking about medication changes so she was evidently held in high regard and respected.*"

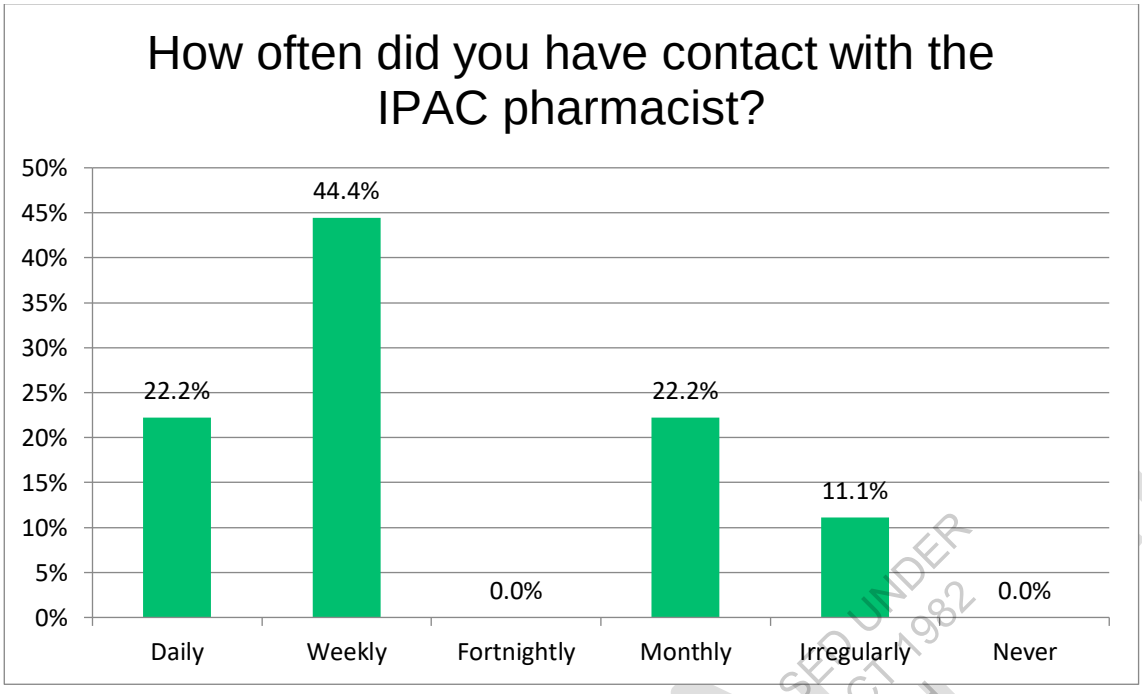
3.4.4 Changes in work and relationships

In regard to changes in work-related activities since the introduction of the IPAC pharmacist, no activities decreased, and many stayed the same, though some activities were increased. Activities that were most frequently increased/improved (reported by at least half of community pharmacists), included the efficiency of processes for medicines supply, facilitation of communication with GPs regarding prescriptions, support for ACCHS patients, clinical appropriateness of prescribed medicines, and an increase in dose administration aid preparation and supply. Of the patient-related activity, participation in HMRs was improved, as well as referrals for HMRs, patients were more interested in their medicines, and eligible patients were receiving a dose administration aid. Comments from community pharmacists included:

> *"The IPAC pharmacist was very helpful for the patients, and also increased our understanding of Aboriginal cultural issues."*
>
> *"The main benefit that I could see with the IPAC pharmacist was that there was a pathway for the clients to have access to HMRs and this was promoted by the IPAC pharmacist to the GPs so this service became more available to the clients and in turn I would think would have improved health and medication literacy and adherence."*

However, these improvements were likely hampered by the irregular low frequency of contact between community and IPAC pharmacists, with three community pharmacists (33.3%) indicating they had contact with the IPAC pharmacist only monthly or more infrequently.

Figure 14. Frequency of contact with the IPAC pharmacist.



Prior to the commencement of the IPAC project, relationships between community pharmacists and the relevant health service were not rated strongly by many of the community pharmacists, with responses ranging from 1 to 8 on a 10-point scale (1 being not effective and 10 very effective), with an average of 5.1.

The quality of communication that did occur during the project was high, with community pharmacists rating the IPAC pharmacists' communication an average of 9 out of 10 (n=8). Working relationships with health services were also improved, with community pharmacists scoring an average of 8.7 out of 10 (n=7) after commencement of the IPAC pharmacist (mean increase of 3.6). Three community pharmacists commented on how community pharmacy could further support the local ACCHS:

> *"If the ACCHS informed us that they would like us to stock certain medications at all times, so that the patients would not have to wait for us to order them, then we may be able to oblige with this request. We can also deliver medications, discuss problems with patients, and work with the GPs and other health professionals at [health service] to improve overall patient health."*

> *"If there was ongoing funding for the role of the IPAC pharmacist I think that would be great. Large urban AHSs would probably employ their own pharmacist in this role. However, in remote settings I believe the best model would be to increase the section 100 pharmacist support allowance very substantially to be able to fund a full-time pharmacist on site at the large remote clinics. However, I would get the community pharmacy to be responsible for employing the pharmacist and then for covering on holidays etc. The remote pharmacist should then work with the community pharmacy that dispenses for the remote clinic. This pharmacist should not be a solo pharmacist working in isolation from the community pharmacy. A hospital pharmacy would not have clinical pharmacists who were self-employed directly by a ward of the hospital who had no relationship with the main hospital pharmacy delivering clinical ward services. Similarly, it does not make sense for a pharmacist to be employed directly by a remote health service working in isolation from the main pharmacy."*

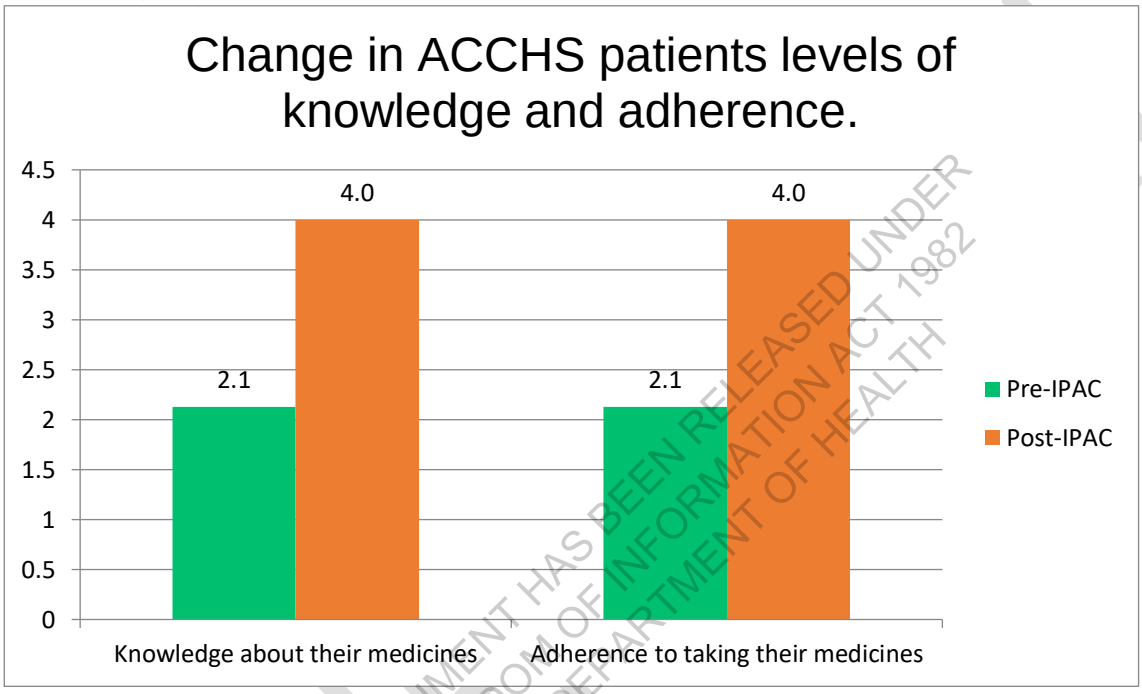
> *"Providing HMR's once training is complete to ensure that the patient is being reviewed by someone with knowledge of regular adherence etc. Joint collaboration between community and IPAC pharmacists to deliver education and training to both facilities' staff."*

3.4.5 Potential impacts on patients

ACCHS patient knowledge and adherence to medicines was perceived by community pharmacists to be poor at the commencement of the project. On a 5-point scale from 1 (very low) to 5 (very high), pharmacists rated patient knowledge of medicines and adherence to medicines with scores at 3 or less.

Perceived patient knowledge about their medicines and adherence to medicines also increased, both scoring an average of 4.0 out of 5, compared to 2.1 prior to involvement from the IPAC pharmacist. This improvement in medication adherence was believed to be largely attributed to the influence of the IPAC pharmacist (with the significance of their influence scoring an average of 8.4 out of 10).

Figure 15. Community pharmacists' perceptions of change in ACCHS patients' levels of knowledge and adherence (n=7).



3.4.6 Overall Findings

From the viewpoint of the community pharmacists, the overall performance of the IPAC pharmacists was high, scoring an average of 8.7 out of 10 (range from 6 to 10; n=7). IPAC pharmacists were seen as being very helpful, useful, and a great point of referral for general practitioners. *"It's a great initiative to have within the community especially when there is limited transport into the pharmacy."* All community pharmacist respondents who responded to the question (n=7) believed that there is a role for IPAC-type (non-dispensing) pharmacists within ACCHSs.

Similar to previous responses, improved communication leading to better patient knowledge and medication adherence were essential roles of the IPAC pharmacist. Community pharmacists concluded: *"These patients need serious attention - their compliance is poor, so we need someone constantly assisting them", "Increased medication knowledge is vital for increased adherence", "It allows people to have the conversation at the time of seeing a doctor with a pharmacist about their medications. They can talk and ask questions while still at the health centre and then hopefully feel more confident about taking their medication once they go home."*

Community pharmacists were unsure as to the workload of IPAC-type pharmacists, suggesting roughly 3 days per week may be required, though "*it depends entirely on the size of the health service and how many clients they have"*. Most community pharmacists were also content with the roles of the IPAC pharmacist. *"I am very glad the project was undertaken and hope that it leads to the permanent funding of pharmacists in AHSs as I*

believe they can really improve the client's health and medication literacy and thereby their medication adherence."

While most intended to continue their role as a community pharmacist, largely due to their investment in the pharmacy as an owner/manager, three of the ten community pharmacists indicated their interest in performing the role of an IPAC pharmacist. *"I see an issue that needs attention in the community and this is a fix", "We are very interested in helping to keep this service going into the future (we desperately need more pharmacists to do that). We feel that it is a valuable part of our community and is something that we are very focussed on as a community pharmacy."*

3.5 Case Studies/Site Visits

Three ACCHSs were selected for site visits for the qualitative evaluation of the IPAC project (see Appendix J). Seven focus groups or group interviews were conducted across the sites. Participants were 17 ACCHS staff and 17 patients / carers. Individual interviews were held with eight (8) health service staff and three (3) patients / carers. Individual interviews were conducted with the IPAC pharmacists working at the three sites. Fieldwork included a day observing the work (observation or shadowing) of the pharmacist and the service in general as well as observation of the community context (e.g. visit to community pharmacies). Table 12 summarises data collection at each site.

Table 12: Data collection at each site visit.

	Site 1 – Remote Service	Site 2 – Regional Service	Site 3 – Urban Service
Individual Interviews	1 x IPAC pharmacist 2 x individual patients	2 x IPAC pharmacists 4 x GPs (3 face to face and 1 by telephone) 2 x Outreach Workers (AHPs) 1 x Clinical Director	1 x IPAC pharmacist 1 x Nurse 1 x Patient/Carer
Focus Groups	1x patient FG (n=5) 1 x service FG: • 1 Medical Director • 1 Director of Health Services • 1 Nurse • 1 GP registrar • 4 AHPs	1 x patient FG (n=6)	1 x patient FG (n=6) 1 x Health Professional FG: • 1 AHP • 1 Nurse 1 x service staff FG: • 3 GPs • 2 Managers • 2 Nurses 1 x GP FG: • 3 GPs (further discussion after the service FG)
Observation	Community observation Shadowing IPAC pharmacist (1 day) (No patient consults were observed) Service observation at 1 clinic (including morning staff meeting)	Community observation Shadowing 1 IPAC pharmacist (1 day) Service observation at 4 clinics	Community observation Shadowing IPAC pharmacist (1 day – over 3 separate days) Service observation at 1 clinic

3.5.1 Case Study 1: Remote Health Service

Background of service

"*We could not run our AMS without a Pharmacist*" (Medical Director)

This ACCHS is located in a large remote town with the population estimated to be just under 20,000. Approximately 17% of the population identify as being of Aboriginal and / or Torres Strait Islander origin. Major industries include mining, tourism and agriculture. The town is classified as a RA4 according to the Australian Statistical Geography Standard-Remoteness Area (ASGS-RA)[67], and a 6 on the Modified Monash Model (MMM) [68].

The service operates clinics across five sites, including three in smaller towns, considerable distances from the main clinic. Clinic staff include Aboriginal Health Workers, nurses, a medical director, GPs, a GP registrar, and visiting allied health services. The Director of Health Services oversees the clinics. The service does not have a diabetes educator, but other allied health services include a podiatrist, speech pathologist, dietician and an exercise physiologist. The main clinic has a section 100 pharmacist onsite from the local community pharmacy that can dispense medications for patients.

The service has been in a state of change over the last 12 months or so, with the appointment of a new CEO, new clinical staff and other new board members. Working together with local Hospital and Health Service and the Primary Health Network in a tripartite agreement, the health service has integrated three existing primary health care centres in outlying communities into the ACCHS model.

Profile of pharmacist

Prior to taking on the role in November 2018 the IPAC pharmacist had worked for nearly four years in one of the local community pharmacies in the town. Previously she had trained and undertaken her intern year in urban locations. The IPAC pharmacist had strong local and professional connections, including with the health service. The community pharmacy the IPAC pharmacist had managed was the section 100 pharmacy for the service. She had professional and social links with early career allied health professionals throughout the region. The IPAC pharmacist worked full time across two clinic sites; spending one day at the P clinic and offices to undertake project administration and four days in clinical practice at the B Street Clinic. She was currently undertaking her HMR accreditation and aimed to be accredited by the end of the project.

Relationships with Patients and the Community

Cultural competence

Patients were happy with the communication style and approach of the IPAC pharmacist indicating she was culturally safe and accepted by the community. One patient had recommended others to go and see the pharmacist, *"in my group and different other people, I tell them; 'Go and have a revision of stuff', and I explain it to them what I have been through."* (patient)

The pharmacist's cultural competence was also observed during field work:

- When referring to a group of homeless peoples, she respectfully discussed "People living "hang out at river" and the need for the main older clinic is where this group feel comfortable attending.
- She took charge of organising an AHP to do a painting for a staff member who was leaving. She asked the Senior AHP if this was appropriate.
- Asked for advice on blister packs – have to have a snack as well as meals, asked Senior AHP about advice on where patient lived
- The Senior AHP was deferred to for any other cultural advice, e.g. organising focus group discussions; if the researchers could observe patients and which patients would be most appropriate for individual interviews.

Health services staff reinforced that cultural competency was a key requirement for the role:

> *"She just doesn't focus just on medication she's got such a passion for Aboriginal people and she won't just stop there which is awesome. She's really good*." (Nurse)

> *"Someone who treats my people with respect and talks to them and listens to them. So, I'm not going to say this would work anywhere else if you haven't got the right pharmacist. I think they need to understand the living environment of our patients. And what other illnesses are in the house because I take out [IPAC pharmacist] out to see one person and there might be other people in that house with other chronic diseases. So [IPAC pharmacist] can talk to them too about taking their medication."* (Senior AHP)

The Pharmacist was also welcomed into people's homes and understood the importance of working with AHWs:

> *"She interacts with the community and that pretty well. You just have to be out there because the majority of people she works closely with goes pretty well."* (AHW**)**

> *"I think that's how the community really feel. One person has a good experience and then it kind of goes through [the group]."* (AHW**)**

In contrast, both patients and staff mentioned that the current Section 100 dispensing pharmacist that currently worked at the service, may not be suitable in IPAC role.

> *"…If we had the pharmacist that we got here, on the floor, you would have some very unhappy people. It would be like, 'So when is your project up?'"* (Nurse)

There was an importance to maintain the current IPAC pharmacist. When there was a discussion regarding the possibility of an additional pharmacist joining the team, the Aboriginal Health Worker stressed the importance of maintaining the relationship with the current pharmacist:

> *"Sorry, I have to frown on that because patients get used to [IPAC pharmacist]. And if you changed [IPAC pharmacist] now, I don't know if they would have the same faith in another pharmacist"* (Senior AHW).

Integration into the team: "Part of a lot of teams"

During the observation, despite the new team members, it was obvious at the morning meeting that the service had a collegial team environment and the IPAC pharmacist was a core part of the primary health care team. The IPAC pharmacist participated in discussions around a local fundraising social event and the team planning day and introduced the evaluation team. However, initially it was difficult for the IPAC pharmacist to establish her role:

> *"I think she did struggle in the beginning. I don't think she was respected with what she was doing and especially down here [at this clinic]. She was forced around and there were a few bad days for her where you know people were pushing her out of rooms and didn't value her work. I think she's done really well to make herself [part of the team]..." (*Medical Director)

While the IPAC pharmacist was formally part of the regional team, she was seen to freely transition across a number of different teams (AHW team, Integrated Care team, Clinic team or PHC team) and, importantly, bring these teams together:

> *"I think in terms of her being a team member I think she's part of a lot of teams and helps bring them together like she does a lot of home visits with [Senior AHP] and [AHP] and you know chasing up*

patients that we have trouble getting in here regularly. …But she kind of gels a lot of the different groups together." (GP Registrar).

"… I think that everybody said [name of IPAC pharmacist], yes, she sits in the Regional Team, but she actually functions in pretty much everybody's team." (Director Health Services)

"I wouldn't say she belongs to one department or one team. She is shared by all. So yeah it's awesome to have her around." (AHW)

The IPAC pharmacist was continually developing relationships across different teams. Her relationship with the allied health teams had been limited due to her physical location in the B Clinic (the allied health team is located at P Clinic).

"I do have interactions with them [the Allied Health team] but because I'm not part of the allied health team … there also in their own little world, so they're not part of the primary health care team. Yes, the primary health care sites want to utilize them but they also do their own thing as well." (IPAC pharmacist)

However, the IPAC pharmacist was developing relationships with the exercise physiologist through a group program and had just started to receive referrals. Being flexible and open to opportunities for key collaborations were keys to establishing her role in the team as well as relationships with patients:

"[I] can't just focus on what I'm doing, you've got to work as part of a team. So, if you go out with someone and they also need to go and do a job for themselves then you're not necessarily doing exactly what your role is. So you might go out and if [Senior Aboriginal Health Practitioner (AHP)*] needs to go and talk to someone about this … and she's also said to me … 'I'm going out on this side of town, we can go and see this person that you've asked me to see but we've got to do them both together'. … you've got to work with everyone and also take the opportunities to go out and see patients when you can as well. Because when I first started that wasn't an option and it wasn't really encouraged or available and that meant that I wasn't having as much patient contact as well, because there's lots of people who we can't get into the clinic and they're the people that the hospitals identified that they could really benefit from I guess, the hospital pharmacist has referred."* (IPAC pharmacist)

A close and respectful working relationship with the Senior AHP was key to developing the role and working with patients.

"I will be honest where I see her really shine is basically when [Senior AHP] come on board and was able to take her out into community and really work in the community. That's where mob really see the difference and start enjoying [the role] And that was a few months ago, I think. Where we can see the gains of what's been happening. Going out with the health workers." (Nurse)

From the observation, there was a sense that the IPAC pharmacist had been given a number of responsibilities and participated in important projects with senior staff. These responsibilities had raised her profile to be a senior member of the clinical team.

Patient Recruitment/consent process

While the IPAC pharmacist initially struggled, she successfully recruited patients through several strategies. While patients were usually recruited opportunistically; the process had gradually become more formalised. At first the IPAC pharmacist tried to book her own appointments with patients, but this was not successful.

"At the start it was very much made just trying to figure out how I fit in to this service and we tried a lot of different ways to capture patients. Do I see them before the doctor, or do I see them after? Do I see them opportunistically? Do I see them for booked in appointments and try to call and figure, find

out if they would like to come in and only see me which doesn't really work? And trying to give the staff as much information as possible about what I can do and that's just taking a really long time with different staff in here." (IPAC pharmacist)

One strategy was to focus on the urgent recall list:

"…In the beginning…she really struggled with trying to get patients in. So, she [asked me] 'how can I look at getting some patients?' At that time our urgent recall list was ridiculous with high HbA1cs and I said here you go. Come and sit down and she goes 'oh my gosh this is amazing'. … 'this is your urgent recall list' and I said, 'I know but obviously it is showing you that they are not taking their medications that is obvious'. She said 'oh this is amazing.' So, then we were able to print that off and she was able to talk to the nurses to bring them [the patients] in. So really looking at what she was always looking at but different ways. Well that was one way of doing that." (Nurse).

As an alternative the IPAC pharmacist saw the daily patient list through the CIS (Best Practice), which health professional the patient was seeing and what were their health concerns. The IPAC pharmacist could also book in her own patients for appointments once a relationship was established with the patients:

"The other way was … getting reception to kind of red flag her. She'd be able to go through the week appointments list as well and go through each person to see who [could see her]. (Nurse)

"We identified patients or go out to the waiting room and chat to people and then usually bring them in to one of the clinic rooms and just go through the explanation of the project. And if they were happy to be a part of it, then sign them up." (IPAC pharmacist)

While the GPs and nurses did not actively recruit or consent patients, they did informally call on the IPAC pharmacist for assistance. Through this process, patients could be recruited and consented into the project. The GP registrar said initially there was not a formal process, so she would just ask the IPAC pharmacist to join challenging consultations. Now there is *"a bit more of a pathway"*. Flexibility was still required so *"a lot of the time it's me dragging [name of IPAC pharmacist] in here to help fix it.*" (GP Reg)

The IPAC pharmacist did her own consenting as "*It wasn't really an option at the start to have someone doing that extra work.*" Working with the AHWs on home visits (as discussed above) was also an effective way to recruit patients. Another recruitment strategy was through *"Work it Out",* an exercise program for patients living with chronic disease:

"She the one that brought me down here from that workout room." (Patient).

"just with the education she attended "Work it Out" a couple of times. Did the education sessions. Spoken to the clients and then I've come into work the next day and some of them have booked appointments to come and go through the medication list with her." (AHW)

Patient Case Study: Connecting with Patients at Group session: Wanda

One of the patients that I've been working with I met at 'work it out' which is one of the exercise physiologist programs. I met her there and the first or second education that I gave I was just talking about, just medicines, I think. One education I spoke about the importance of the flu vaccination and the next time I just took a blank made medication list that I showed that I could help you fill this out if you wanted to come in and have an appointment with me. From there she made an appointment and it was actually made up at the other clinic which is even harder to get people into. So, she made an appointment and we organised she would also see the doctor after, at the same time so we made her medicines list together. We spoke about that she didn't like taking as many tablets as what she was, she just thought it seemed like a lot of tablets. After I explained them to her, she was she was happy with that, but there was a couple [of medications] that I spoke to the doctor about and The doctor invited me in to the to the consult and we

spoke about it all together with the patient. And we stopped a couple of her medications and made the changes that were required. And from there she had her medicines list and she was happy with that and she also had her medications changed and she was really happy.

Culturally respectful relationship building and cultural understanding of the IPAC pharmacist was also demonstrated through the consent process. The IPAC pharmacist had a nuanced understanding that relationships and rapport required time; particularly due to the continual staff changes at the clinic.

> "*…the rapport building has been really important to what I've been doing. So, some of the time it really wasn't the right time to sort of jump in and ask for consent for the project without building up that bit of trust with the patient. The patients have had so many clinicians come and go on them, there's a lot of… 'well you're going to go'. I have to tell my story to every single person who I come into this clinic for, why can't I just tell my story once and then I see the same person again?'. … It's like no-one's quite willing to just divulge every single bit of information about themselves on the very first visit. So, it definitely takes a bit of time to build up that rapport*." (IPAC pharmacist)

> *"I think the second or third visit there's definitely more engagement because they sometimes seen doctors only once. So, if you see them a second time that it's a familiar face and then by the third time it's like 'oh you'."* (IPAC pharmacist)

Patient Survey (N-MARS)

The one aspect of the role that the IPAC pharmacist highlighted as something less worthwhile was the N-MARS. She did not work with other staff to conduct the N-MARS. She surmised that the questions were not in-depth and did not delve into the reasons for non-adherence:

> *"I think the theory behind it is good. I think a compliance check is definitely part of the pharmacist role. Whether or not asking a patient those exact questions three times throughout the project is going to make a difference, I'm not sure. I think that the information that you're giving patients in regard to their medicines is more important. For example, me just telling someone you need to take your tablets, that doesn't give them any motivation to take tablets just because I'm telling them. So, we need to find out why aren't they taking them, are they feeling sick, do they not know what they're for, are they at inconvenient times. How can we make the medicines work for them in a way that the medicines still work and do what they need to do?"*

Nevertheless, the IPAC pharmacist incorporated the N-MARS questions into general conversations and adapted the survey for different patients "*So I try to incorporate it into general conversation. It sometimes is a tick down the questionnaire but other times it's sort of like weaved into conversation just to make it less sort of study-ish.*" (IPAC pharmacist)

While some questions were not at all useful to assist with understanding patients or with education:

> *"The sharing one, the sharing question, I haven't had anyone tell me that they do share their medicines because I and that's what they've told me they don't share them, but I'm not sure if they would in that sort of direct question whether they would be.... I think patients know not to share their medicines, so they're not going to tell me that they're sharing them too because I'm asking. If it came up in a conversation, and it was really informal then they might, but if I'm the medicine lady and they know that I'm looking at their medicines and trying to help them with their medication they're not going to tell me that they are sharing and doing the wrong thing with their medications because I think most people know that, that's not how they work*." (IPAC pharmacist)

One question was useful for education and to discuss strategies:

"there's a question about 'Is it hard for you to get your medicines or have access to them', from there we would talk about like do you want a delivery or is there a specific day that would be better for you to pick them up from the pharmacy or just how can we make it better."

Key roles

Patient-centred roles

Patients knew the IPAC pharmacist as "*the medicines lady*". The IPAC pharmacist was passionate about being a medications expert and need for this role in ACCHSs. When asked the IPAC pharmacist indicated she would stay in the role if it was to continue. The main reason was to expand the scope of practice of pharmacists and have medications expertise in the primary health care team:

"I'm happy with the progress that I've made so far, and I think that there's still heaps of work to be done. And I just think it's super awesome for pharmacists to be expanding their scope of practice into these kinds of roles. I think it's really good for patients because they're getting someone who is focused on medicines and knows about medicines in their health care team which hasn't happened before. I think it's good for the service to make sure that they are having quality use of medicines. I just think it's awesome." (IPAC pharmacist)

The IPAC pharmacist recognised that the role was important and that other health professionals in ACCHSs did not have the same expertise around medications:

"I really like what I'm doing. I think it's really important. I really like working with the clients that [health service] services. I think that there's a huge gap with medication management that just hasn't been addressed before. There's been no one in these services focusing on medicines. There's a lot of other things that a lot of services are doing really well but no one... Medicines are a bit too scary for people to go close to and have confidence with and have that training that that's where they want their expertise." (IPAC pharmacist)

There was a focus on developing patient-centred holistic care around medications that should be part of the organisational culture:

"I think the main thing from organizational level is just having an understanding that medicines are an important component of holistic health care and giving them the appreciation ... We need to keep up with relevant guidelines for them and we need to make sure that people are taking the medicines that they need to be taking and not taking medicines that they don't need to be taking. ***Making sure that the patient is involved in that process.*** *I think for a really long time the doctors or any clinician has been making decisions on behalf of the patient without the patient being at the centre of that decision-making process and that means that they don't know what their medication is for. So, if it's not making them feel any better or any worse then, I don't know if I would take a medicine that I didn't know about that didn't make me feel any different, and no one could tell me what it was for or spent the time to tell me what it was for."* (IPAC Pharmacist)

Medication reviews were seen to be the most valuable part of the role by the IPAC pharmacist:

"I think the medication reviews would be the priority or the area that I can say that the most benefit would get from patients are reconciling medicines, making sure that their therapeutic…making sure that patients are taking their medications and giving the information to patients about their medications. That's the biggest thing that people have come up to me and said 'We're so happy that you're here because no one knows why they take their medication'. So that's what a HMR does as well, or medication review, whatever you want to call it, but that's the that's probably the main one." (IPAC pharmacist)

Patients and staff confirmed that this was their understanding of her main role. Why this might be seen as

an obvious role of the pharmacist there was huge impact on patients and on staff:

> *"And I mean and they're asking questions. We [Aboriginal people] don't ask questions. We just have the faith, the doctors going to prescribe it to us, obviously we need it you know. They don't know what it's doing to them. So, they ask her lots of questions. So, I mean they are getting educated. It's good. It's good to see you know they're taking [their medications], I suppose ownership of their own health. You know so it's good to see."* (AHW)

> *"There was a patient …that was being seen by a new nurse. And this patient had someone to advocate for her [and] wanted to know what are your medications? And she was asking this new nurse about all her medications. So, this poor new nurse was sitting there with the instructions from the medication box trying to explain it to the family and the family sitting there because she was using big words with this family … but they wanted to know what was going on. So that's when I turned around and I said 'Hey, we got [name of IPAC pharmacist]. Book her in with [IPAC pharmacist]' and they were like 'oh yay.'* (AHW)

Patients had started to ask questions about their medications and the IPAC pharmacist had the time and knowledge to answer these questions. The IPAC pharmacist role was seen as an essential part of the service in an AMS given the number of medications that patients are taking.

> *"[She] is awesome at what she does. I've worked closely with her through the 'work it out' program as well as a few home visits and everything. And even just patients... They come in for an appointment, want to see the doctor just to ask the question why they've been given this medication you know. I mean she can sit down and yarn with them and then there's no need for that doctor appointment. So, it frees up a lot of their time too. So, education wise for medications you know we've had our clients come in to do the medication list reviews and stuff like that. And she's awesome at what she does, and she has that community connection now."* (AHW)

> *"Someone that asked me a question about whether their medication plays a role and I said I don't know. [The patient] said 'well you need to get someone in here.' And I said 'we do. … We have a pharmacist.' ... She was telling me what we needed. I said 'already we have that lady. You might not have been and visited since, but she is here, and she can answer anyone's question.'"* (Senior AHW)

The pharmacist role was seen to compliment the doctors' roles:

> *"Look to me Aboriginal patients are on the right medicine, but they don't take it because they're not given all that information. So, what I see is a lot of people are prescribing multiple drugs and having chronic disease means you are going to end up on 10 or 15 pills if you correctly prescribe everything for every condition. To me that doesn't work. There is very little respect for the person. Aboriginal people I don't think speak up for themselves in terms of side effects. Talk up for whether they want to take these pills, they just don't take them rather than come back and say these pills are making me sick or I don't want to take them or why am I actually taking them. There's a lot of decision making for Aboriginal people without their consent or their understanding of the pills and I find that a lot. So, to me a pharmacist just puts a different angle on what doctors do. I mean we're very good at prescribing the right stuff … but the amount of drug interactions you can get from you know 10 or 15 pills. They see people on four or five blood pressure pills. If you suddenly start taking them and you haven't taken that history of whether they have actually been in here in the past you have all sorts of trouble. And then with our level of renal disease in the area, we need to be a lot more mindful about what drugs we give people. And we still commonly see locums prescribing anti-inflammatories, for example, you know high risk cardio vascular and renal disease area. So, trying to get people educated and educating the doctors. ……. **So to me, I don't think an AMS can work without a pharmacist.**"* (Medical Director)

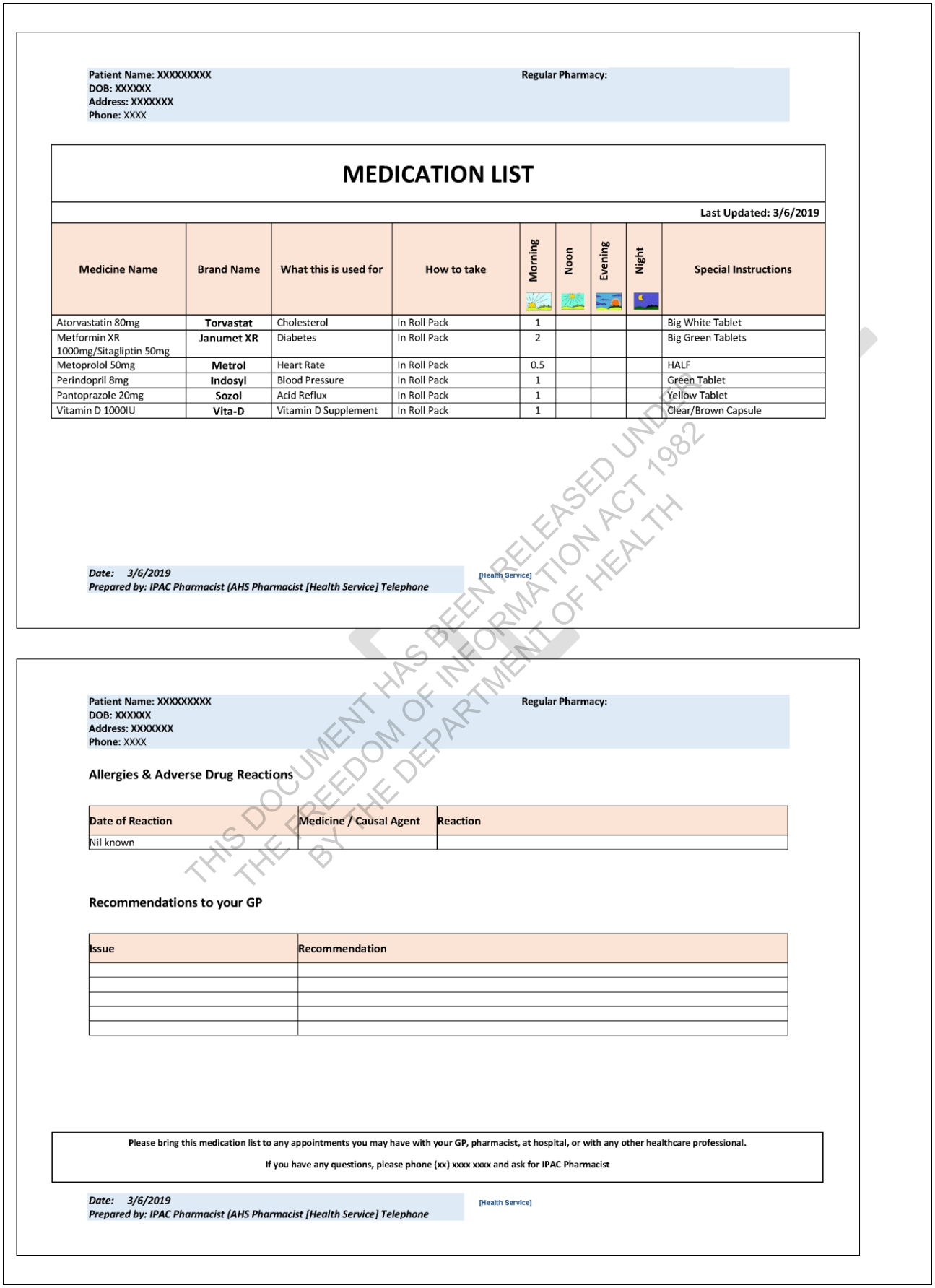
This was supported by the patients who felt that the IPAC pharmacist had picked up issues with their medications that had previously not been discussed by other health professionals:

> *"Well that was this tablet she gave me. It something starts with a J. Jasmine or something, like anyway …. And she said it protects your kidneys and your heart and everything see. And she could not understand why I wasn't on it before. I thought well as long as I'm on it now and this was good enough for me. And she knocked me off from a lot of other tablets different tablets and just wacked me on a couple of these. She said see how you go. And I'm going quite good....*
>
> **I:** [Sounds like good management on your behalf.
>
> *On her behalf. I am very grateful. Very grateful to all of you hey. For this year. Yes, this is great this. They get you in and this is just great. She's really good because when I was getting all them spasms really, really bad all the time, she picked up that I was getting these tablets from here and they were too strong. And then she came and told me, she said you know you're not going to get those 40s, so she gave me 20s or 10s I forget now. At the time but it made a difference. She picked it up."* (patient)

Patients Knowledge and Understanding of Medications

Education on medications was not just undertaken after a medications review or if patients had problems. The IPAC pharmacist actively educated patients about their medications. One way that the IPAC pharmacist worked with patients was to co-design a medications list (see Figure 16). This education tool was a list of patient's medications, that included a description of medication, when it was taken and what the medication looked like.

Figure 16. Example of the patient medication list.



Patient Name: XXXXXXXXX
DOB: XXXXXX
Address: XXXXXXX
Phone: XXXX

Regular Pharmacy:

MEDICATION LIST

Last Updated: 3/6/2019

Medicine Name	Brand Name	What this is used for	How to take	Morning	Noon	Evening	Night	Special Instructions
Atorvastatin 80mg	**Torvastat**	Cholesterol	In Roll Pack	1				Big White Tablet
Metformin XR 1000mg/Sitagliptin 50mg	**Janumet XR**	Diabetes	In Roll Pack	2				Big Green Tablets
Metoprolol 50mg	**Metrol**	Heart Rate	In Roll Pack	0.5				HALF
Perindopril 8mg	**Indosyl**	Blood Pressure	In Roll Pack	1				Green Tablet
Pantoprazole 20mg	**Sozol**	Acid Reflux	In Roll Pack	1				Yellow Tablet
Vitamin D 1000IU	**Vita-D**	Vitamin D Supplement	In Roll Pack	1				Clear/Brown Capsule

Date: 3/6/2019
Prepared by: IPAC Pharmacist (AHS Pharmacist [Health Service] Telephone

[Health Service]

Patient Name: XXXXXXXXX
DOB: XXXXXX
Address: XXXXXXX
Phone: XXXX

Regular Pharmacy:

Allergies & Adverse Drug Reactions

Date of Reaction	Medicine / Causal Agent	Reaction
Nil known		

Recommendations to your GP

Issue	Recommendation

Please bring this medication list to any appointments you may have with your GP, pharmacist, at hospital, or with any other healthcare professional.

If you have any questions, please phone (xx) xxxx xxxx and ask for IPAC Pharmacist

Date: 3/6/2019
Prepared by: IPAC Pharmacist (AHS Pharmacist [Health Service] Telephone

[Health Service]

The IPAC pharmacist worked with the patients to determine how they would describe the medications. For example, one patient called a purple table "dusty rose" so that was the description made on the medication list (observation). The medication list had been adapted by the IPAC pharmacist from another IPAC pharmacist. It reported took a bit of time to compile and could not be generated automatically from the CIS. However, it was worth taking the time to develop as the patients saw a lot of value in it.

> *"I have made a medicine list template which would be good if it could be generated from the clinical information software and instead of me typing it all out manually. But the patients love the medicines list that they get because they could put on their fridge, they can have it in their bag. It's a nice tangible thing that they can take away as well, instead of just talking to them all the time and they're like 'oh she told me so many things and how do I remember it all.'"* (IPAC pharmacist)

Patient adherence

Staff saw that through her expert medicines knowledge and rapport building that the IPAC pharmacist was able to facilitate patient adherence.

> *"We have one diabetic lady who was seeing [name of doctor]. She took herself off her insulin that [IPAC pharmacist] and I have been visiting and she's gone back on her insulin. She was just taking the tablet but not the insulin. So, she's gone back on her insulin. To me that's...*" (AHW) **"***That's a win*." (Director Health Services)

Patients were also being more honest and telling the IPAC pharmacist how often they took their medications.

> *"And as it's been said they [patients] don't always tell you. They are not going to tell you, 'no I am not taking it at breakfast because I don't eat breakfast'. But a lot of people are, I have found, are a lot more willing to tell [the IPAC pharmacist]. I had a girl who was on Warfarin and she's not taking it and I have asked her a lot of times. I [asked] "is there any way we can make it easier?". And eventually one day she told [the IPAC pharmacist] she had PV [per vaginal] bleeding. And that is why she will never take her Warfarin. And even though being a female doctor and young as well. She's not [telling me]. But it was when she was talking to* [IPAC pharmacist] [she told her]." (GP Reg)

The IPAC pharmacist had the time to explain brand changes by the dispensing or community pharmacist; especially if tablets looked different to the patient's normal tablets. This is an example of an education strategy that would help with adherence.

> *"And just you know pharmacists love buying the cheapest next brand of Coversyl. So, there's like seven different types of Coversyl they put in their Webster Pak and I have had that many people come in and say I'm not these, shouldn't be on these pills, and I say yeah it's the same one, it's just a different colour. But no one bothered to tell him, they just put a colour in, and they go 'Oh what's this pill' and they won't take it. They're suspicious. They don't take it. And then you know it was only the other day, a medication change, someone should have told them …" (Medical Director)*

Patient Case Study: Bobby

"*I'm back on track again"*

Bobby is his late 60s. He grew up in [town] and has been attending the ACCHS for twelve years. He has diabetes, back and wrist pain, issues with his prostrate, gout… He has had medication adherence issues in the past, particularly as some medications affected his sleep:

"And then also every now and again I'll drop my gear [stop medication] and see how long I can last. … So, there was one [tablet] for me depression, there was a tablet in there [Webster Pak] and I was picking it out and throwing it …"

Although he has been on a Webster Pak for about 12 months, Bobby still sometimes finds it difficult to manage his medications: "*I'm behind because sometimes I go bush and I forget a couple of days and then I come back and I am a week behind … "*

Bobby met the IPAC pharmacist at the *"Work it out"* group. This was an effective way for the IPAC pharmacist to meet patients. Bobby was very enthusiastic about the group:

"We do an hour exercise program at the gym tailored to chronic disease patients' needs. And then we do an hour education session. So, [the IPAC Pharmacist] has come along and did education sessions with us on the importance of medication reviews. We've had the clients come in and do medication lists and reviews with the [pharmacist] and everything." (AHW – observation)

Bobby appreciates how the IPAC pharmacist took the time to discuss his medications, particularly as he has had to see many locums over the years:

"… you get doctors they'll say oh we'll put you on this, but you are in and you are out. You know what I mean, you sort of get a brief idea of what it does but, … there's a couple of the doctors they'll pick up so you're some of your pills you know and they explain what this one does and that one does and what you need this one for. … Because you know doctors, they sort of haven't got the time.

I went to see her about a revision and yeah we dropped a couple [of medications] off. Took some different stuff. She recommended one medication I was on before, all these locums come through here they'll take you off this for your blood pressure and then you don't sleep. Then you ask them for a sleeping tablet. So it has just been really good., I dropped off a couple...

Bobby outlines how working with the IPAC pharmacist was a collaborative process:

I've seen her a couple of times. … she sits down and she more or less asks you… 'do you know about all of your medications that you are taking?' I said 'no not really. I know this one is for this.' And that's when we started discussing whether some overlap and could start creating other dramas or whatever, so we worked it every week and brought them all up and just started working through it.

Bobby saw an immediate impact on his wellbeing after adjustments to his medications:
[my] prostrate tablet I've got to take it every night and if I don't I'm in big dramas. And if I don't take my blood pressure tablet at the same time, I'm even worse, like for 16 hours, I don't know if you've ever been busting for a pee for 16 hours or something. Awful. … That's all fell in line, so you know it was really good.

He also feels he understands his own medication and is *"back on track".* It turned out the medication he thought was for his depression and that he had discarded was for his blood pressure: "*and it turned out it was one of my blood pressure tablets. That was why my blood pressure sort of come back up again. [The IPAC pharmacist] explained that all to me."*

Bobby explains how he now better understands his medications and the reasons why he must take them:

"she sits down and yeah goes through that with you and then if you've got any questions or whatever she will tell you the function of what it's meant for and supposed to do. It was really good. The last six months I've been really happy. And you know it's a real benefit and its long overdue you know. You can understand some of the stuff you know for this and that but some of them inter-mingles and affects something else in some other way and that's what you're not clear on. Anyway, we have looked into that. My blood pressure's under control now … straight away it just started dropping like that, so it's nearly back to normal. …. So I'm back on track again.

He appreciates that the IPAC pharmacist has more knowledge and time than doctors to discuss medications:

"you know like from what I can see all her job, from what it's done for me and we are all ignorant of medicines you know doctors they say take this and you're only in there like 15 minutes at the most. Take this and see you later especially like here we got that many flying through locums. … from what we spoke about [it has given] me a better light on what everything does and what the tablets do and where it could go either way you know. Interact with other ones … I reckon it's a good idea and really I think if anyone's on medication, like I don't know how many tablets I'm on, seven and it's probably 13 a day and to sit down and talk about them … it's definitely of benefit."

He understands his medications and feels he can now discuss his medications with doctors:

"like yesterday they had to make an adjustment I got to drop one pill off starting today and then they are going to monitor my blood pressure to see how it's going, but now I've got a bit more understanding. But you know if have something else happen, like I get on another tablet, I'll be asking where it's going, what it does."

As his life improved so much Bobby would highly recommend the IPAC pharmacist to others including those from the 'Work it out' group and in the community:

"in my group and different other people, I tell them. Go and have a revision of stuff and explain it to them what I have been through … I honestly think … at least one time a year people should be recommended to go and see her you know like make it a statutory visit all that stuff that I see the benefits that I've picked up ***and now my management of medications is better, my life's better and so if it works for me, it could work for someone else****."*

He sees the inclusion of the pharmacist in the primary health care team as long overdue: *"this should've happened 30 years ago I reckon you know."*

Educating staff around Medicines

Another core role around patient care was the education of clinical staff around medications.

> *"From a junior doctor perspective [the IPAC pharmacist] was really helpful in educating me with a lot of the patients who are on lots of medications and the interactions. It was very handy to have her close by just to run things past her and get some information and also to then have her spend time with patients educating them on things as well. A lot of patients have said to me 'I've been on these medications for so long. I don't know what they do'. And [IPAC pharmacist] would spend the time with them just so they understand. And [she is] also very helpful with de-prescribing as well."* (GP Reg)

> *"She's picked up on so much …For instance you know we had a gentleman. He was like pretty much given multiple tablets for the same thing. And she was able to fix that … take it back to the doctor and have a yarn with the doctor …. It like they're [the patients are] taking ownership for their health. You know it's good to see."* (AHW)

Some of the suggestions to medication changes were made informally, and changes would be made by speaking directly with the doctors:

> "*So, if you just see something that you think should be actioned straightaway and the doctors are very, very happy with that."* (IPAC pharmacist)

Changes from a formal medicines review were made through Best Practice as there were significant notes. However, the IPAC pharmacist had to proactively approach GPs, as only regular doctors had messages sent to their inboxes and GPs also received a great deal of mail:

> "*Other processes with discharges are they get uploaded to the GP inboxes in the medical software and I sort of find out which doctors that they're getting allocated to and approach them directly because they get a lot of inbox things and medication changes are sometimes missed. So just to have my finger on the pulse to make sure that these changes happen, if the GP agrees with them, and the renal ones is, there's a whole process where I attend the meeting and I write notes from it and come back and report them to the GP, but also the hospital pharmacy has a medication change form and I help to make sure that those all get uploaded to the patient files so that they are documented."* (IPAC pharmacist)

When asked how often GPs took on board the recommended prescribing changes; it depended on how the recommendations were discussed

> *"If I directly talk to them about it, it would be like 100 percent of the time. If I know that they have understood what I've written down and they yeah, they would, they've taken on all of them. It's the ones where I've made recommendations but I'm not sure if they've seen it or if they don't agree, that I haven't had that sort of feedback they're like 'Oh I didn't think that that was appropriate' or maybe they just didn't look at it."* (IPAC pharmacist)

Organisational/systems changes

Although the ACCHS provided section 100 services from four clinics, the service had never had a non-dispensing pharmacist prior to the IPAC pharmacist; and the Director of Health Services and Medical Director stressed that there were organisational, systems and policy changes that were required before the role could be fully utilised. The systems changes took several months to establish and required about 0.5 FTE of the IPAC pharmacist's workload. The Director of Health Services felt that this was a particularly important role and discussed with the IPAC pharmacist this should be the focus of her role initially:

> *"From a project perspective what the intent of it was, was for it to be more client focused around quality use of medicines and quality prescribing and that kind of stuff. And I think we're finally kind of six months, seven months in actually getting [IPAC Pharmacist] up to that point. But what we have to acknowledge first was that being such a big service across five different centres in four different communities there was a whole heap of systematic stuff internally that we needed sorted out first. Given that we're providing section 100 services out of four of our sites. We needed, … the pharmacist's eye over what it was that we're doing and that took up at least the first half of [IPAC Pharmacist's] workload. Now that we've started to get those systems in place and the management supported those systems,* [IPAC Pharmacist's] *actually finding time to spend with patients which is great."* (Director Health Services)

The IPAC pharmacist was on the Clinical Governance Committee of the ACCHS which had just started when she arrived. She also sat on the joint Clinical Governance Committee of the local hospital and health service with the Director of Health Services and Medical Director:

> *"I sit on the [health service] Clinical Governance Committee as well as the joint clinical governance [committee] with the hospital and health service who have they have a tripartite agreement with the Primary Health Network as well, particularly for [three remote communities] ..... So that's been something new that's been implemented since I've been here, and I was invited to be on that as well." (IPAC pharmacist)*

The IPAC pharmacist's involvement at a wider regional clinical governance level was an important role given the changes occurring in the ACCHS such as taking over the provision of health services in remote communities. In a meeting in March the IPAC pharmacist discussed pharmacy guidelines for joint Clinical

Governance Committee. The IPAC pharmacist showed the committee the legislation around prescriptions and stressed that while in remote areas there was easy access to medicine for health professionals, supply needed to be done "the right way". As part of clinical governance committee of [the health service] the IPAC pharmacist was helping to develop a scabies protocol. This was described as a passion project of the head nurse at the health service. While the IPAC Pharmacist reflected that this task could be seen as outside of the ten core roles of the project. She reflected that it linked in with chronic disease due to the connection with rheumatic heart fever.

Quality / Judicious Use of Medicines

Another key systems role was the quality use of medicines and the judicious use of medicines. This was essential in remote areas where there is legislation regarding which health professionals can supply and dispense medications.

> *"Then I suppose the other things that I've worked on to do with policies and governance and things like making policies around quality use of medicines. (IPAC pharmacist)*

> "*… the quality use of medicines and judicious use of medicines from an organizational level making sure that we have access to medicines in all of our sites, making sure that we are giving people the most up to date best evidence for different disease states, different antibiotics, just using medicines in the best way that they can be used, and then just a bit of governance around medication use as well. Because no one's ever been in this position before, there's not much that, prior to me starting, there was no governance on medications and that's really big in the other areas in hospitals, like in metropolitan areas there's a lot of focus on that but out here it just hasn't, there's never been someone to do that before.* (IPAC pharmacist)

The IPAC Pharmacist worked closely with the Medical Director. Given the current environment in the service with many locums, some who had never worked in remote areas, the Medical Director appreciated having an expert in medicines to work with and to give up to date information.

> *"My job is better quality and safety. What I have found is [IPAC pharmacist] she is like a dog with a bone. She keeps emailing me until I do it [change prescribing]. It's good to have someone else interested in quality and safety not just put up with the rubbish [inappropriate prescribing] that you see. No, I don't know why AMSs, the doctors that come to AMSs suddenly can't prescribe PBS items and how little people know about the Aboriginal PBS items and continue not to use them and are totally unaware of it and come to work in these places. So, I don't know where there is a role for educating doctors before they get here or when they get here. I don't think [IPAC pharmacist's] got enough time to do that. You know doctors don't like being talked to by pharmacists in general. The old school doctors … they still want to use their old drugs and stuff like that. It's hard to make people change."* (Medical Director)

There was a need to educate locums and new staff about the correct management and evidence-based use of medicines:

> *"For me you know I've been making her work hard in the clinical governance roles. So together we have got rid of Bactroban which is incredibly hard to stamp out, but we just didn't want Bactroban used any more. And you know so polices that like she does and that's good. And then stuff like head lice, we've changed all the head lice management. We got away from the drug-based stuff. So, bit by bit we're just getting people to use the correct stuff or evidence-based [medicines]. We had one doctor who loved Sudafed. I don't know how many times we'd tell him not to write it, he still writes it. She's trying to make people use evidence-based medicine but it's amazing how people don't read emails."* (Medical Director)

> *"…antimicrobials stewardship as well and especially with a lot of locums that haven't given Bicillin to kids before for skin sores*." (GP Reg)

*"We had a doctor from the Northern Territory who questioned the use the Bactrim for skin infections. I'm thinking 'Where have you been hiding?'." (*Medical Director)

The IPAC pharmacist worked with other staff on developing other policies and protocols. The Medical Director was undertaking an audit of warfarin; described as his *"passion project".* He was undertaking this during the observation and came in several times to consult the IPAC asking *"does this patient need to be on warfarin?"*

Another example was recalling patients for injections. The IPAC pharmacist initiated the system change and worked with the nurses and reception staff to develop an efficient protocol.

"There were issues of recalling patients for injections … when a patient comes in, the receptionist will put an injection on the [CIS], and she said 'how does the nurse know which injection?' because she said 'there's some patients that are on three types of injections. How do you know which one they are coming for, because what I've seen is they're actually missing them' … So then we were able to sit down and come up with a system which was really good. … These are quite hard patients to find, so she identified that and rectified it." (Nurse)

The IPAC pharmacist is involved in a working group to look at the costs of medications for renal patients:

"…there's a lot of drugs that renal patients require. They are very expensive, and the hospital just says oh go down to [health service] and get your free everything. You know we have to look at our budget for pharmacy and [Director Health Services] has got a little working [group] on that." (Medical Director)

The IPAC pharmacist had worked with the hospital to ensure a supply of some medicines is available through the ACCHS:

"…things like that are really expensive drugs. And you know the hospital says here you go [health service], you look after these patients… So today someone wrote a patient [a script] for Tamsulosin, a prostate drug which is like $70 for a script. What do we say then, you can't have it, you've got to go back to the hospital get it through the hospital? You know so we, being a nice friendly AMS, we pay for it. You know they should be more mindful of those sort of drugs when they write them and they don't and [IPAC pharmacists] been pretty good at trying to get some of those drugs (for patients) through the hospital and then getting them sent down here and storing them in the fridge here so that they can be given here and it's all about the patient really rather than the money, which I like. But it's bloody hard you know." (Medical Director)

Relationships and Collaboration with other Providers

Relationships with community pharmacy

The IPAC pharmacist had a strong working relationship with the community pharmacies, built on her previous work. They sometimes spoke "*multiple times*" a day about patients' medications.

"I think it's been very productive between everyone. The community pharmacy I hope has seen this as a helpful person to be within the service. There was certainly no, bad blood, because I left or anything like that, that was not a not a problem. And also, even now I've had a relationship even with their competitor but they are, the other pharmacy in town, is linked with [health service] as well for some of our nursing home patients. So, I've had to sort of branch out as well to make those connections too and they email me with their script requests and things like that because they have seen someone here before." (IPAC pharmacist)

Working with the hospital

The health services' relationship with the hospital had previously been challenging; particularly around communication about medication changes on discharge. The IPAC pharmacist worked with the Medical Director on transitional care, particularly for the renal unit patients:

> *"There's been a lot of work that I've been doing with probably the core roles of transitional care between discharges from hospital and coming back into community and also probably with the renal unit is probably a really big one as well. We've been trying to improve the communication between the renal unit and [the health service]. They have medication changes really, really, regularly and in the past [the health service] has been bypassed in that step for medication changes and they've gone straight to the community pharmacy which makes it tricky when the clients come to [the health service] for general GP services and …their medication list has not been reconciled. So, it has caused issues in the past and that's something that having my pharmacist focus on medicines but then also chronic disease, so someone who's getting dialysis certainly falls into my scope of what I can do." (IPAC pharmacist)*

The Medical Director had taken the IPAC pharmacist to meetings with palliative care staff, and to *"renal meetings, blood meetings".* Loss of information around medical changes was particularly challenging when there were many locums; so, a system needed to be developed:

> *"I've been working pretty closely with [IPAC pharmacist] and you know the amount of information gets lost somewhere between the hospital and here and specialists and here, and medication changes that should have been made, actioned. I think a lot of it is our locum doctors don't have enough regular solid doctors. People just have to learn very quickly, and it doesn't work really. So, a lot of stuff gets missed*." (Medical Director)

The IPAC pharmacist was able to liaise with the other health care providers and ensured there was a process so that the changes were known:

> *"But also liaises with the hospital along with those medication changes for discharge patients and having her on the floor is really good to kind of like she will update everyone with information she gets from the hospital or rang or meetings also*." (GP Reg)

> *"A lot of our patients that have lots of medication changes on discharge, the pharmacist there liaises directly with her. She'll go through it see what the changes are, highlight them and then find the doctor that looks after them."* (GP Reg)

> *"Other processes with discharges are they get uploaded to the GP inboxes in the medical software and I sort of find out which doctors that they're getting allocated to and approach them directly because they get a lot of inbox things and medication changes are sometimes missed. So just to have my finger on the pulse to make sure that these changes happen, if the GP agrees with them, and the renal ones is, there's a whole process where I attend the meeting and I write notes from it and come back and report them to the GP, but also the hospital pharmacy has a medication change form and I help to make sure that those all get uploaded to the patient files so that they are documented*. (IPAC pharmacist)

The IPAC Pharmacist also ensured that renal patients had the correct medications when they were in [town] for *"performance": "as well as organizing renal stuff for patients that have come over up for performance that means for dialysis while they are here who haven't brought anything with them. So [IPAC pharmacist is] organized to make sure they have the bags and everything that they need while they are here for a short period of time."* (AHW)

The IPAC pharmacist was also involved in other activities on occasion that were outside the core project roles including helping other agencies with processes for medication management.

"She also, because I got assigned to the [alcohol and drug] recovery centre at the beginning of the year for a few months and so I dragged her along with me to help me. Because their medication like how they dispense it and all that was so dangerous out there and so she was able to fix that as well. So, she sat down with them. We all sat down together and fixed that within like a month. She had proper medication charts and then they had trained up their staff … amazing." (Nurse)

Project - Enablers

Overall value of IPAC pharmacist

Both the Medical Director and the Director of Health Services said that they could not imagine being able to run the AMS without a pharmacist as part of the primary health care team. This sentiment conveys the value of the role and the understanding of the scope of practice.

"To me, I don't think an AMS can work without a pharmacist." (Medical Director)

"We'll get to the end of the project … we've already identified that we can't function as an AMS without a pharmacist. So, the project stops. We then have to try and find the money to continue with that work, which is really hard to do there." (Director Health Services)

Staff and the IPAC pharmacist felt that the ACCHS could have two full time pharmacists working, due to the amount of chronic disease in the community. One pharmacist could cover [town] and the other the remote communities. The IPAC Pharmacist also felt that the role could also be supported by a health worker to assist with visits. The Medical Director stated: *"but you know two pharmacists wouldn't be enough really, to convey all that information for the amount of chronic disease we have."*

Having the right person

Both staff and patients agreed that the IPAC pharmacist was "the right person" for the position. She had the local knowledge and connections, cultural awareness and the right personality to undertake the role. The research team observed close and congenial relationship with all staff. The IPAC pharmacist had an open-door policy with doctor, nurses, and AHPs. It was commented that the position would not have worked without these traits and experiences:

"This discussion could be a very different discussion if it was a different pharmacist. So, the success for [the health service] of this project is at least in part if not marginally about [IPAC Pharmacist] and her personality and professionalism" (Director Health Services)

The pharmacist was also ***persistent, "very resilient"*** *(DHS – FG) and* **proactive**. There were a number of setbacks at the beginning of the project at the site. The IPAC pharmacist started late (in November); was unable to join the other IPAC pharmacists at an off-site induction and there were significant board and staff changes at the clinic and service. Due to the changes, clinical staff did not know she was coming or her role:

"So, it was really up to me to sort of introduce it at things like the morning meeting or in-services and that took a long time because of the staff changeovers." (IPAC pharmacist)

"I think the next person is going to obviously have an easier run. But to me it's getting that respect which you only earn through good work and stuff. To me we see a lot of people come and go with these projects. Some are good. Some are not so good. Some of them you never remember again so … I think you need to be careful how you put that person into an AMS and probably need to look at the AMS before you just put them in there and where they are. … A lot of people would have run for their lives if they were put in the same position as [name]. And they would have just thrown in the towel and gone nope can't do this. I think a lot of people do in remote. ... I think she obviously got massive

support around her from being in community for a long time. She's got ties everywhere. So, she's the ideal person for that job." (Medical Director)

Having someone with the right "organizational fit" and right personality was important that the skills and experience.

"Yeah absolutely. Because you can look at somebody's experience and qualifications and all of that kind of stuff. But the important thing you need to factor in when you're looking at stuff for AMSs is organizational fit and are they going to fit with the team. And that's more of a personality trait than a skill set. Something that you can't learn from. So, we were lucky with [IPAC pharmacist]." (Director Health Services)

"she thinks outside of the box." (Nurse)

Previous relationships and links with the hospital help bring different services together and build better relationships:

"She's got a lot of connections all over the place. So, it's really good. We struggle with the hospital." (Nurse)

The pharmacist understood the nuances of the role, need to develop relationships and build rapport and to be flexible:

"I would say that, don't rush the process. Don't go too hard too early. Make sure that you are present. I think that that is a huge [reason] why I am starting to feel valued is because people are coming to me now because I've been here. I think this role would have been really hard for someone who moved to [town] for this job and to come into this place with no knowledge would be nearly impossible.

"I think communication skills; I would say a huge one. I think you've got to be flexible and adaptive to what happens… you've got to kind of work with what you're like given and you can't expect that your day is going to be exactly how you put it in your appointment book. … It's not going to be that and you're going to get a call from someone that has come from [remote community] and then gone to [urban centre] to get their fistula for dialysis, and then they come to [town] and they are starting dialysis and then they need medications but they need all of this other stuff and then that's a bit of time to figure all that stuff out. … every day is really different. So, it's, you've just got to show up and be there. Go with the flow." (IPAC pharmacist)

The IPAC pharmacist perceived that clinical skills and being HMR accredited were not essential to the role:

"The clinical stuff, I would say it will all come to you. You have, all the resources that you need. … I think that my job is still successful even though I'm not HMR accredited. I'm doing [the accreditation course] because I want to learn more. I wouldn't say that if I was interviewing someone and they didn't have it, I wouldn't give them the job." (IPAC pharmacist)

Flexibility of being able to use the project as Service required

Managers at the ACCHS felt that there was flexibility in how the IPAC pharmacist role could work at the service. For example, focusing the role on systems issues in the beginning; and setting up processes that would allow the IPAC pharmacist to focus on patient centred care:

"We needed to have that flow in our clinics before we could say ok well now we can effect patients through. And I think the project flexibility to allow us to use [the IPAC Pharmacist] in that fashion is definitely a winner. If we hadn't have had that flexibility, [the IPAC Pharmacist] might have spent six months sitting here in the clinic twiddling their thumbs whilst she waited for that to build." (Director Health Services)

However, there was a tension between the flexibility and autonomy, at times the IPAC Pharmacist felt that she would have liked more direction in the role. This may have been because she did not attend the formal induction with the other pharmacists as she had started later:

> *"There was a lot of autonomy in what we were doing which makes sense because all the services are really different. But it also meant that there was not as much structure for the role and what we were trying to achieve. I guess they did want it to be we make it our own, but that was hard with all the different types of experience that people have already had so I think there could bit more support there."* (IPAC Pharmacist)

A theme throughout this case study was that due to the health services remoteness, the number of clinics and recent organisational and workforce changes; the IPAC pharmacist needed to work outside the scope of the 10 core roles. Some procedures and processes needed to be established prior to the IPAC pharmacist being able to focus on patient centred care. Health services needed to **co-design** the role to taking into account local situations:

> *"I think the project needed to be tweaked for services. We're not one facility. And I think the project had in mind one facility, [with the] pharmacist in there with their own clinical space being able to see a throughput of patients. But we are not one facility, we're five facilities across the size of a small European country. And that needed to be taken into consideration."* (Director Health Services)

IPAC pharmacist also commented that some roles could not be undertaken before policies and procedures, such as supply of medicines were established:

> *"So the first bit of time was just sort of shuffling around between the two clinics also going straight up to the remote sites visiting them physically because there was an instruction that we needed to get those things sorted … as part of the pharmacist role, which was making sure that there was a supply of medicines and like a consistent supply and a quality supply of medicines to the outreach sites because they don't have, they didn't have clear lines of like pharmaceutical access."* (IPAC pharmacist)

Managers perceived that, '*while not in the project brief*' this flexibility was allowed:

> *"Well I felt bad, you get these things saying 'how is the project going?' And we are actually doing other things as well. And it made us feel bad that we are not using [IPAC pharmacist] in the correct perfect way. But [the Project Coordinators] didn't seem to worry too much*." (Medical Director)

> **"***The discussions that I've had with [NACCHO project coordinator] were "I know that [IPAC pharmacist] is not doing project specific work but this is work that we need her to do so we can get ready to be able to do the project'*." (Director Health Services)

The IPAC pharmacist worked with other staff in the remote sites to develop imprest lists for the remote clinics, and also with a private community pharmacist based in a remote town, that serviced two other remote towns, where the ACCHS had clinics. The community pharmacist was new to remote work and the IPAC pharmacist provided support for the pharmacist through developing sustainable systems for tracking stock and obtaining further medication supplies which benefited the ACCHSs patients as their medications were in stock.

> *"I suppose the work that I'm doing with our **remote sites**. None of those patients are consented to IPAC so they're not patient focused activities. The way that sort of came about as part of the project is that people need their medicines so we can't even start to treat chronic disease if they don't have access to their medication. So that was sort of the theory behind doing that sort of work, but it did not fit in with an exact ten core roles and also [there were] no consented patients in those areas."*

Project - Challenges

Changes at health service

Changes to the service and to staff had been a constant challenge for the entire time the IPAC pharmacist had been employed. The ACCHS agreed to be part of the IPAC project under the old CEO and on arrival the IPAC pharmacist said "*no one knew I was going to start or what I was here for.*" (IPAC pharmacist)

> "*…when I showed up on that day…[they] didn't know that I was going to be here. So, there was very little, if not no understanding of what I was doing except for maybe up at the really high management who had said yes to the project and they had those discussions already in that introduction. So, it was really up to introduce it at things like the morning meeting or in-services and that took a long time because of the staff changeovers*." (IPAC pharmacist)

> *"It was just always changing from then on. I think I've had five or six line managers in my time here and there's been one big restructure and then different role changes within that as well. …When I first got here I didn't quite understand all of the intricacies of the organization and I was trying to figure out for myself how to navigate through."* (IPAC pharmacist)

There were three other issues that impacted on the project. Firstly, a manager from the service felt that they did not have adequate input into the recruitment of pharmacist:

> *"And look I think that that was partly luck as well because I mean we weren't involved in the recruitment process either so that was done through NACCHO."* (Director Health Services)

Secondly, the service was 'not ready for the project'. Therefore, the IPAC pharmacist had to be quite assertive. There was a tension between the needs of the project and the needs of the service:

> *"Well when I first got here it was just there wasn't that much of an introduction. I think the manager who was here at the time had no idea that I was."* (IPAC Pharmacist)

> *"I'm not sure if [health service] and the project had the same expectations. So I think the CEO who was first approached to do the project changed [in] June/July last year. And then a new CEO came on board so I'm not sure if the project had already started and in the works and then the new management has come in as well."* (IPAC pharmacist)

Clinicians were not sure what her role was and how they were meant to work together:

> *'I think one of [the IPAC pharmacist's] problem was she just got dumped into this really. We had no idea what she was really going to do and I think we made a lot of it up."* (Medical Director)

> "*Even the IPAC pharmacist's line manager didn't even know much about the project when she first started either.*" (Director Health Services**)**

Thirdly, there was not as many patients currently coming into the service and when they did present opportunistic care often mean patients were overwhelmed. The IPAC pharmacist perceived that community dynamics meant that sometimes fewer patients attended the clinic:

> *"And then when they [patients] were here because they weren't coming as often… they were already trying to do everything else... if they have already been here for three hours and then I'm sort of trying to tack on to the end of that it was like, do I have to? And of course not. So, if there was an option there to, to leave then they would definitely take it."* (IPAC Pharmacist)

Workforce retention of GPs

Due to changes in the health service and staff, the IPAC pharmacist had been at the service longer than most of the medical and nursing staff, a unique position, different than at the other IPAC sites.

> *"When I started we had lots of locums as well. We weren't familiar with the patients or medications and whatnot. So [IPAC pharmacist] was actually one of the stable people that was around all the time. She would have seen patients before and she knows them and can tell me about what their medication issues are before I meet them. So that was really helpful. I assume other places don't have that luxury*." (GP Reg)

> *"…staff retention seems to be very tricky particularly in this in this area in [description of area] just because it's so remote. Since I've been here there's been a couple of regular doctors come and go and also lots and lots of locums. So, locums spanned from one week to probably three weeks that they're here for and the longest regular doctor [GP Registrar] that's been here, has only been here for six months and … today is her last day."* (IPAC pharmacist)

> *"with staff changes for one and then restructures and different people coming in, I feel like I'm explaining what I'm doing weekly if not more. And I think that's been a bit of a barrier to the success of the project because there's just been not enough consistency in it. …At the start of the project I was working between the two clinics and then I would get asked to go on a trip up to one of the other sites and then I come back and there's not a room available. So, if I'm not here at all times, then I guess because, because all the other staff are changing all the time … and they just forget that you're here*." (IPAC pharmacist)

Locums may have misunderstood the role, as pharmacists are often stereotyped to dispensing behind a counter.

> *"You know you got all these stereotypes that you expect from people's roles. There is never just a pharmacist wandering around talking to you. That's a bit much you know. Normally they just stand behind the counter*." (Medical Director)

> *"There's some people who are who are here to do the GP service that they are getting paid for and not to sort of branch out into other areas of [health service] that are available. There's also doctors who come here that may not see the value in a pharmacist and there's also at some points in time, two [pharmacists] here, so they don't know that I'm part of [the health service] and they're part of somewhere else. We're both just pharmacists so they might go to the pharmacist who's sitting in the pharmacy because that's where the pharmacist normally sits*." (IPAC Pharmacist)

The IPAC Pharmacist felt that she was not working to capacity as not everyone understood her role.

> *"[I'm not working] to the full capacity that it deserves. I think that they understand that I know about medicines, that I can talk to patients about medications and do a review and all of that kind of thing but I don't think that they quite … grasp how big this could be or how important it could be."* (IPAC pharmacist)

She also did not feel like she had been able to fully utilise her skills and expertise.

> *"at the start it was it was tricky to sort of even figure out what I was supposed to be doing. Yeah. Yeah. So just trying to make myself as useful as possible but certainly now there's lots more sort of people coming in asking me questions. I suppose it's been a little bit different as well because there was a pharmacist based here a couple of days a week already for the supply side of things. So, the general before I got here just sort of little medicines questions would go to them. So 'oh what should we do for this' or 'can we do this or do you have this' one whereas like all of that stuff is in the Medicines Information core role, is all those little things like drug availability on the PBS, or pricing or*

just if it's available or if it's out of stock, all those little queries would go to the pharmacy because that's been here for 10 years. Yeah. And so that was a little bit unique to this service." (IPAC Pharmacist)

As there were not as many GPs in the service, there were not as many patients receiving advice and management of their chronic disease. At the time of fieldwork medical staff consisted of the Medical Director and the GP Registrar (who was leaving that week) and two locum doctors. Due to the workforce issues, patients may not be able to see a doctor if they were a 'walk in' after 11am. Patients sometimes had to wait for lengthy periods of time.

"There's just something that I'd like to raise and it's not stirring or nothing like that, if you can make something better it'd be good. You know when you're waiting to see the doctor sometimes, it's taking forever. You know what I mean. Hours and hours and hours. Now you get some of these old people or anyone that's got the diabetes. [That] stresses you out and makes your sugar levels go up or down or whatever. Is there any way that you can look at? If nothing can be done fine but at least look at it." (Patient)

Patients also commented on the change to staff and at the focus group and in interviews talked about medical professionals they had seen many years prior and the difficulty they had building relationships with locums:

"all these locums come through here they'll take you off this for your blood pressure and then you don't sleep." (Patient)

While this has been a challenge, it has also had benefits. With locums and new staff not knowing the service without a pharmacist so the role is seen as an essential part of the team:

"… it's good we got rid of all the old school people and someone like [IPAC pharmacist] now she's there and we should keep her. We need to keep her in place so that the new doctors just assume that that's always been the way. Because to get respect is hard and you don't know what that person's jobs is you just ignore them or you don't see the value in them. … when I'm not here, I'd like those processes to keep going ... I think that's the hardest thing you've got rapid turnover, staff problems and when we retire, these people don't know what the systems are and it's really hard to make and secure and so that people don't change them. I think we've had that many people come in and want to change everything. You know its hard thing for us when you sort of put all these processes in and someone goes oh I think I know better and that's really hard especially around pharmacy. we've the problem in the outlying communities, it's been horrendous." (Medical Director)

Furthermore, changes had been made to the AHPs role, and they now had a wider scope of practice than the original AHPs when the pharmacist commenced:

"when I first started there was only two health workers and now we've got four. So, the two health workers stayed in the clinic. One of them couldn't drive which meant that they didn't ever go out. They were just too busy to go out. So that meant that if I couldn't reach someone on the phone, there was no other way to see them." (IPAC pharmacist)

Space/clinical room

Not having a dedicated clinical space was difficult, particularly at the start of the project when the IPAC Pharmacist was working between two clinics.

"… at the start of the project I was working between the two clinics and then I would get asked to go on a trip up to one of the other sites and then I come back and there's not a room available. So if I'm not here at all times, then because all the other staff are changing all the time … people coming in and out as well and they just forget that you're here." (IPAC pharmacist)

At the main clinic she was located a room at the end of a corridor far away from the doctors *"when I was at the end room there were not as many opportune moments to see people or GPs."* She then was moved to a room opposite the GPs, which meant she was visible and enabled the *"open door"* interactions, "*I moved to a room near patient waiting area. I will see people as they leave."*

No HMR accreditation

The IPAC pharmacist was not HMR accredited, although she was undertaking her accreditation training at her own expense. This meant that the ACCHS could not bill for HMRs. The Medical Director also felt she was inexperienced in that area and being accredited would mean there was *"an official document saying, you should stop this drug"* as this had more credibility: "*this drug interacts with that because you know I think a lot of doctors don't really listen always.*" (Medical Director)

The ACCHS did not access HMRs with other pharmacists prior to the employment of the IPAC Pharmacist:

> **"***There is one, now two local pharmacists who are HMR accredited. [The health service] is not super interested in utilizing them when they have me. They're sort of happy to forego the billing side of things because I'm within the service and we try to get that rapport."* (IPAC pharmacist)

In lieu of HMRs, the pharmacist undertook non-HMRs as part of the project. She would have liked further training in this area.

> *"The HMR process or the non-HMR process was really individualized and I'm not HMR accredited so I found that really hard to figure that bit of it out and come up with a process for that and things like recalling patients and the differences in software; I thought we could have a little bit more like training in best practice."* (IPAC pharmacist)

Project and limited funding/Sustainability

Underlying the project was sustainability. During the site visit many health services staff commented to the researchers that core funding was required for ACCHSs to continue the integrated pharmacist service. Some patients also commented that the service needed funding to keep the IPAC pharmacist. The limited time period and funding was a challenge, typical of projects in the sector.

> *"I mean my concern with those kinds of projects is that they funded for a specific length of time and it's almost like they're funded with the plan that they're not going to work, because there's no then plan for ongoing funding.*
>
> *…because AMSs and Aboriginal communities are used to this and why funding things. It's a project body part funding, you get it, it's like STI funding, we just lost our STI funding. We're in the middle of a syphilis epidemic and we had our STI funding pulled. But they get funded and all of a sudden government's got a new priority. A new you know thing that's going to win votes at the next election and that's not a priority anymore. And communities like well actually we really need that service. How do we continue to function without that particular service*?" (Director Health Services)

Summary

The ACCHS is spread across five sites, including two clinics in town and three in smaller towns, considerable distances from the main clinic. The IPAC pharmacist at this ACCHS had worked previously in a local community pharmacy and was known to and knew the community. Although the ACCHS was not prepared for her role, due to changes and workforce issues, because of her previous connections, personality and persistence and resilience she developed the role, focusing of being the services' medicines expert.

The service adapted the role for their needs, initially focusing on developing systems and policies that would enable the pharmacist to practice and focus on patient care. The IPAC pharmacist had become an important and integrated member of the primary health care team. The pharmacist answered medication queries, educated health professionals and provided input into various committees to support the ACCHS and the

other local health services. She undertook medication reviews and was currently completing her HMR accreditation training to improve her skills in this area. The GPs valued the pharmacists input. The IPAC pharmacists facilitated communication and improved relationships with community pharmacists and the hospitals, particularly around discharge summaries. Communication was made easier due to pre-existing relationships the pharmacist had prior to the project.

The pharmacist had also developed good working relationships with the Aboriginal Health Workers and Practitioners, patients and the community. Patients and health professionals highlighted changes to patients' understanding of medications and adherence. A strategy to facilitate understanding used by the IPAC pharmacist was to co-design a medications list with the patient which included a list of patient's medications, a description of each medication, when it was taken and what the medication looked like.

Managers commented that the health service will continue to have a non-dispensing pharmacist role, citing that it was an essential role, despite the limited funding and time period of the IPAC project. At the time of site visit, the Health Services Director and Medical Director reflected on how they had managed to operate prior to the project and felt that their ACCHS needed the non-dispensing pharmacist role moving forward: *"I don't think an AMS can work without a pharmacist*." (Medical Director)

3.5.2 Case Study 2: Regional Health Service

"This shits me you know, you get a program and it works and bugger me dead if they don't pull the plug on it." (Patient)

Background of service

This ACCHS is located in a large town with the population estimated to be just under 80,000. Approximately 7.4% of the population identify as being of Aboriginal and / or Torres Strait Islander origin. Major industries include mining, tourism and horticulture. The town is classified as a RA3 according to the Australian Statistical Geography Standard-Remoteness Area (ASGS-RA)[67], and a 2 on the Modified Monash Model (MMM)[68].

The ACCHS was established about twenty-seven years ago. Since 2014 a change of service design from a disease-based central model to a decentralised clinic. This is a "hub and spoke model" with seven (7) clinics located in different areas. All the clinics have the same mix of teams with size of the teams being the right size for the population. The philosophy is that for continuity of care and patient services, it's better to have smaller clinics closer to where people live and is based on the Institute of Urban Indigenous Health (IUIH) model of primary health care (from clinical director interview). The 7 clinics are located around the town and include a women's clinic and a men's clinic. There are 17,000 registered patients and regular patients sit somewhere around 8,000 to 9,000.

The workforce is very stable, with no locums and one GP who has been employed at the service for over 20 years:

> *"We employ about 32 GPs but about 14 FTEs so we have a lot of part time GPs staff, and we have registered nurses, AHPs. We've got very highly rates of Aboriginal staff and each clinic also has an Indigenous outreach function. We employ a pharmacist in a public health role whose responsibility is to help us maintain imprest, to control costs because we are not eligible for Section 100 but to contain costs and to ensure quality use of medicines in [the health service].*" (Medical Director)

> *"At any given time, we usually have anywhere from seven to 10 registrars across the board as we are a teaching practice."* (Outreach Worker)

Profile of IPAC Pharmacists

One IPAC pharmacist IPAC pharmacist A) had trained in Melbourne, but had worked in the state/territory for 13 years, in four different towns, and had extensive experience working with Aboriginal patients. While IPAC pharmacist A had mainly worked in hospitals, she had experience in ACCHSs, and had done HMRs for the service, as an external provider, for 3 years so had strong connections with staff and the service. She helped write the position description and advocate, find funding and recruit for the public health pharmacy position which exists in the ACCHS. She was HMR accredited and very experienced in Aboriginal health (including time as a renal pharmacist at a remote hospital). She had commenced her role in October 2018.

The other IPAC pharmacist (IPAC pharmacist B) was already employed at the service in a part-time public health pharmacy position. She had trained overseas and undertook locum work in North Queensland while on a working holiday. After a brief return home overseas, she moved to [town] and worked at the local private hospital for 12 years. She then commenced at the ACCHS two years ago (2017). Her public health pharmacy position in the service, prior to taking on the IPAC position, was non-dispensing and focused on governance, medical safety and audits. There was no patient-related activity within the previous role.

IPAC pharmacist A worked 5 days across 3 clinics (1.5 days at Clinic A, a half day at Clinic B; and 3 days at Clinic C). She was originally at Clinic C for five days but found that there were lots of RDOs on Fridays. Furthermore, it was about a 30-minute commute time to the clinic. IPAC pharmacist B worked two days a week in the IPAC role, 1 day at Clinic D and one day at the Clinic E, and 3 days in the public health role.

Relationships with patients and community

The Pharmacists had well developed relationships with patients and the community and were culturally safe. The community respected and appreciated the way both pharmacists developed relationships with patients and their communication skills:

> *"So she's (IPAC pharmacist A) built that trust and that relationship with them now. So you know and like anything you know word of mouth you know it'll spread with our Indigenous people*." (Outreach Worker).

> *"I've never had any complaints from patients about [IPAC pharmacist B]. They always were really happy to see her and they were always there, everyone seemed very happy with her communication as well. There was never a situation where they [said] 'I don't really understand what she was saying'. I think she gave really clear advice to both the patients and to me*." (GP-J)

Both IPAC Pharmacists understood culturally appropriate communication and developing relationships:

> *"I think really the pharmacists who work in our clinics really have a better understanding of the social situation of our clients and obviously it's much easier for the follow up for discussing things as well if it's someone that you have a regular have regular contact with at work*." (GP-EF)

> "*You know I guess that's why I work in Indigenous health; you get as much out of it as the patient does most of the time. And that's a cool thing about IPAC actually, just for the record, is that I really liked being able to follow people up, because doing HMRs for so many years, it's just a one off thing. You might see someone again in twelve months if you're lucky, they're not going to remember you, you probably won't even remember them. You just don't get to close the loop, see everyone again, check how people going. Whereas with IPAC you have to find people again, which is good, because you know you build up those relationships. People see you more than once because as we all know, in any clinic situation but particularly in Indigenous clinic setting people want to build up rapport. They want to see the same person more than once. So I feel like I've really liked that part of IPAC, with that type of follow up …. You know people calling, … they call direct to us now and ask questions about the medicines. How successful is that? I feel like happy days when that happens*." (IPAC pharmacist A)

> **"…** *having, I think, a really gentle approach with patients. Patients would tell me that they're taking their medicines and see [IPAC Pharmacist B) and I'd find out, yes they're taking all their medicines but they're taking both their mane and nocte dose at one time and that's like that she'd get this very honest information out of them so as someone who's on the team for the patients she was just really great in that respect*" (GP-ET)

Integration into the team

Both IPAC Pharmacists had integrated well into the PHC teams, despite working across different clinics. They were also part of the ACCHSs Health Systems Team. Both IPAC Pharmacists were familiar with the service, having worked internally and externally in other roles. They had been given a uniform and were involved in staff meetings.

> ***"…*** *it makes a big difference having the shirt. You are part of the team, you're one of the good guys. It's really good*." (IPAC pharmacist A)

The IPAC pharmacists attended all staff meetings that involved every staff member across the clinics and gave education sessions. They also attended health systems meeting so that they could remind staff they were in the clinics.

> *"I was invited to the clinic planning day. So that really helped because I was able to talk about the project and push the services. Other than that, I think because I was already here as a pharmacist….*

I was already kind of part of the team anyway, I wasn't coming in from outside. So I think that was a big bonus." (IPAC pharmacist B)

Their integration into the PHC team was enhanced by constantly reminding other staff of their role and patients who could be referred to them:

"I think [we are] very well accepted …. Obviously the challenges of setting up a new service I think because it's never been provided before so it's not foremost in people's mind I don't think. So that was a challenge to start with just the constant reminding that we're here and we need referrals and bugging the clinicians rather than bugging the clients." (IPAC pharmacist B)

Working across all the teams and with different healthcare professionals also assisted with the integration of the role:

"Because the outreach workers are [the] main contact for going with us on the home visit. So working closely with them there [also the] Care Coordinators. My first whole handful of clients from here was through the care coordinators rather than the GPs until the GPs kind of got up and running. So the care coordinator here was really supportive. We haven't got much allied health but in terms of the physio … I've referred a couple of people to her and she's identified a couple for me and the social worker we would work closely with as well ... The whole team works well together." (IPAC pharmacist B)

As they had worked previously with the PHC team it was easier for the pharmacists to integrate. There was also recognition that the pharmacist needed to be part of the team:

"I think we work more as a team in this service. I think the clients we have [have] very complex needs … so people have so many chronic comorbidities that and we also know that managing chronic disease seems to be making a difference to survival. So I think it's essential that we keep providing … quality medicines. So I think pharmacists are an essential part of the primary health care team and I think having them actually embedded in the AMS just means that the service is sort of individualized to the client. I just think it's a much better service when they can actually do that clinical sort of one on one with people rather than being at arm's length …. without having the individual contact. So I think if we want to keep trying to close the gap I think pharmacists need to be part of the team." (GP-EF)

Patient recruitment

Patients were recruited for the project across clinics predominantly through referrals from GPs. The ACCHS did not want the IPAC Pharmacists "cold calling" people and so consent for the project was only able to be sought from patients who were referred.

"…people already have kind of a high burden so you [do not want] to harass anyone into it. Yeah but you know it worked well because then we knew that anyone referred was viewed as needing a medication review as well because how do you identify people in the waiting room as to whether they need a review? So we knew that everyone was appropriate and then, they needed the service anyway… I would do the whole review anyway because that's what they were there for and then at the end I … do my spiel about IPAC and whether they wanted to consent. So it wasn't first up I feel like it wasn't putting people off as it wasn't first up. you provide the service anyway because that's what you're going to do and then at the end did you want to also be a part of IPAC." (IPAC pharmacist B)

Key roles

Both of the pharmacists implemented the ten core roles of the IPAC project. The service already had a non-dispensing pharmacist to assist in development work on policy and systems level. Medication-related policies and procedures were generally in place, however, not directly included as part of the ten core roles.

Home Medication Reviews

Home Medication Reviews were a key role of the IPAC pharmacists. Both pharmacists were HMR accredited and had undertaken HMRs with Aboriginal and Torres Strait Islander peoples prior to the IPAC role. Having the flexibility to undertake the HMRs in the clinic, rather than going into people's homes was appropriate for a proportion of Aboriginal people. However, with the support of an Outreach Worker home visits were also available, depending on the needs of the patient:

> *"So I think it has allowed in fact before that we weren't doing any in-house HMRs or RMMRs. So they were being sent to other community pharmacists and actually from my point of view it's so much better to have it with our in-house people, much better. One because they know our clients, if there's clients who are sensitive or for whatever reason shy or whatever, they can take one of our family support workers or Aboriginal Health Workers out with them, but they can also see people in the clinic."* (GP-EF)

> *"One of the things we've been really interested in is the Home Medicines Review not in home. I'm sure people will tell you about the barriers to Aboriginal people having home visits."* (Clinical Director)

> *"And if [IPAC Pharmacist] had any concerns about medication storage or anything like that she would do a home visit. So, there was still that option of getting her to do a home visit if there were concerns about that, but I think having the service within the clinic works a bit better than a HMR. I find it much easier to sell an IPAC pharmacy referral to a patient than an HMR*." (GP-J)

The IPAC pharmacists being based in the clinic saved time for GPs and patients. GPs were able to seek advice on medications and their side effects, which reduced the need for referrals to specialists in some cases. GPs could also refer patients to the IPAC pharmacists for HMRs (one pharmacist had conducted HMRs for the service prior to taking on the IPAC role, as an external provider). They were reportedly conducted in a timely manner as patients could be seen again by the GP immediately after the review.:

> *"I think it's definitely saved me time. It's avoided a few referrals to… specialists where I think, 'I don't know what's going on with this patient. Why are they having these symptoms?' And then [IPAC pharmacist] does a review and she's like 'Well you know this dizziness is a really common side effect of this [medication]. …. Why don't we try stopping this and we'll see what happens?' We do and it works. So I think it definitely is time saving from a patient perspective because they're not sitting around waiting for a public referral in the hospital system for months and months … From previous experiences referring for HMRs that would sometimes take a couple of weeks and then it would take weeks and weeks before the pharmacist would put together their recommendations, that letter, could take a month which could be, it's still handy but it can be quite tedious. … You got a recommendation from [IPAC Pharmacist], especially if you were in the same clinic. [IPAC Pharmacist] would say 'Thanks for that referral, I just saw this person and … what do you think about these changes ...' So you'd have like an answer that day."* (GP-J)

> *"Much quicker, [timelier] and then you could make the changes quickly, you can make the changes there and then because [IPAC pharmacist] would often talk to the patient about the changes. And you'd say to [IPAC Pharmacist] 'Does the patient know that were going to stop their glicazide or whatever?' And she said 'yeah, I talked to them about it' and I'd say 'I'll just do it now'. So much, much more efficient. Otherwise with a HMR you'd have to get them back to talk about. I'd often [talk] to the patient after [IPAC pharmacist] anyway but with an HMR they'd have to specifically make an appointment to come back to talk about those changes before you could make those changes which isn't always easy*." (GP-J)

The reports provided by the IPAC pharmacists were also better suited for the busy GPs in the clinics:

> *"Also the reports that you get back are much easier to read …You get a HMR report back from a community pharmacist and it'll be six pages long and you just think 'I don't care just tell me the main*

summary of the key points here'. I don't have time to read six pages of this when there's two points at the end. Whereas the IPAC pharmacists they were much more succinct, much more efficient at sort of getting their point across and making changes." (GP-J)

Most recommended changes to prescribing from the HMRs were adopted by GPs:

"A hundred percent. Oh no I think there's maybe two that I didn't have any recommendations. So, I guess it's ninety-nine percent. …." (IPAC pharmacist B)

"Let's say … maybe 75 percent of the time and often it's, was things like you know consider tapering of their PPI. Consider increasing their statins, doing a creatinine clearance and sort of having an alert that this person is sort of on the brink of having to reconsider whether they can be on this medication or not. So picking those things up." (GP-ET)

While some GPs took on all recommendations *"there wasn't a single patient that she saw that she didn't make a worthwhile suggestion or comment."* (GP-J), one GP did not take up any of IPAC pharmacist B's recommendations. However, she noted that this may have been due to his clinical experience:

"He's a very good GP. So it's not bad. It's not bad prescribing or you know wanting to ignore my recommendations. ... And … it's not any definite thing that I recommend. It's just 'hey would you consider this' and he considers it and then just it's 'no thanks, I'll just carry on with what I'm doing'. He's always very polite. Thanks for your suggestions. So it's not anything … doesn't want to listen, he does consider it. … he's like no thanks." (IPAC pharmacist B)

Recommendations were formally reported through the CIS (Communicare) and flagged for the GPs to follow-up. However, often recommendations for changes to medications were discussed in collaboration with the GPs:

*"I think every recommendation [*IPAC pharmacist B*] made was appropriate. There was only ever once where she said this should we increase this statin, and I was like 'oh no I just started it' and she was like 'oh yes you did'. … that was done together collaboratively. …. But [IPAC pharmacist]'s recommendations, I can't fault. She's always gives a different aspect to patient treatment and their medication use and they're compliance. So I always found huge amounts of benefit with [IPAC pharmacist]'s recommendations*." (GP-J)

Understanding that prescribing may be due to different providers:

"And you know we often in Aboriginal health services often patients don't often see the same doctor. So, they go from seeing one doctor to another to another and then their medications just tend to accumulate, and they don't have one doctor that sort of sits there and manages and says 'You know now you're on eight medications'. It's just oh you've come in with your reflux today we'll start this medication. Whereas I think in mainstream patients tend to have, this is generalizing, but they're more likely to have a single GP who sort of has a good overview and manages it whereas in Aboriginal health organizations they'll see a different person and often you don't want to change what someone else started. So often patients just accumulate medications until a pharmacist comes along and says 'Why are they still on this?' You say' I don't know I've just been prescribing it because they've been on it for four years. And then you talk to the patient and they haven't had any reflux symptoms for that long. So I think for all of those reasons, it would be beneficial to have someone regularly in that role." (GP-J)

HMRs were also seen as an income stream for the service that could enable the IPAC role to be financially viable without project funding:

"I think just being integrated into the team's worked really well and just making the medication reviews part of, … chronic disease management. The number of claims for 900s [item 900] has gone up dramatically. So another financial benefit to the health service and I think overall although we didn't meet any of the [project] targets and [there] probably wasn't as many referrals as I expected but I think overall … we still had a good number of clients through." (IPAC pharmacist A)

"It does help that the health service can bill for our work. … I know it's not the be all and end all but until pharmacists have Medicare billable numbers it's the only one we got. And I think that that's just a nice extra thing for the health service to be able to do." (IPAC pharmacist A)

Increasing patient understanding of medications

GPs, pharmacists and patients noted that patients' understanding of their medications had improved due to working with the IPAC Pharmacist. Patients often commented that no one had explained their medications to them before and now they had better understanding:

"…most people's comment, without a shadow of a doubt, is something along the lines of 'thank you so much for explaining that all to me. No one's ever told me what each of those tablets do'. That's what you just hear nine times out of ten and again, heart happy, when you hear that stuff. Everyone's right to know what the medications are for." (IPAC pharmacist A)

"So, I think the most useful thing is actually the client contact. … when they sit down with people and talk about their medicines because I think the people we see actually have been really underserviced in that sense because often they haven't had much involvement with community pharmacists. So, some of them may have lived much of their life in a remote community where there are no pharmacists, or the medications get sent out and given out by nurses or doctors or whatever. Or they might be sent out as packs and just given out, so they don't actually have direct contact with a community pharmacist. Some of the ones who have always been in town, the same thing might have happened with [health service], where their medications got sent here or was given out by us. So, they haven't had that input from a pharmacist. But the other thing is we've got a very disadvantaged population, most of whom who don't have access to the Internet or they may not have very good literacy so they don't often have the same access to information about their medications [that they] have been given for years have been given all these different medications without anybody really spending the time to explain what they are. And in fact, the GPs and nurses often can't explain because … we often don't know which tablet is which and we get confused when … different brand names get switched so it can be confusing to us which tablet is which. And so that's why it's just extremely valuable. I think that people actually get someone to sit down, go through their concerns, actually can say you know what each one's for, what the interactions might be what side effects might be." (GP-EF)

Education emphasised why people were taking their medications. Patients were able to feed back their own concerns about medications:

"I've found a lot of the clients that we've visited... they know the basics about why they take their medications whether it's for diabetes or a chronic illness or whatever. But breaking it down especially when you get the Webster Pak and you've got could be anything up to 20 odd tablets in there, but actually breaking it down and informing the client and educating that client about what that specific tablet is for and how it's actually helping them with the chronic illness and things like that. I mean every client I've got to say they were informed of the medications that they were taking and actually educated as to why they take them. Because a lot of it I found in the nine years that I've worked here and I've done several roles, I used to work with the chronic disease team as a support worker. I've found a lot of those clients didn't necessarily know what they were taking their tablets for, it was only because a doctor had actually said well here look these are your tablets, you just take those at these specific times set out on your Webster Pak and you know, all good. We'll see you in three-months sort of thing. But with this with this program here, …their medications are being reviewed right there and

then because the client is giving the pharmacist feedback right there and then as to whether that tablet is helping them, that [for example] that tablet makes me feel sick. So the pharmacist is able to look at it, document that, write it down and without the actual client having to come back into the clinic necessarily those medications can be reviewed with the pharmacist and the GP." (Outreach Worker)

One IPAC pharmacist had had a patient call up during observation concerned that her medication had been changed since being discharged from the hospital (see boxed case study).

Case study: Understanding of Medications

I reckon compliance has picked up and you know people's understanding has really picked up. And you know when people question stuff, that's when I really know that they understood. Like even our lady today, I guess she's just in my mind because she rang and we went to see her, but how's that [her] noticing what changed from morning to night time. [I'm] impressed …. She's wouldn't have any education per sae. She's not someone that you would expect … to be quite that on the ball with her tablets. So I mean beautiful things like that where people really surprise you or people who you know they were falling in real pickle with their diabetes and maybe you do see a good change with it in their HbA1cs. …often they get worse but you know when you've got someone and then they understand their tablets and you realize that it is increasing compliance. Amazing.

[She is] a complex patient, multiple comorbidities. You know in and out of hospital, in and out of the health service. She's actually just gone on to dialysis in the last couple of weeks. And so all her medicines have essentially changed because now she's on dialysis and even when she picks up her medicines from now, [they] will change, it won't be from the pharmacy here at [Clinic C], it will be at the renal unit and she was really worried that there was too many in the morning now. …. And I tried to reassure over the phone that that is probably very fine and safe and has just been from a different doctor and you need some change now that you are on dialysis. Please take your medicines as they packed. She requested a home visit which I'm happy to do and had capacity to do just today. So I went out in the afternoon. Before that got a list of all of new medicines from the renal team. So actually now I've got what her new regime for her renal stuff is so I could check it and so I could explain it all to her. And she's spot on. Like most of the things have changed to the morning. Most of that is safe and fine. But you know on review actually she has noticed a couple of really good things like particularly the pregabalin that she normally had one capsule at night, is now two capsules in the morning. That's a sedating medication that is normally given at night-time. I can't see any reason for that to be changed to the morning necessarily so possibly that is an error. So I just emailed the renal team at [hospital] just to ask about that. I thought possibly that was a packing error from the pharmacy, but it's not because it clearly says on the renal sheet 'morning'. That looks like a junior doctor who's prescribed that one, so I'll just ask those sorts of things … So actually, to that lovely patient's credit, she has picked up without knowing specifics, she's been proactive enough to come and ask those questions and that just makes me really happy because people are taking real power over their medications now. (IPAC pharmacist A)

Another patient that [IPAC Pharmacist A] mentioned today, that actually rang her directly and said can you come, lots of issues, actually incredibly complex and she's bouncing in and out of hospital and she's got heart failure and end stage renal disease and in the last admission to hospital they've started her on dialysis. So she rang [IPAC pharmacist] today and said 'Can you come to my house and sort out my medicine?' I was on twice daily dosing and now all my medicines are in the morning and [IPAC pharmacist] was like actually I've got people booked but I will try come this afternoon. But that sort of direct building rapport and relationships with their patients which is so, just invaluable. And so if that patient had those questions and the [IPAC] role wasn't there, who would be here to help? Well she'd probably come to see the GP and then I would have that because we haven't received a discharge summary from her yet from her recent stay. You know I would be trying to scramble to work everything out. And so it's that's just I think along with my patients that have become more up with their medication regimens that sort of direct sort of relationship." (GP-E)

Some referrals from GPs or health professionals were to discuss and explain medications as well as assist people with their inhaler techniques. Patients had received a HMR but wanted more information about their medications:

> *"I think for lots of people they've already been told a lot of the stuff anyway because I have had people come back who've had a medication review. But then are saying to the GP or the AHW that they don't understand. You know I've had a couple of re referrals saying they don't understand their medication. So I think that their education is important and a lot on kind of inhaler techniques that then they just keep representing and they're still not kind of using it properly."* (IPAC pharmacist B)

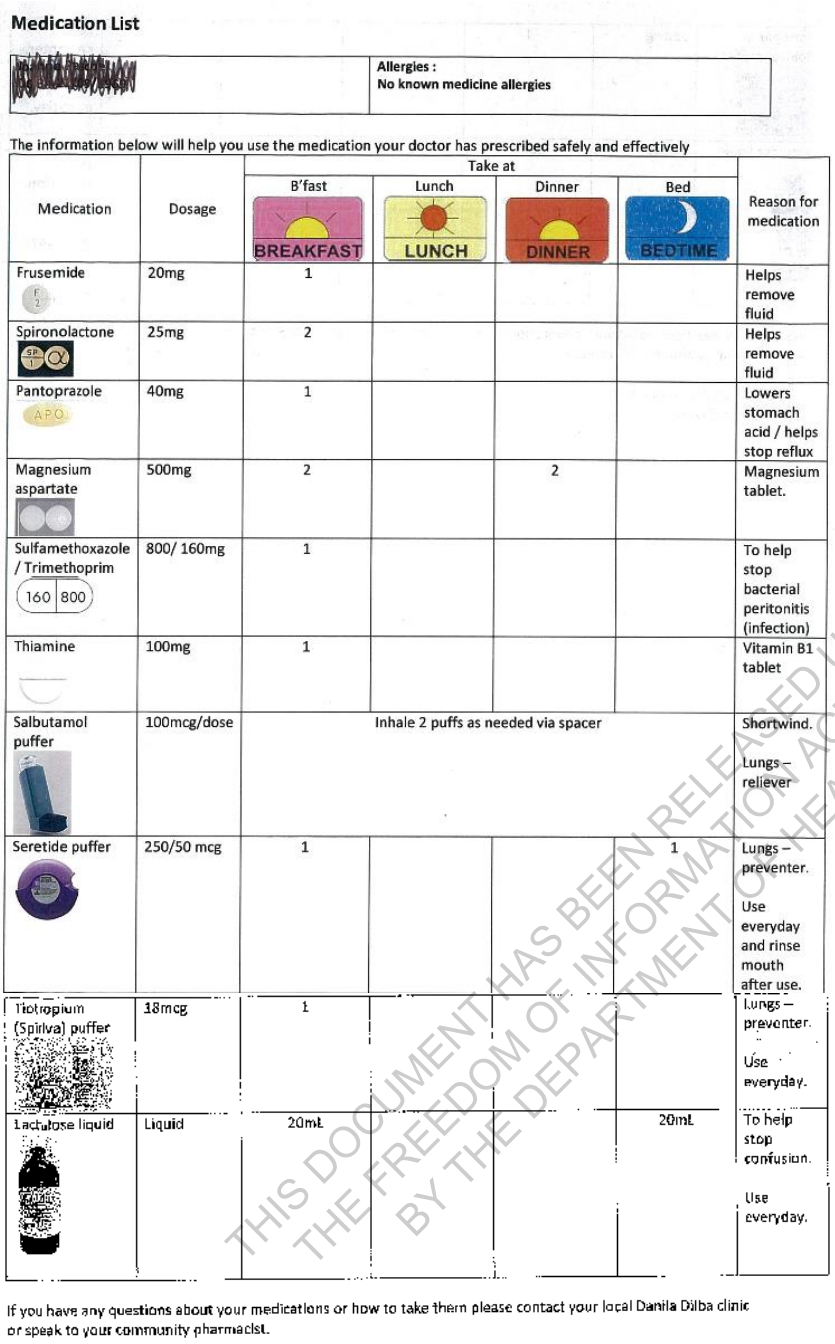
Medication list

A way of enabling patients to be empowered was to improve their understanding of their own medications. One of the key tools that the pharmacist developed was a printed medications list (see Figure 17). This tool was adapted for individual patients and consisted of pictures of medications, the dosage, what time of the day to take the medication and the reason for the medication. Patient feedback has been very positive.

> *"I don't read and write real flash and I couldn't pronounce a lot of the words on my tablets. I had no hope. It was Chinese to me. Having that sheet helps me with that. I mean I'm not practicing the bloody words but at least I can recognise them." (Patient)*

> *"I think it's a brilliant idea …… What she does, and she does it individually for every client based on their medications, there's a diagram a picture of the actual tablet itself and then it's broken down to how many times a day they've got that in their Webster Pak, how many times I have to take it throughout the day and actually the number of the tablets that should be in the Webster Pak and things like that. And what she's done instead of instead of having what we call 'doctor jargon', you know, we don't, not even me and I'd like to think that I'm a little bit educated so to speak, but I don't understand the terminology. So what [IPAC pharmacist] has done is broken it down into just plain English so people can look at it and they're given copies of that and they can look at that and they can read it themselves and they can understand that 'oh okay yes that little blue tablet that helps me out with whatever' whether it's a blood thinner, blood pressure. Yeah. Depending on I suppose your chronic illness and what you require. But she's broken it down and she does that individually for every client that we go and visit."* (Outreach Worker)

Figure 17. Example of patient medication sheet.



Medication List

[redacted]

Allergies :
No known medicine allergies

The information below will help you use the medication your doctor has prescribed safely and effectively

Medication	Dosage	Take at B'fast (BREAKFAST)	Lunch (LUNCH)	Dinner (DINNER)	Bed (BEDTIME)	Reason for medication
Frusemide	20mg	1				Helps remove fluid
Spironolactone	25mg	2				Helps remove fluid
Pantoprazole	40mg	1				Lowers stomach acid / helps stop reflux
Magnesium aspartate	500mg	2		2		Magnesium tablet.
Sulfamethoxazole / Trimethoprim 160 | 800	800/ 160mg	1				To help stop bacterial peritonitis (infection)
Thiamine	100mg	1				Vitamin B1 tablet
Salbutamol puffer	100mcg/dose	Inhale 2 puffs as needed via spacer				Shortwind. Lungs – reliever
Seretide puffer	250/50 mcg	1			1	Lungs – preventer. Use everyday and rinse mouth after use.
Tiotropium (Spiriva) puffer	18mcg	1				Lungs – preventer. Use everyday.
Lactulose liquid	Liquid	20mL			20mL	To help stop confusion. Use everyday.

If you have any questions about your medications or how to take them please contact your local Danila Dilba clinic or speak to your community pharmacist.

The tool enabled patients to have something tangible, that they could carry and refer to:

> *"I think you know [IPAC pharmacist A] and I think [IPAC pharmacist B] is the same but they certainly didn't let anyone leave without a detailed list of their medications, and sort of jargon free list. So you know it's useless if they walk away with a thing that says they're on ramipril for their hypertension and they have no idea what that is, that you know they always left with a really good understanding all the medications [they] are on, why they were on it and why anything was stopped if it was stopped you know and what side effects to expect and things like that."* (GP-J)

While this tool was valued by patients and clinicians, the hours spent developing the tool was not recorded in the logbook. Developing medication lists could take a whole afternoon.

Patient Case Study: using the Medications List: "It's my cheat sheet"

Marjorie does not read and write. In the patient focus group, she explained how she used the Medications List or her "cheat sheet".

Yeah I call it my cheat sheet.

"[IPAC Pharmacist] printed off a sheet with all the tablets on it and all the right colours that they are in the Webster Pak. And whenever I go up in that hospital. I give it to them. They can photocopy it but they got to give me back the original. And it stops me from having arguments about tablets and medication that I'm on, that they're not giving me or they should be giving me. And it just saves such a hassle. But you got to give it to the doctors when they come around and you got to make sure they put it on their little laptop computer. Otherwise it doesn't come back to you. And then you really, I think you need to have a, pharmacist to pop up and explain because they never got the same colour and the same type of tablet what we've got and explain the differences. Yeah because when I go up they want you to take things and I don't know what it is."

Interviewer: How has that been … since you got your cheat sheet?

"*It's been a 100% better than what it used to be before. Well because sometimes I'd go days without a particular medication. This time at least it's only normally 48 hours*.

Even when they get you in the ambulance because I normally do carry mine [information sheet] with me all the time. I can give them that.

I don't read and write real flash and I couldn't pronounce a lot of the words on my tablets. I had no hope. It was Chinese to me. Having that sheet helps me with that. I mean I'm not practicing the bloody words but at least I can recognise them.

Patient Case Study: Enabling independence and choice: John

John lives independently in a cabin in a nursing home. He has Parkinson's disease. Within the last year he had returned to [town] after travelling across three states (NT, WA and SA). IPAC Pharmacist A traced John's medical history from the different clinics where John had been prescribed medication. She found errors from moving multiple times. She facilitated the lowering of the dose for one medication and John has found that his shaking is better.

IPAC Pharmacist A also worked with John to support him to take control of his own medication. Previously he had to and walk to the nursing centre to get his medication; five times per day. This was especially difficult during the hot and rainy wet season. John did not have a dose administration aid and was dependent on staff to administer his medication. This was a big change for John, as he was used to being independent and managing his own medications. IPAC Pharmacist A said they needed to *"think outside the box."* She worked with John and nursing home staff to enable John to keep his medications in his cabin. There was a case conference with his GP, the IPAC Pharmacist and nursing home staff. Both John and the staff were educated in the use dose administration boxes and tablet crushers.

IPAC Pharmacist A has re-visited John multiple times and reports that John is now happy he has his DAA box in the cabin. John felt that no one else would have been able to enable him to manage his own medications, but the IPAC Pharmacist.

(From observation)

Patient Case Study: Developing patient centred guidelines with support workers: Henry

Henry lives in supported accommodation (state/territory Government facility), he is awaiting a speech therapy appointment. Henry took several medications and found these difficult to swallow. IPAC Pharmacist A worked with Henry and his support workers to ascertain what changes could be made to his medications.

IPAC Pharmacist A helped develop a crushable version of Henry's medication list. As several different support workers cared for Henry, IPAC Pharmacist A also developed a crushing medication guide for use by the patient's support workers. The supported accommodation organisation decided to use the guidelines for in-house training for staff. IPAC Pharmacist A sat down with staff and developed "don't rush to crush" guidelines.

The researcher observed that the staff continued to contact IPAC pharmacist A about Henry's medication. One sent an email concerned that some tablets were not dissolving correctly. She contacted the worker and reassured them that the tablets were OK (dissolved reasonably).

(From observation)

Patient adherence

Due to the IPAC pharmacist roles of undertaking medical reviews, developing the medication list and patient education; the Pharmacists had had an impact on patient adherence.

> *"Often patients would come in and they have not taken their medication for a long time because of a side effect that we've sort of missed. And then [IPAC Pharmacist] will come along and say they're not taking them because of this, why don't you try this instead. And then you'd see, you definitely see increased compliance."* (GP-J)

The pharmacist had more time to sit down and discuss medications and had different ways to communicate about medications.

> *"GPs do not have time to do all of this. Like how are they going to fit that into a consult? This is what's it's great having a pharmacist here because we can sit down we can actually do the tablets one by one and I prompt for that actually when I get to like I should say too I suppose in that question like 'How many days in the last week have you taken this medication'. I guess I added a lot of prompts to that like. What about the night-time ones… just to clarify."* (IPAC Pharmacist A)

The GPs could give specific examples of patients who had seen the IPAC pharmacist. Patients who had previously said they were taking their medications have become adherent.

> *"I've got one patient, she's got hypothyroidism, her TSH [thyroid stimulating hormone] was always elevated. She's always said she was taking her medicines and was always elevated and then [IPAC Pharmacist A] met with her, and I'd tried to convince her to use a dose administration aid, she was very, very reluctant to do that but meeting with [IPAC pharmacist A] resulted in her using a dose administration aid storing her thyroxin in the fridge and taking it at the right time and then lo and behold her TSH is almost undetectable. So we had to reduce her dose of thyroxin and so you know that that process of convincing her to use [the DAA] you know sometimes different professions have more luck*." (GP-E)

> *"People that have had haemoglobin A1cs in the 10 - 11 percent and have gone through this process where they're taking their medications. You know they've stated they taking their medications but actually have said to me they're taking the medications and it turns out that they never take their night-time medications seeing [IPAC Pharmacist] and some of these people we ended up …just reworking their regimens so that they are only on morning doses and then…ending up at target, you know under 7 percent. They've been over you know 8 or 9 or 10 percent for [a long time] and just that*

feeling you know I've sometimes emailed her and said you know this person has started taking all their medicines, I can't believe it." (GP-ET**)**

"I think another area that's really improved is people taking that preventative inhaled corticosteroids and preparations and understanding. For some reason I seem to inherit a lot of patients that think that salbutamol is the preventer and are taking their salbutamol regularly, two puffs in the morning and two puffs at night but they're taking their purple puffers, they're seretide PRN and just picking up those clangers, I think as well because, her role is to systematically go through people's medications which we might not always do when we see a patient for the first time because that's her role to meticulously go through people's medications and look at drug-drug interactions and that how they are taking them, and the puffer techniques. I think on the whole, it has so improved the health of my patients that I've referred to her and like the kind of proof is in the pudding with the numbers, the improved glycaemic control." (GP-E**)**

Education of other health professionals

Education for other health professionals was provided by the IPAC pharmacists three different ways: in formal education sessions; during joint consultations (usually with Outreach Workers) and "ad hoc" when GPs or health professionals had *"hall way conversations"* or asked them questions in their office. The pharmacists were open to answering any questions; and GPs appreciated the informality of this process and the promptness of replies:

"So there's been a lot of informal collaboration which has been incredibly valuable as well as the sort of more formalized process of the pharmacist meeting with the patient and going through everything and then often meeting with them again and then meeting with them again on some occasions and having an ongoing sort of relationship with the patient as well. So it's been a lot more than what I anticipated." (GP-E**)**

"*Dropping into her room, plonking myself down, [asking] 'what do you think of this*?' (GP-EF)

"… GPs can pop in. … that's happened heaps today [during observation]. Things like clinical questions, that's always fabulous. It's just to help with things; that doctor that just knocked on the door needs some help with some S8 scripts. I'm happy to help with that. Doctor's asking everything from antibiotics sort of spectrums and which antibiotics to use and resistant patterns to …. what laxatives to use in renal impairment. And having a face to face suits a lot of people." (IPAC pharmacist A)

*"I don't know if they could have been any more supportive. They were, they're always contactable. [IPAC Pharmacist] … she's got a mobile phone... But I call that probably on a daily basis and if she is with a client she'll answer, and she'll say I'll call you back. And if she's not with a client she'll always say talk to me it's fine. She'd always taken my call and answer my questions and if she was in the clinic on the day, she'd always have her door open and very approachable. If she wasn't with a client, [she was so] very approachable for us to be able to talk to her about questions or any comments or whatever. And also she's very good with her email she always replies. She's always very prompt." (*GP-J)

The IPAC pharmacists were happy to undertake research on any questions that they could not immediately answer. They also helped the GPs obtain knowledge from reliable sources:

"Both of them are always available to kind of do quick literature reviews or look up some information and also reminding me how to look up information or where to find stuff on our system because sometimes it's all about where to find the resource." (GP-EF**)**

"I hated pharmacy subject, to be honest, when I was medical student. But then when they [IPAC pharmacists] come in they just open your eyes and they show me … this website that they looked at and is like 'oh ok' it built up my interest too." (GP-S)

There was also the formalised feedback around medication and learning around best practice:
"And so I think our processes are much better and having pharmacists involved actually allows us to do that. And then they also get onto us about things …reminding us about de-prescribing say PPIs. You know all those things that are kind of current in pharmacy best practice. They are kind of pushing that along faster than we will probably be thinking about that but I think they keep on reminding us all you know what's best practice for smoking cessation or whatever current cut sort of topics in pharmacy." (GP-EF)

"It is the advice to GPs and it's someone in their team who they trust giving them feedback about stuff. it's about GPs being able to tap into expertise and not have to seek it. And also to deal with what they don't know, they don't know. (Clinical Director)

The Pharmacists had been involved in formal education at staff meetings:

"They do quite a lot of educational stuff for the rest of the staff … they do get quite involved in presenting to both medical and non-medical staff and in fact they come to the monthly doctor's meeting." (GP-EF)

"Everyone, all clinical staff, so Aboriginal health practitioners, RNs and the GPs and that was was very valuable. And then it's actually been helpful because I don't think I'm alone amongst the GPs, that being a little tentative about the new glycaemic agents. And it's been quite good to be able to liaise with someone." (GP-E)

Relationships and Collaboration with other providers

Relationships with Community Pharmacy

The ACCHS works with four community pharmacists that are located close to each of the main clinics. A good relationship existed prior to the IPAC project due to the contracts that existed with the pharmacies in relation to arrangements for preparation and supply of DAAs.

"There's always that interaction with our pharmacies because we use specific pharmacies for dispensing and the making of our medications or Webster Pak and things like that, there's always, I suppose, conversations happening if it's between the pharmacist or our pharmacist doing the project and our pharmacists that work in the, five or six pharmacies that we actually have that actually deal with specifically [health service], I suppose medications that we get for our clients because the packs are made up at those pharmacies. We have our accounts with them, and we've worked with them for years. So, there's always those conversations between our pharmacist and their pharmacist and you know our pharmacist speaking with our GPs and GPs speaking with pharmacists in regards to medications." (Outreach Worker)

"That was what the role was before. The [health service] role was liaising and we've got contracts in place with our pharmacies as the ones that will have accounts for clients because we pay for everyone's medications. So yeah we've already had kind of a very structured process and we get them to come and do the imprest in the clinics for us too so they come and visit and check the imprest. So they were already known to myself and to a lot of the clinic staff as well." (IPAC pharmacist A)

"I'm largely talking about retail pharmacist that we have contracts with. … when you've got pharmacists who are managing our imprest basically on a contractual basis to have someone who speaks the same language, for want of a better word to talk about 'stuff'." (Clinical Director)

Liaison with community pharmacists had increased with the introduction of the IPAC pharmacist roles, particularly around managing patients using dose administration aids. Some patients were no longer picking up their medications from the community pharmacy:

"So with that sort of thing I think also they do a really good job of liaising with the community pharmacies that do the packing. So you know making sure that they're not packing for people who are not picking up or and also putting in systems for people who aren't coming in for review because sometimes the community pharmacies want us to keep on providing scripts for people who aren't coming in … who aren't regular clients. So I think they … give us someone extra to advocate for us as well about you know trying to provide the best quality service so that we're not providing medications without other clinical services." (GP-EF)

"We started one little project the other day …if a patient hasn't picked up their Webster Pak for three months from the [name] pharmacy here, they send us a list of all those patients and say 'look we're not going to pack anymore for these guys. They haven't picked up for three months. We need them to have a review'. That goes to the duty doctor and the duty doctor tries to call all those people and then also look through the notes and [see] have they moved are they now in the city or what's happened. And then if they can solve it great and if they can't they then flick them to me and I actually go out on a home visit with one of the Outreach Workers and just do a bit of a door knock and can say 'Oh hey you know, you haven't picked up your meds for a while. Doctor needs to see you again. Would you like to book in? By the way this is why the medicines are important'. You know just a bit of an extra kind of safety net so that's a bit of a new thing I suppose and look none of that's officially probably IPAC stuff but that's helpful." (IPAC pharmacist A)

There was also increased communications with the community pharmacies as a result of increased HMRs:

"A little bit of extra communication because of the medication reviews so because the item 900 requires you to send the plan to the pharmacies that they're hearing from us I suppose rather than the HMR pharmacist, but that's set up" (IPAC pharmacist A)

Liaising with the Hospital

The IPAC Pharmacists had a key role liaising with the hospitals, particularly around discharge summaries. One pharmacist had introduced herself to the hospital pharmacy team and information about the IPAC role was part of the orientation for hospital pharmacists. During observation, one IPAC pharmacist noted that she had received a discharge summary from a new hospital pharmacist who must have heard about the role during orientation.

"[We] went in to the [regional hospital] and did a presentation to the pharmacists about [health service] and say about the IPAC services so we could try and work more closely and that they could let us know about any patients they were discharging that they'd identify that had medication changes that needed to be followed up" (IPAC pharmacist B)

Both IPAC pharmacists had done a lot of work in transitional care which had improved the quality and timeliness of discharge summaries. The IPAC pharmacists would contact the hospital pharmacists for patients' discharge summaries, saving the GPs a lot of time.

"[The IPAC Pharmacist] worked at [Hospital] in the past, so it's like she's got superpowers, she can get the discharge meds. I might try and liaise with the RMO. I might try and liaise with the pharmacist… trying to get to the bottom of what's happened when someone's been discharged from hospital versus what becomes a far more efficient and accurate outcome." (GP-E)

***"…** liaising with [Hospital], where people have recently been in hospital or even when they haven't recently been in hospital and there's confusion about their discharge medications and reconciliation of different regimens..."* (GP-E)

"… you can help with that transitional care which has been really rewarding I think and time consuming and the kind of stuff that if like there's just no one else that would do that role. Like

community pharmacy doesn't have time to do that stuff and they don't have access to Communicare so they can't really see it." (IPAC pharmacist A)

The IPAC pharmacists also followed up any confusion or changes around medications, particularly for renal patients:

> *"Sometimes there's confusion at discharge whether people's medications have been changed or they'll talk to the hospital pharmacy. There can be discrepancies between the discharge summary and what the hospital pharmacist thinks they've been discharged on. So they often do that work of actually trying to match those things up and chasing up the … doctors, the more junior doctors and the pharmacy team."* (GP-EF)

> *"If there's discrepancies like there are a few times discharge medication said this, and in the written discharge summary …it says this one is 40mg but here it says 20mg. [The IPAC pharmacist] will sort it out"* (GP-S).

The pharmacists also received referrals directly from the hospital pharmacists for patients who had recently been discharged from hospital and were confused about their medications:

> *"… when they get discharged from the hospital and they've got their discharge summary and they get a new script ... and the doctors at the hospital, I guess, because they're so busy they don't have time to explain what the medications are for or the changes. Then they'll come make an appointment here, see our doctors and that used to take up a lot of our appointments. … so instead of seeing a doctor they could bypass the whole thing and just make an appointment straight with [IPAC Pharmacist] who's always happy to help and explain the medications and why they've been put on it*." (Outreach Worker)

Apart from the hospital pharmacists, the IPAC pharmacists also liaised with specialists, particularly from the renal unit.

Project – Enablers

Experience and personality of the pharmacists

A key strength or enabler of the IPAC role was the individual experience and personality of both the pharmacists. Both pharmacists had extensive experience working in the state/territory and with Aboriginal peoples and in the Aboriginal Community Controlled Sector which enabled them to work effectively in the role:

> *"…we had people who'd had very sound experience in the [jurisdiction], sound experience in remote, had had cultural training and, and in the organisation and also worked, [*IPAC pharmacist B*] worked in the organisation for some time which you learn a lot on the ground. And [IPAC pharmacist A] had been working at [remote community]. So, it was about getting the right people. And so that that goes to communication style and expectations and all that sort of stuff, not just with clients but also, we have all Aboriginal clinic managers so that that was part of fitting in the team*." (Clinical Director)

The specific skill set of the pharmacists, including being HMR accredited, was also cited as a key enabler:

> ***"…** I think being HMR accredited probably is pretty important. … but I feel like… it just means you're more comfortable with your clinical recommendations"* (IPAC pharmacist A)

The pharmacists saw Indigenous Health experience, particularly working with renal health patients and patients with chronic disease as important to the role. They also had experience working in a multidisciplinary team:

"I don't think many pharmacists have worked in a multidisciplinary team as well so knowing, understanding everyone's roles and being appropriate in terms of how you communicate with other staff as well." (IPAC pharmacist A)

Another key enabler the working relationship developed between the pharmacists. Both IPAC Pharmacists felt that they had developed a good working relationship, as they worked at different clinics and had complimentary skill sets. They also valued the peer support and the opportunity to exchange ideas:

*"We've got different skill sets. … I love asking [*IPAC pharmacist B*] things just someone to bounce things off. It's just I feel very lucky. I kind of feel for the people in the other sites that haven't got a comrade with that, because being a sole practitioner is really hard*." [IPAC pharmacist A]

The pharmacists were approachable and worked well with all staff and patients:

"Personal skills are really important. You know just being flexible, not getting perturbed if things change during the day because things do and being a good communicator is just imperative." (IPAC pharmacist A)

They also took the initiative to be their own champions of the role.

Service had experience with a Pharmacist

The ACCHS had lobbied for a long time to have a non-dispensing pharmacist role in the service. This meant that not only were GPs used to having a non-dispensing pharmacist, but that many of the pharmacy systems and protocols were already established:

"[The previous pharmacy role had] no contact with clients and the position sits in health systems, so it's very much looking at policies and procedures. It was really originally … to get the pharmacy budget under control, so it's very much an admin [role]. But because the pharmacist was here then we were asked questions obviously about medication and … we would look to policies and procedures for medication safety…" (IPAC pharmacist B)

"I think we already had a pharmacist so it's not like some other health services where there's been too much to change because we already had a pharmacist to advise on medication safety and we already had a big medicine's guidelines. We already had, the imprest and the medication processes sorted and we've also got really good prescribing on the whole here I find." (IPAC pharmacist A)

Pharmacy Technician Support

Furthermore, the health service had a Pharmacy Technician already on staff that was able to provide support to the IPAC team; particularly around arranging appointments and paperwork for HMRs. The Pharmacy Technician also took on some of the accounts role of the non-dispensing pharmacy role so that IPAC pharmacist B could undertake the IPAC role two days a week.

"She helps us with it, so before IPAC started her role was to help with the referrals for HMRs. So she did kind of all the background and the paperwork in forwarding the referral to the HMR pharmacist and then receiving the report and then letting the doctors know of the report. So we just modified that slightly for then our referrals so she helps us. So she gets a report of the referrals. She contacts the referred clients and finds out where they'd like to see us and books them into us because that was probably a bit that was, takes up quite a lot of time that kind of admin stuff. So … she's been a big help there." [IPAC pharmacist A]

"another very useful thing that [Pharmacy Technician] does and this is all because it's Medicare rules and you have to. She closes that final part of the Medicare loop. So once the GP's claimed the item number 900, it says in the Medicare rules that we've also got to send a copy of the doctor's comments and changes to the community pharmacy. … So [Pharmacy technician] sends that to the retail

pharmacy so that everything's happy with Medicare but cc's us into it too" (IPAC pharmacist A)

Stable Workforce

While not directly identified by those interviewed, another key enabler identified through observations during the site visit was the stability of the workforce, particularly the GPs. There were no locums and there was a stable GP workforce that grew to understand the role of the IPAC pharmacists and fully utilise their skills. Workforce stability may not have been identified as a strength or enabler as the team were not aware of the impact of a locum-based workforce which could have been detrimental for the IPAC role. (You don't know, what you don't know.)

Project - Challenges

Engaging ACCHS staff

Initially it was difficult for the IPAC pharmacists to facilitate referrals to them from all GPs. Clinicians sometimes forgot to refer and had to be reminded of the IPAC role and change their practice:

> *"that was very hard to do at the very beginning because we're not used to it yet. And it slipped my mind often …"* (**GP-S)**

> *"… one of our other doctors who's been here a long time she's actually one of the original GPs for [health service] when it first started she's been a challenge. she has a whole stream of chronic disease patients so perfect patients for us and so working with her and then trying to remind her that we're here and she has said that it's something that she has to change her practice because it's not what she normally does. So I think she's quite set in their ways and so it's just a change of practice but even she's been really supportive and done a few [referrals].*" (IPAC pharmacist B)

> *"Probably initially in the first three months [I did not refer] and that was probably just because not because I didn't think that they had benefit, but because it just wasn't in the forefront of my mind."* **(GP-J)**

> *"I think challenges was getting everyone on board. …. Just reminding people that we're here*." (IPAC pharmacist A)

One GP commented outside of the interview *"I wish more of my colleagues used [IPAC Pharmacist];"* supporting what she reported in the interview, that the role *"probably hasn't been as utilised as it could have been"* (GP-E). She stated that it may just be the way GPs worked and whether or not they were collaborative. The IPAC pharmacists also felt that, while the GPs and Outreach Workers utilised their role, there were other health professionals that they could have engaged:

> ***"…** there would probably still be people in the clinic that don't I reckon because particularly somewhere like [Clinic C location] where it's pretty busy. I do reckon maybe the RNs and the AHPs haven't used me as much and maybe that's also me not using them because I don't always have to go and talk to them about particular things which you know I think if we haven't got shared care patients then I reckon probably the RNs and the AHPs wouldn't know exactly what it is that I'm doing still in some of the sites*." (IPAC pharmacist A)

High rates of 'Did Not Attend' (DNA)

The ACCHS experienced high rates of patients not attending when an appointment had been made. However, this was common across the service: *"Hate to say but that's just part of the gig*." (IPAC pharmacist A)

Patients were also difficult to follow up, mainly due to changes to their phones and being out of credit (reliance on pre-paid phones). Text messaging worked better for some patients.

Recruiting patients: numbers were not as high as expected

Both pharmacists commented that a challenge was that they did not get as many referrals as expected. GPs sometimes did not refer as they not only forgot about the role, but also because patients sometimes had multiple health appointments and they felt that another referral would be another burden:

> *"And the other thing is you know these, sometimes patients see sort of multiple allied health you know they've got, they're seeing the diabetes educator and the optometrist and the podiatrist and the cardiologist and the endocrinologist and you think 'I'm just going to overload you if I if I ask you to see a pharmacist as well'. So you sort of put that for the next time we see you, I might mention that. I think definitely, unfortunately especially initially, … our pharmacist isn't the number one priority here. That needs to go on the backburner but certainly towards the end of the recruitment process I thought the pharmacist was probably one of the most important allied health [professionals] to get patients into... just because you always I never got a referral back from [IPAC Pharmacist] that was a waste of time. You know there was always something to come out of it."* (GP-J)

> *"Generally, I think [people are] overloaded with medical…appointments you know, in a three-month period they might see the optometrist and the podiatrist and the psychologist... Having one more appointment another appointment, it was just too much sometimes. That would probably be the most common, they were like 'nah like it's enough, I see, I already see enough people'."* (GP-E)

> *"How much time do you need, if someone has to see five different health professionals who should they be and how much of them do you need? There's those sorts of things that I think are a challenge for us. What's the right number of times to come to a health clinic and what do you do there? Because you could spend all your life [going to appointments] couldn't you."* (Clinical Director)

> *"A lot of, some people had too much going on already. So you already had lots of appointments, didn't want an extra thing that they had to worry about and come back and see us."* (IPAC pharmacist A)

At Clinic B clinic there were only two referrals, and this was due to the previous experience of community members with other initiatives:

> *"At Clinic B, people just do not want to sign a form. [They are a] bit fearful of that. Not that into things where it's all formalized. You know these guys have lived through intervention, they've lived through stolen generation, you know signing a bit of paper they don't understand is not high on their list of priorities. So I think Clinic B in particular, I feel like people just didn't want to sign something but the other ones I guess, transient people, they're not regular people of the service, so can't consent. A lot of people said they'd want to have a think about it, which really is code for no."* (IPAC pharmacist A)

At the observation the IPAC pharmacist listed a number of reasons why patients were not considered for recruitment. These included patients being under public guardianship, were transient, had an intellectual impairment, not a regular patient, wanting to have a thinking about it and having too many other appointments.

Short project length

The short length of the project and the lack of sustainability of the IPAC role was a challenge outlined by GPs, pharmacists and patients. Being given a year to reduce or impact on chronic disease markers was not seen as realistic.

> *"We just haven't had it long enough to see what the potential is from a, from particularly from a client education and an adherence point of* view" (Clinical Director)

One GP commented that the project seemed to have just started and then stopped and may have been a reason for other GPs to stop referring:

"I do wonder if sort of midway through the process, it's such a short project. And there was this sense that maybe at the midpoint that there was going to start to be an evaluation process. I don't know whether that was misinterpreted as things were going to wrap up and so people might not have been aware of the duration of the project because I just went to chat to [IPAC pharmacist] directly and said can I still refer people to you. So I don't know whether people got a missed signal." (GP-E)

"It would be fantastic to have more time. We're all aware of where it sits at the moment and I think that we know the recruitment at the start of it all was really key. But I think of course is this common underestimated, the integration builds up time, so you don't start with a linear recruitment process, it's very much that early work in relationships if you're trying to change the way people do business and the way, particularly consumers approach a new service. In terms of whether you know, I really think it's hard to tell what value, consumers, people see from what they've got yet." (Clinical Director)

"I think [more referrals] would come if she if that if the role continued. I think that would come in time. My experience an AMS context is that things take time to grow and flourish but then once they occur they just take off and they have a life of their own and the big issue is when things are sort of over three to six-month timeframe you really... I don't know is there scope for continuation?" (GP-EF)

Patients and health services staff commented to the researchers during the site visit that the role was successful and needed to be made permanent:

"This shits me you know, you get a program and it works and bugger me dead if they don't pull the plug on it." (Patient)

"If it was more of a permanent situation, permanent placings within our clinics, I could probably see that there'd be a lot more referrals for this. And I think from there I mean I know that at the beginning of this program it was very slow to get started but it grew momentum very quickly once the word was put out there through our clinicians, health workers, RNs and other specialised services, internal services that we have within our clinic and organisation." (Outreach Worker)

IT problems

Another challenge was IT problems. The CIS (Communicare) frequently went offline. The pharmacists also found the system confusing to use and reported that it was easy to lose notes in the system. As the service was so large there werlso e multiple servers so if one went down, IT support had to help.

Logbook and recording

Another challenge was the logbook. Lots of activities undertaken by the IPAC pharmacist could not be recorded in the logbook:

"I think the things we were doing sometimes there wasn't anywhere to record them, which I think is why people have been creative and used other headings to put them under, but then everyone's done that…So I think it's rare that it would be impossible, it would be so hard to design something to capture everything before you even know what is going to be happening so." (IPAC pharmacist A)

There were also differences in where logbook entries were made between the pharmacists. One pharmacist noted in the observation that there was no consistency with her and the other pharmacist in where they entered some data in the logbook; it was just the different ways they had interpreted the logbook, so may not be any consistency across IPAC:

"I think we saw our figures the other day myself and [IPAC pharmacist] and I were quite different in terms of how we'd been recording stuff. So I think if that's the same across the board everyone's kind of using it slightly different which [laughter]." (IPAC pharmacist B)

"Even me and [IPAC pharmacist B] have been recording things differently and we're in the same place. we only realized that when [PSA rep] came up and gave us our stats and we sat down and looked at them like 'oh gee whiz, you know, that's pretty, like I record everything I think'. … obviously some other pharmacists would like err on the side of not recording. Whereas I must obviously err on the side of recording because my numbers are much higher and that's going be annoying for [the project evaluation team] when you have to like crunch the data and I just feel like I'm not sure how that's going to end." [IPAC pharmacist A]

Furthermore, there was a significant amount of time taken for data entry; particularly when there were IT issues

"It slows you down and then you forget to record stuff." (IPAC pharmacist A)

Summary

The ACCHS is a large service spread across seven clinics. The two IPAC pharmacists had previously worked with the service and had extensive experience in Aboriginal Health. They were culturally safe and accepted by the community. Both pharmacists had integrated well into the primary health care team, through attending staff meetings and reminding staff of their roles as well as holding education sessions.

HMRs were a key role of the IPAC pharmacists. GPs were by being able to refer internally and reports from the IPAC pharmacists were brief and succinct. The GPs also perceived that HMRs were conducted more quickly. GPs and the IPAC pharmacists reported that patients' understanding of their medications had improved due to working with the IPAC Pharmacist. Patients often commented that no one had explained their medications and now they had better understanding. GPs also reported their time was saved with the IPAC pharmacist being able to answer quick questions and research other issues. One GP reported it saved referrals to specialists.

One of the IPAC pharmacists had developed a medications list that was tailored for each individual patient. Patients reported using this *'cheat sheet'* regularly and some carried it on them and were able to present it to other health workers at the hospital or if picked up by the ambulance, which made communication about their medications easy.

The IPAC pharmacists and GPs reported improved relationships with community pharmacists and the hospitals, particularly around discharge summaries. There was also a pharmacy technician that supported the pharmacists and assist in making appointments with patients for HMRs and making sure that all paperwork was completed.

One GP stated: "I think pharmacists are an essential part of the primary health care team and I think having them actually embedded in the AMS just means that the service is sort of individualized to the client." The ACCHS staff were very supportive of the project and supported the continuation of the role.

3.5.3 Case Study 3: Urban Health Service

"Yes we would we would like to share her. It's just that we don't want to share!" (Manager)

Background of service

This ACCHS is located in an urban centre with the population estimated to be approximately 140,000. Approximately 4% of the population identify as being of Aboriginal and / or Torres Strait Islander origin. Major industries include mining, tourism and agriculture. The town is classified as a RA2 according to the Australian Statistical Geography Standard-Remoteness Area (ASGS-RA)[67], and a 2 on the Modified Monash Model (MMM)[68].

The health service provides services at five centres throughout three local government areas. Clinic staff include several GPs, a GP Registrar, Aboriginal Health Workers, registered and enrolled nurses, and allied health services.

During the IPAC project the primary clinic was relocated from a suburb in the eastern part of town to a new building approximately 2.5km away in the city centre. The two-storey building in the central business district offered the opportunity to install a customised fit-out and now offers a range of clinical services and allied health services, all co-located in the same building. The move was undertaken in May 2019.

Profile of pharmacist

The IPAC pharmacist at this site was first exposed to pharmacy as a child through stocking shelves in her father's pharmacy. She is very experienced and had spent many years working in retail and community pharmacy in both Australia and overseas. She also holds qualifications as a teacher. She completed a brief stint in hospital pharmacy and then went back to retail in 2008 and gained her HMR accreditation. Since then she has been 'easing her way' out of community pharmacy and into consulting, staff training, HMRs, helping with setting up patient plans and setting up, protocols for DAAs.

Prior to taking on the IPAC role, the pharmacist had previous experience with the health service including providing staff training, helping set up DAA protocols and conducting HMRs. The IPAC Pharmacist worked three and a half days a week at the main clinic, and one smaller outreach clinic in a neighbouring town. The majority of time was spent in the main clinic and she only went *"to [neighbouring town] when I have a full day booked. Probably a day a month"* (IPAC pharmacist).

Integration into the team

All staff participating in the focus group discussion agreed that the IPAC pharmacist was part of the team. One Manager stated *"she's always approachable. She's always got an open door policy and she's open to any communication methods whether it be BP [Best Practice] message, hey [IPAC pharmacist] have you got a second, in the tea room, on the phone, whatever it might be"*. A nurse said "*She definitely is like part of the furniture"*. Another nurse commented that the pharmacist had developed good working relationships with staff *"Yeah really good. As I say she's not intrusive. We know that she's here"* (Nurse F).

Events and meetings

Various staff from the service reported that the IPAC pharmacist regularly participated in events and meetings: *"she comes to our staff meetings if she's here and she's always involved … We do weekly in-services with [IPAC pharmacist] and we go through different medications, different conditions… why you would be on that medication… it's been really interesting get that sort of information about different medications and things during those times"* (Nurse F)

A Manager noted the pharmacist faced challenges participating in existing support groups: *"because they were off site [initially] … and [IPAC pharmacist] was only part time with us"*. However, the pharmacist reported there was opportunity to participate in some health promotion activities:

"There's things that were held at [old clinic]. They regularly had things in the back car park … NAIDOC week … any reason to have a BBQ. Things to do with the ideas van when it was there … they'd sort of try and do things and then have a barbecue and a football kicking competition for Tackling Indigenous Smoking… it was always a good time to go and chase down patients that you hadn't seen for a while you know. They turn up for that" (IPAC pharmacist).

Champions

The IPAC pharmacist felt she was her own champion within the health service and was proactive in attending meetings and introducing herself to staff and patients: *"I guess that was about that advocacy again. So when we had new doctors starting, if I saw people were in the waiting room, I would try to catch the doctor before I went in and just go' if you need to use me I'm here. What I can tell you is I've been to this person's place quite a few times and we have an issue with.'"* (IPAC pharmacist)

A nurse also stated that the pharmacist was proactive and introduced herself to staff: *"Well she did [introduce herself] and I think did we have a meeting originally … we had a staff meeting, one of our regular sort of clinical meetings and it was mentioned there. But [IPAC pharmacist] really made sure that we were aware of it*".

Support from the Health Service

The pharmacist reported her services were promoted on the health services Facebook page: "*They have a Facebook page. I think there were some things put up on there*". A manager also reported that the role was promoted in the services newsletter: *"Yes we had it in the newsletter … I know it's definitely been in the newsletter"*.

The pharmacist stated the posters provided by the project team were also used to help promote the project: *"there were big posters everywhere"*.

There was lots of support from all staff and the pharmacist *"was introduced to lots of patients" by "just about everybody … right from the reception staff through"*. She stated that she *"already knew quite a lot [of patients] but I was regularly introduced and you know my role explained to patients".*

Space/clinical room

Whilst the move to the new building enabled other teams to be co-located within the clinic, it was reported that there had been some challenges with IT and consulting space. One manager noted, *"Before we moved from [old clinic], she had her own consult room out the front, and since we have been here, we've sort of had a few teething issues with our IT and whatnot and have moved [IPAC pharmacist] around, but it's always been within that GP consult area. So and she makes sure everyone knows where she is".*

The nurse stated that rooms were sometimes an issue and the pharmacist got *"just what's free on the day… some days I think if we have a few doctors it's difficult because we have a chronic disease nurse as well, so they have an office. So it's a bit hard for her I think with the room situation some days but 9 times out of 10 she gets a room".*

The pharmacist agreed saying that at the previous location *"there was a little path to my door, knocking from lots of different staff members, lots of the time"*. However, since the move she stated *"here it's quite different"*.

Uniform

The pharmacist did not wear the health service uniform: *"Actually I've got to admit, I've never had a uniform but that's been my choice from early on and then it wasn't offered, but that's because I had said no early in the piece. But halfway through this project, I probably would now [say yes I will have one], if it was offered"* (IPAC pharmacist).

Understanding of role and support from staff

Staff had a good understanding of the IPAC pharmacists' role and the project with one GP describing it *"to have an in-house pharmacist and see how that intervention improves management for patients with chronic disease like diabetes"*. Another GP stated that *"all patients can utilise the services of the pharmacist if they want to know about the side effects of the medications prescribed by us or any other concerns they have with their medication … with the chronic diseases … some patients [are] not very compliant with their medications so the pharmacist is a great help to us"* (GP).

From a management perspective participating in the project was *"about seeing whether it's sustainable to be able to have a pharmacist that's going to add value to our service, and what the outcomes are with the patients, to see if this is something that we could add in if it was possible or if funding's available"* (Manager).

The pharmacist agreed that staff had a good understanding of the role and "*on the whole most of them used me very well."* However, the move to the new location posed some challenges: *"I find though that they're less inclined to use me here because of the geographical isolation. You know we're so far apart where there's nowhere near the interaction that there was at M Street [old clinic] between all the staff and the customers"* (IPAC pharmacist).

The pharmacist felt she had been able to fully utilize her skills and expertise and had "*met the doctors' requirements"*.

Key roles

The pharmacist stated the most beneficial component of the role was *"patient care. Straight out, many patients have benefited a lot. And many don't want to be benefited. But I still keep trying"*. The pharmacist was *"just making patient [educated] and … things easy for patients. These patients get completely overwhelmed by the health system and have very little health literacy and no ability to navigate their way through multiple referrals and so I see my job more than anything, as pulling things together. I'd say my role 50 percent of the time has been about being a pharmacist and 50 percent of the time as being a patient advocate".*

The pharmacist was involved in *"lots of team based collaboration, lots and lots"* and case conferences with other staff within the clinic.

> *"I would do what I call team based collaboration 20 times a day, where I would grab [the AHW] and me and … rush into [the GPs] office because there's a patient there who we think we can make things better for" (*IPAC pharmacist*)*.

The GPs **valued the pharmacists input** and often invited her into consultations with patients where a **'three-way interaction'** could take place:

> ***"****Basically you know I go through the records before seeing the patient and if I have seen non-compliance or interactions or concerns or uncontrolled condition chronic disease then I might bring in [IPAC pharmacist] and say you know, what can we use in this situation?' Even with the patient so it makes a big difference bringing in [IPAC pharmacist] into the consultation."* (GP-A)

Two other GPs concurred and described this process as being *"excellent"*.

Patient advocacy was also a core role that the pharmacist believed was *"not quite captured in there [the 10 core roles]"*. However, the PSA support staff suggested that some of these activities could be included as activity under the transitional care role:

> *"There were quite a few things that I was doing in the beginning that [PSA Coordinator] suggested was more like transitional care and that I should start recording a lot more in transitional care. So these were people that had come to my attention, had got out of gaol for example and had just simply dropped off the face of the earth and I went hunting for them. You know then found out that they needed some help to get back into the health system as much as getting back into their life"* (IPAC pharmacist).

The pharmacist felt she had met the clinic manager's requirements.

Patient Recruitment and Consent

The IPAC pharmacist felt ***"****A hundred and ten percent"* comfortable approaching patients in the waiting room. At the initial site which *"was a smaller clinic. I wandered about a lot more. I knew who was in the waiting room all the time. I was able to check out who was there, say hello everybody sit down with them in the waiting room… I mean some of them beat you down with a big stick and call you some names but you know you've got to get a bit tougher than that"* (IPAC pharmacist).

As mentioned above staff also introduced the pharmacist to patients. An AHW reported: ***"****It was mostly the doctors referring people actually"*. The pharmacist concurred saying *"quite often a doctor would stick their head out and say [IPAC pharmacist], come in here. I think this patient is going to be perfect for you. Brilliant. I'll catch you afterwards"* (IPAC pharmacist).

A couple of the nurses referred patients to the pharmacist particularly if they presented and had high HbA1c readings for example: "if we did HbA1cs and things like that and they were high, we'd always go to [IPAC pharmacist] and say 'do you want to see this patient?' … and she would" (Nurse). Another nurse stated:

> *"We would notify [IPAC pharmacist] of patients with chronic disease and with HbA1c levels and also even if the HbA1cs weren't too bad but urinary ACR, just anything that that that might indicate that yes she would be of use to them. We would then give her a heads up and say 'well we've got this patient would you be willing to see them or would they fit your criteria?'. Well we'd book into her column. She had her own bookings column but if she was here I'll just ring her because she's really receptive and she'd like to try and get people while they're here because it's quite hard and you can book them but they DNA [do not attend] … for all of us. It's just the nature of our clinic we get a lot of DNAs, so [IPAC pharmacist] was always very keen to get them pretty much immediately. And if she couldn't see them then and there she would come out and talk to them personally to, I guess, encourage them to come in for the appointment in the future."* (Nurse)

This was supported by other staff. A manager stated there were challenges as *"a lot of things happen here opportunistically and … over the past year with our HMRs, you know it's all good to do a referral and then [IPAC pharmacist] might spend days trying to contact the person."* (Manager)

Another clinical staff member said *"There's a lot of Indigenous people don't like to see a lot of people that they don't know. So I think that first initial when you mentioned it to them they're a bit standoffish, but if you support them with that and they do see [IPAC pharmacist], they grow onto her." (*Nurse)

The pharmacist *"did the PR"* and an AHW completed the consent paperwork at the health service and the pharmacist reported this process *"worked really well"*. Only two patients didn't provide consent after meeting with the AHW and receiving the information brief:

> *"One consented and signed up and everything and then two days later rang back and said no. A very, very non-compliant young type 1 diabetic. And the other one had said yes to me but he is a patient, a schizophrenic bipolar patient who then had reservations about all sorts of things and said no when he'd had the whole 20 minutes of the reading the three pages to think about it. He said no, that was fine"* (IPAC pharmacist).

Some patients were not interested in seeing the pharmacist at all, or receiving any service: *"the GPs said 'Do you want to see the pharmacist?' but they've said 'no I don't want to' or they've said 'yes' but not come to appointments… we have a lot of people that don't turn up …. not just her. Definitely it's across the board. That's just the culture I think"* (Nurse).

No local issues were identified that might have impacted upon recruitment.

Relationships with Patients and the Community

Cultural competence

The pharmacist had much experience working with Aboriginal and Torres Strait Islander people through her prior work at *'other remote towns with high Aboriginal populations'* (IPAC pharmacist). She felt very comfortable approaching patients.

Through observations during the site visit it was evident the pharmacist had developed meaningful and respectful relationships with patients. Other staff members at the health service had observed the great working relationships the pharmacist had developed with patients. Staff had also received comments from patients in relation to their interactions with the pharmacist:

> *"She was so very opportunistic as well so she will reach out to patients, even in the waiting room. I've seen her sit down and just sort of have a little introduction and then try and coax them back to her room and she has a really good chat with them. They quite often come back to us as the nurses and will mention that they've had a good conversation with her. They understand a lot more now and they know what they're coming in for with their different tests they come to the treatment room for"* (Nurse).
>
> *"the patients are really happy to see her. Some patients even ask to see her again. I think she's getting good rapport with the patient and medical education yet she is very happy to bring any patient with not complying with the medication or not following the instructions of the diabetes and is very uncontrolled. She just goes and get them from home and brings her back here"* (GP).
>
> *"I have had that feedback from patients … lots of feedback just saying her knowledge is amazing and the time that she's willing to spend … really good. She's very informal the way that she gives education, so again it's a nice relaxed atmosphere with her. She doesn't act like a health professional at all. She's just got a really good manner about it. I think it really suits our clientele well"* (Nurse).
>
> *"We've also received formal feedback from a couple of patients as well in regards to them in the form of a letter. It was about a patient with diabetes that had pretty much given up on that and controlling that and it wasn't until engaging with [IPAC pharmacist] that she then decided she was going to take control of it and that was her thing and that you she needed to be on top of it. She was really appreciative of that"* (Manager).
>
> *"I've been with her when I first started at [health service]. I went with her to do Home medication reviews. She's doesn't just see patients inside the clinic but she will visit them at their houses where they're more comfortable and she's able to find out more information there than someone in the clinic ordinarily would be able to"* (AHW).

Patients participating in the focus group discussed interactions with pharmacist being *"really good"* and *"great"* indicating positive respectful relationships with the IPAC pharmacist. The patients also reported *"definitely"* referring other people to see the pharmacist *"all the time".* One patient felt that the pharmacist really cared about them:

> "And even if we make a doctor's appointment just to see our doctor, she will still come over and talk to us and check up on us. Even though we're not there to see her, she still comes over and checks up on us which is fantastic. Shows that she actually cares." (patient).

A carer also commented:

> *"Well I look at those things [cultural safety] personally and you, not judge people but when you're working with people you know … if she's saying things that make her unsafe. No she was good. She's very down to earth, relaxed, have a little joke. Have a laugh, talk about things and to the point. Our people like that to be the point you know but also to feel relaxed and my wife is really relaxed. It was good … It's how they communicate. And that's the big thing that you got to teach is communication skills. Well [IPAC pharmacist] definitely has that. Now I'm not just saying that because she is here. I mean I don't beat around the bush. She's good."* (Carer)

Another example of the patients responding positively to the IPAC pharmacist was described by a GP:

> *"She asked the patients to send the daily blood sugar readings to her by text. So most of the patients send the daily readings to her every day".* (GP)

Patient-centred roles

The pharmacist was very effective in facilitating patients to be **empowered** and take control of their own health care. She would physically change seats with the patient allowing them to sit in front of the computer, let them read their own health record and explain anything they didn't understand. She encouraged them to be the 'leader' of their health care team:

> *"inviting the patient to be the team leader and putting them in my chair and inviting them to read their files. So it's about empowerment … I'm very, very willing all the time to change seats."* (IPAC pharmacist)

Through this process the pharmacist was **building the patients' health literacy**. She was also encouraging other staff members to involve patients in their care by telling them their results:

> *"I see them [other staff] trying to involve the patient much more. So for example there was a culture of screeners [other staff] not telling patients their blood pressure and blood sugars and things. That had to change … So we started little on things like that and then you know more and more I invite patients when Aboriginal Health Workers are in here to read the correspondence that comes from the specialist with me. 'So come on, pull up here, now see where he says this, do you understand what that's about. Can we talk about this?' So the more I'm talking to you, the more I realize that I'm being much more of a teacher here than a pharmacist."* (IPAC pharmacist)

Some patients stated that the pharmacist was a great **advocate** for them and would participate in their consultations with their medical officer. This **three-way interaction** was perceived as very valuable by the patients:

> *"My doctor [GP] he's fantastic. [IPAC pharmacist] and him will sit down and talk together, will come together in my appointment and we'll talk about medications and what she recommends, what the doctor recommends and then we will all come to an agreement is fantastic because they both communicate with me in the room so it's brilliant."* (patient CA).

> *"[GP] and [IPAC pharmacist] comes in and sits down with [GP] and talks 'oh I am wondering if we can try this' and [GP] will say yes or no. [GP] will look it up and see if it is right for me to use or not and that so it's good with [IPAC pharmacist] in that. She comes in and really reacts with the doctors too."* (patient MK).

The medical officers concurred that they **involved the pharmacist in their consultations**. This helped empower patients and involve them in their health care decisions.

> *"I did have a few patients where they came from other clinics as well as referred from some of my other colleagues due to poly pharmacy as well as pain medication as well as SSRIs. So that's where I sat with [IPAC pharmacist] for a couple of them, explained things and then let [IPAC pharmacist] take over and have that discussion with them later on … [IPAC pharmacist] was instrumental in trying to … replant those seeds for these patients when they kept coming back and saying it's not working and things like that. So she was pretty good on those patients and it worked well."* (GP Reg).

> *"I go through the records before seeing the patient and if I have seen non-compliance or interactions or concerns or uncontrolled conditions, chronic disease, then I might bring in [IPAC pharmacist] and say 'you know, what can we use in this situation'. Even with the patient so it makes a big difference bringing in [IPAC pharmacist] into the consultation."* (GP).

If the pharmacist couldn't see a patient immediately for a full consultation, she would briefly meet with the patient and put a plan in place to **follow-up** with them:

> ***"****And that could be a five-minute meeting that could be me [GP] calling her in to briefly discuss something and then she'll say [to the patient] come and see me after the doctor's visit and I'll give you my number"* (GP).

The GP confirmed that the IPAC pharmacist had *"done that really well. She's got those communication skills."*

A nurse also commented that she was effective in following up patients:

> *"Yeah really good. As I say she's not intrusive. We know that she's here. She's dogged though like she won't let a patient escape if she feels that she can be of use to them she will stalk them in that waiting room and if they need to go to the GP first she'll keep an eye out and she'll say to reception make sure they come through to me before they leave the clinic. She also gives us a heads up says 'you've got so and so coming in to see you and you make sure they come in and see me afterwards'. So that's really good."* (Nurse).

At the conclusion of their consultation with the IPAC pharmacist the patients would receive a copy of their contract as discussed with the IPAC pharmacist. The pharmacist reported that patients kept a copy of their contract for their reference. Some of them would put it on the fridge. The traffic light system was used to assess their test results and patients were monitoring their own progress.

> ***"****The resources we produce. They are all theirs. Yeah they take them home. I've been to places where they got them on the fridge. I do traffic lights, always traffic lights. We have traffic lights for blood pressure, we do traffic lights for HbA1c, we do traffic lights for BGL. We do traffic lights for ACR and you know patients are pretty good. You know they'll come in and they say ah I'm in the orange. I'm in the orange.: (*IPAC pharmacist)

Patients Knowledge and Understanding of Medications

All of the patients participating in the focus group discussion agreed that their knowledge about their medications had improved since they had seen the IPAC pharmacist. One patient said the pharmacist *"explains it more in depth than the doctors do, about the different tablets. That's what I like about her." (patient DE).*

> *"She asked me what medications I was on. And at the time I wasn't on anything. And she asked me if I understood what these different medications did. And I said Well no not really. And she explained to*

me the benefits, what they actually do. I don't know what metformin did. All I knew was it made me sick. And you know I didn't know that I should have been started on a low dose because most people get sick on it. And then she told me well you can have metformin and you know insulin together. And I had no idea because I'd always been given metformin or insulin. Never been, you know but she explained the benefits of each one and why you know it's beneficial to have you know the medications you know because of what they do. I never knew that." (patient TA).

"I've tried going to mainstream but I found going to mainstream things weren't explained properly to me, not like they do here at [health service]. And since I've been going to [IPAC pharmacist] well I found it really good, it's improved a lot" (patient DE).

"I know me orange and white one because I am an epileptic" (patient SI).

Another patient said that when she had questions about her medications that she would "just go to [IPAC pharmacist] … the doctors seem to close you, shut you down when you start talking about your medication and stuff" (patient DA).

One of the medical officers concurred that patients' knowledge had improved:

"They are such meaningful interventions that she provides … You know we try and we say 'oh you shouldn't be on this because of X Y Z' and think we do a really good job and they say 'no I don't want to do it'. And then we think 'ah whatever I tried'. Yeah but having somebody else reinforce it and someone who carries a little more weight with medication" (medical officer).

The nursing staff had seen evidence of patients' knowledge changing and consequentially their test results:

"I've had a number of patients say to me 'you know I've spoken to so many people about my diabetes, but until speaking with [IPAC pharmacist] I didn't really understand it'. And they're coming in and really wanting to know what their BSLs are, because I always ask them, you need their consent so I always say you know 'are you ok if I take your blood sugar levels?' They are like 'oh look, definitely' … and they'll say [IPAC pharmacist] has explained this and the other. They are keen to know what their readings are. They tell me that they have started monitoring whereas before they wouldn't. You would have people after seeing [IPAC pharmacist] come in and get glucometer machines. They've had them before but the batteries died or they've lost it or whatever so they've come in got another glucometer, and actually been interested in how it works because you can tell when you're educating someone whether they're receptive or not. And quite often you just feel like you're going through the motions they're going to take it home they're not going to use it. Whereas after a session with [IPAC pharmacist] they are keen to know how it works. They are keen to demonstrate it back to you. That's how it works. This is how I'm going to use it. … it's been really good. There has definitely been positive feedback from patients" (Nurse).

"She's had a really good impact on our diabetic patients. First of all, she explains to them using really good analogies so they can understand what's happening in their body and just how dangerous diabetes is because a lot of them, they're fairly complacent. I don't think they really understand … they've been for diabetic education sessions and they've spoken to us here, Aboriginal Health Workers, the doctors, the nurses, so we've all done our bit to try and to educate them, but [IPAC pharmacist] does it in a way, as I say, with analogies. So they really do understand. And I think it sort of shocks them into changing their behaviour. So she's had a really good impact there as well. And she's got people interested in actually monitoring their blood sugar levels and being interested in coming back to have the HbA1cs done and then feeling really proud if there's a change. Whereas before they weren't really interested and not motivated at all. So that's an area where she's just been really invaluable". (Nurse)

Benefits for Patients

All of the patients reported the pharmacist having a positive impact on their experiences at the clinic and on their health.

> ***"****It's been good since I've been here with [IPAC pharmacist] because like everyone says [in the focus group], she's helped you out with your medications. My old doctor, I tell him, these tables they making me put on the weight, not helping me lose it. [IPAC pharmacist] has adjusted all my tablets around and took me off insulin now thank God. I hate stabbing myself. And she just helped out and I've lost a lot of weight since I been here in the six months".* (patient MK).
>
> "Well [IPAC pharmacists'] been really good …. She's just helped me a lot with my insulin and my tablets because I was on 36 a day. I was like a ticking time bomb, but she put me right there and my insulin is good. My sugar is real good. So everything is really good and thanks to [IPAC pharmacist], she helped me out a lot" (patient SI).

One GP also described the impact the IPAC pharmacist had had on a patient:

> *"I had a patient for her it's difficult to know whether it is Type I or Type II [diabetes mellitus]. But she was diagnosed with Type I from some other place and she was here for the last three years I think. She was here initially with … complicated pregnancy and she was never compliant. We always checked the HbA1c and it was more than 14 and we tried to educate her. I tried to educate her for the last three years every day when she is here and she's agreed to take the medication initially but after two weeks she'd just go off insulin, and [IPAC pharmacist] tried with her a few times, and finally she organized a case conference with her family, diabetes educator from the hospital and she collected everyone and organized a case conference here and talked to her family. She has a twelve-month old kid … so now she is convinced about whether she has to [take medications]."* (GP).

The impact of patients' interactions with the IPAC pharmacist is explored further in the following patient case studies.

Patient Case Study: Sharona

"It's been life changing"

Sharona is a young Aboriginal woman in her 20s. She has been diagnosed with Diabetes Mellitus however the clinical staff including her specialist endocrinologist, have been unable to determine if it is Type I or Type II. The IPAC pharmacist and GP described Sharona as a patient who had improved the management of her diabetes. Sharona agreed.

Sharona introduced herself:

"I'm Sharona and I've been coming to the service for about I think two, three years now. And it's been life changing so it's helped me a lot."

Sharona explained that the most useful aspect of meeting with their IPAC pharmacist was her ability to recommend and discuss appropriate medications for her with her GP and explain to her why each medication was needed.

"*Before I was on different medications that was just not working at all. And then she [IPAC pharmacist] recommended some medications and I've recently just started the insulin and it's already been life changing. I've gone from having continuous hypers to normal sugar levels for once in my life and everything is just starting to go* ***back on track*** *for me since she's been here, so it's been absolutely helpful.*

"She's basically explained everything to me. She will even show me diagrams and she will print out the information and highlight everything, circle what I need to know and any questions that I have she'll answer them spot on, and she explains it so damn well, that I am just like 'Oh wow I did not know this before'. And the insulin that I was first put on I was actually allergic to and I did not know that because I was injecting myself and I would get, it was burning sensations, severe bruising and like my stomach would go purple and whatnot and she's like 'you're allergic to it'. I'm like 'oh am I?'. She's like 'yes, we need to start you on something else.' So she's helped me so much with changing the medications and adjusting their units to what it needs to be. And I've gone from having high sugar levels from like 30 to 29 every single day, down to ten to eight … It's brilliant."

Sharona reported that communication with the pharmacist was easy and the pharmacist followed up with her using texting and phone calls *"and then if there's that issue that she books us a face to face".*

The IPAC pharmacist would even say hello in the waiting room and check in to see how Sharona was even if she wasn't at the health service specifically to see the pharmacist: *"And even if we make a doctor's appointment just to see our doctor, she will still come over and talk to us and check up on us. Even though we're not there to see her,* ***she still comes over and checks up on us which is fantastic. Shows that she actually cares****."*

The IPAC pharmacist sometimes sat in with Sharona during her consultations with her GP in a **three-way interaction**. Sharona said she was involved in making decisions about her medications and the communication was clear:

"My doctor, Dr [GP] he's fantastic. [IPAC pharmacist] and him will sit down and talk together, will come together in my appointment and ***we'll talk about medications*** *and what she recommends, what the doctor recommends and then we will all come to an agreement is fantastic because they both communicate with me in the room so it's brilliant."*

Sharona commented that she had talked to other people in the community about coming to see the IPAC pharmacist and with your family *"yeah definitely"* all the time.

Sharona had been in hospital due to an insulin pump failure and was able to recognise that the medication supplied by the hospital was very similar to what she usually took.

"I have had to go to hospital. I think at the beginning of the year because my insulin pump failed on me for 48 hours and I went 48 hours without insulin and I got really sick and I went to the hospital. They kept me in but the medication looked basically the same as what I use".

Sharona's GP also commented on her situation and the value the IPAC pharmacist was able to provide in assisting with managing and **following-up** with the patient: "*And there was another person that we saw. We see people together often and she will get consent from myself and from the patient and we do a little sort of case conference situation where we kind of run the consult with the three of us talking. Even just yesterday afternoon we had somebody as well who diagnostically difficult when there's no real hard Type 1 or Type II even though she's been under the endocrinologist and just very difficult to manage her diabetes with insulin. She has a pump and the continuous glucose monitor and all of that sort of thing. But there's also a lot of social stuff and [IPAC pharmacist] really stays on top of this person even though she tries sometimes to disengage when things are difficult socially but if that had just been me and her, , I'd be at the mercy of when she decides she needs to come in and that would guaranteed be for a prescription."*

The IPAC pharmacist was able to make recommendations to the GP to adapt Sharona's medications to minimise challenges she faced in her social situation.

Patient Case Study: Taneesha

"She was so excited to see what her HbA1c was that she had left it to her birthday because she was so confident that she would be celebrating"

Taneesha is a young mother who is originally from [interstate]. She has been coming to the health service for approximately eight months. She had been diagnosed with Type II Diabetes Mellitus 16 years prior, however, until recently, had been disconnected from the health system.

The IPAC pharmacist described Taneesha as one patient who had been successful in improving the management of her diabetes. Taneesha was a patient that the pharmacist approached in the waiting room after identifying she was a patient diagnosed with diabetes and met the project criteria:

*"Taneesha is probably the obvious one. Taneesha came in. She had disconnected completely with the health system. She was diabetic and had no contact to speak of with the health system at all ... I don't remember why she came in and she was sitting in the waiting room as a new patient and I sort of walked past and picked up the thing. So I sat down I just went 'so Taneesha, hello my name is [IPAC pharmacist], I'm the clinical pharmacist here and I just notice you've put some diabetes down there. Do you to tell me anything about it?' and she went 'nope', and I went 'ok. So is that because you've had issues before'. She said 'well they just keep putting me on tablets and I hate them and they give me other side effects and I just decided I wasn't taking them.' I went 'ok, fair thing, fair thing. So have you thought about the risks of not doing it?' She said well 'I'm fine'. 'Yeah now but I think you've got a 9 year old and you've got a 13 year old…' and so we just talked from there. (*IPAC pharmacist*).*

Taneesha describes her first interaction with the IPAC pharmacist:

"Until I came here and [IPAC pharmacist] explained to me all the different medications, I had no idea that you could actually have different types of medications with each other. I was always given either one or the other. And I was, nothing was ever explained to me. And she sat me down the first day I walked in, she approached me and just explained to me all the different medications and what you can have together. I mean I've had type 2 diabetes for 16 years and I never knew that. I never knew that."

The IPAC pharmacist explained Taneesha's condition to her including the risks and how medication would help her to minimise the risks. The pharmacist **empowered** Taneesha through improving her knowledge.

*"You know my whole thing, is the first thing that I tell all the patients is 'who's the leader of your health care team? Who's the leader of your health care team?' And they go, 'oh I don't know, the doctor?' 'Nope wrong'. 'The specialists?' 'Nope wrong.' 'Would it be me?' …. That would be the answer wouldn't it. 'So who has to be happy with every decision? You. Not the doctor, not the specialist. Does the specialist around to your place at night and give you the tablets? No. Well then, he's pretty low down the list isn't he. So it starts with you and then there's your husband and your kids and then there's your GP and then there's all these allied health people, that's me I'm in there. And then there's your specialist and they feed information up. Not the other way.' So I talked for about maybe an hour and a half that day. We talked about what's going to happen. You know if she doesn't do anything and this is what can happen but if she does... I do a new sheet for everyone, I refuse to use [printed] resources, I write everything for the patient just like it's our contract." (*IPAC pharmacist*)*

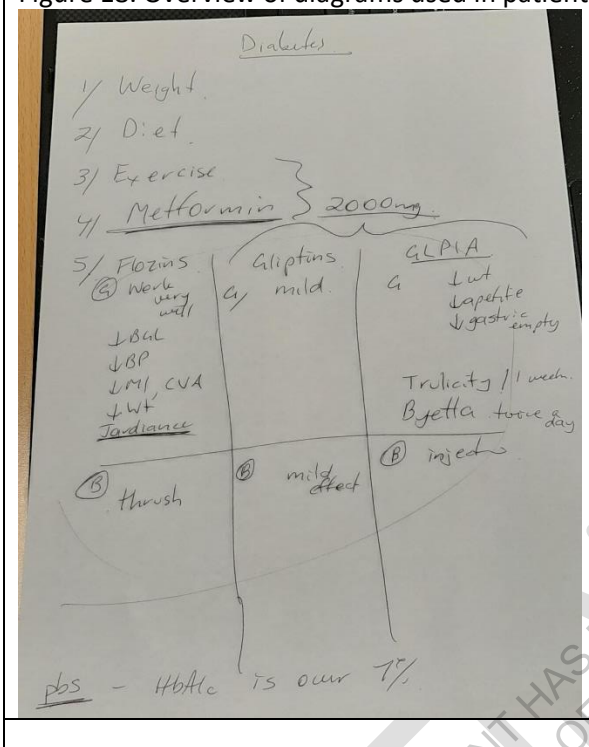
Taneesha described how the IPAC pharmacist **explained the medications** to her.

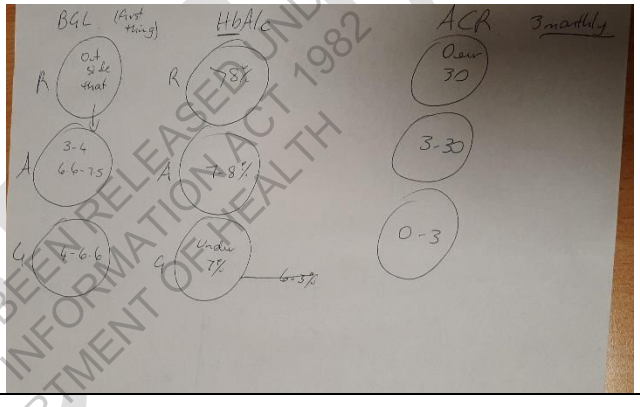
> *"…. She asked me what medications I was on. And at the time I wasn't on anything. And she asked me if I understood what these different medications did. And I said 'Well no not really'. And she explained to me the benefits, what they actually do. I don't know what metformin did. All I knew was it made me sick. And you know I didn't know that I should have been started on a low dose because most people get sick on it … then she told me well you can have metformin and you know*

insulin together. And I had no idea because I'd always been given metformin or insulin … but she explained the benefits of each one and why you know it's beneficial to have you know the medications … because of what they do. I never knew that.

The IPAC pharmacist described this as an individualised contract. The contract outlined the descriptions of the medications and the pros and cons for each and the possible options that the patient had. See Figure 18 for an example of the framework that may be used in a patient contract.

Figure 18. Overview of diagrams used in patient contracts.





For Taneesha the pharmacist also initiated a **'patient directed dosing chart'** in consultation with her GP, so that Taneesha could be more in control of her own medication and adjust it considering side effects she may experience.

"So I go metformin, good things, on the other side bad things. Flozins - good things, bad things. Gliptins - good things, bad things. GLP-1As good things, bad things. Right now, this is what our guidelines say in this order. But we can do this or we can do that perhaps we just don't even like the idea of that one. We just chuck that one out because if you're not happy with it you're not going to take it. So it's pointless me writing you a script or getting you anything to do with it. Anyway, by the end of that time her HbA1c was …, twelve or something and I talked her into starting a few things and we always talk about here 'patient direct dosing charts' so its patient directed. So, you're going to start on this wincey little dose and you're going to increase it, knowing the benefits are there, but you can increase it at your own rate" (IPAC pharmacist).

The IPAC pharmacist also put plans in place with Taneesha and a strategy to **follow up** with her and monitor progress. This was commonly done via text message. The pharmacist would say "'*here's my phone number, you text me and you say this is what I'm doing now and I'm going to record that'. And I send them smiley faces and thumbs up and all sorts of things and every morning my phone gets ding ding ding ding." (IPAC pharmacist).*

The pharmacist stated that Taneesha had been empowered and could now monitor her readings and felt comfortable discussing her health care with other health professionals.

*"So the outcome of the story is Taneesha now tells all the doctors exactly how she's managing her insulin, her HbA1c is in the 5s. Absolutely always. She's lost weight. She's active, she takes part in the community now. She's a different person." (*IPAC pharmacist*)*

The IPAC pharmacist said the key to improvement was ensuring that health care was *"**patient-directed**, all patient-directed. Everything I go on about is patient-directed."*

Taneesha had also become a ***"peer tutor"*** and encouraged other people to get their health care issues sorted. The pharmacist said that Taneesha *"tells everybody else. She's become my peer tutor you know to get things sorted. (*IPAC pharmacist*).*

Taneesha stood out in the mind of her GP also who commented that she was a patient who was a 'success story' and had managed to get her diabetes under control.

***"**Yeah there was a really stand out patient to me recently … [Taneesha] had **come in on her birthday to get her HbA1c tested** and I sort of spoke to her and said 'oh gosh what are you doing here on your birthday?' But she was so excited to see what her HbA1c was, that she had left it to her birthday because she was so confident that she would be celebrating. Her HbA1c had previously and I mean January this year was like 12 or something horrible and it was I think below six at this visit … And she spent the entire time, she was just enthusing about **[the IPAC pharmacist] and how she'd empowered her with knowledge** which was the most important thing and the thing that keeps popping up with so many patients is that no one has taken the time to explain to them about their condition, what their role is, what the role of the medication is. So that they feel like they're the one in control and it's up to them to make the changes to improve things. So this woman basically came in on her birthday just to be congratulated and to feel good about it and so she should, she deserved to feel good about it. But she did give a lot of the credit to [IPAC pharmacist]."* (GP – A).

Carer Case Study: Craig

"Having that follow up I believe is wonderful personally."

Craig is an Aboriginal gentleman in his 70s and carer for his wife Glenda who was in her 80s. Glenda is a strong Aboriginal woman who was taking multiple medications (polypharmacy) and had been diagnosed with dementia which was progressively getting worse. Craig had to take more control over the management of Glenda's medication as she was now almost unable to do this for herself. Craig explained his situation:

"My wife is starting to get, she's losing it now, getting dementia. And so the tablets have been a worry for me. We used to get the tablets in a little strip, not a strip, in a bubble pack [blister pack]. And you'd break off each day and that was good…. But my wife wouldn't let me do the tablets, she said 'I'm not a little girl. I know what I'm doing.' But she would forget the day, and she'd take the morning ones on a Tuesday and take the lunch ones on a Thursday and then when I come to look, I had no idea what she had just taken. So I thought this is not good you know." (carer).

The GP at the health service referred Glenda to the IPAC pharmacist for a Home Medicines Review. The carer reported that the IPAC pharmacist did a **great job communicating** with him and his wife and the outcome of the review and the recommendations was positive.

"then through the doctor here at [health service they] organized to have the visit and come out and go through tablets. We've actually got her off six tablets which weren't needed. And she's had no problems not having them yet, which is good. And she was getting sick of taking tablets… cause my wife she'd put them in all in her hand, just put them in her mouth and a glass of water and they're gone. When she got up went away and I look on the chair and I'd fine one or two tablets, 'now when did they come out?'

The carer reported that he understood the role of the IPAC pharmacist prior to the home visit, but he had never experienced it before.

"Yes [I understood] but I never experienced it… [IPAC pharmacist] sat down and just talked and explaining about the tablets how she's going to check into this. And when you take them in all this sort of thing do you take him with you meals and after your meals and so you know it was more personalised and Murri.. that's the only way you are going to get through, we are oral, visual people … just having [IPAC pharmacist] to come out and sit down and talk with us as another human being to another one or another that was good and good for me but also I found it put my wife at ease. She thought well someone is really interested. And that's been really good … So that coming to our house … I said to my wife later I said that 'wasn't that good?' She said 'that was the best.' She said 'well I don't need to go to the doctor anymore.' This is perfect you know … coming in and sitting down and talking and I found it really good too because I had better understanding because my wife would not allow me to go into the doctor with her. She said 'I know what I'm doing' and if I go she gets all upset. You know because she thinks I'm trying to take over. I am, but I can't tell her that. You know because she's forgetting. But to me and to my wife that was the best thing. It was good." (Carer).

The carer reported that the IPAC pharmacist was very thorough and ensured they had a good understanding of the medications.

*"You know she went through everything and **explained everything**. And what I was trying to say before … our culture is oral, visual and so the important stuff to have someone sit down then explain and got the tablets in front of you and what they do was a big plus because I think we didn't know what half of them did... And she sat there and she explained, she said 'that's why I think that one, that one and that one are unnecessary … and so you know just going through that and explaining what works with what and what you don't need and she didn't need ... I mean for her to sit down and tell us that and explain it that I could understand it, I mean I [teach at university and I'm educated] lecturer in history and speak eleven languages*

but I really don't get things sometimes. Anyway that to me, that was so important." (Carer).

The carer felt that the IPAC pharmacist was able to support the GPs by following up with patients and helping them to understand why they were taking their medicines and promote adherence:

"I mean the doctors obviously must get frustrated. They're going through, check the patient's right, make a decision on what medication is going to help the patient and a lot of our people, goes in one ear and out the other. 'Ah it's too hard eh. I got to go down, get that tablets and do this.' And I take it for a little while and then I feel good and I don't have to do it anymore. So that's the important part. The follow up and the continuation … little kids will have severe flu, runny nose, very bad cough straight to the doctor put him on amoxil. You know we try to stop all that as much as you can but you know and amoxil and then the mother and the doctor tells him you've got to take this till it's finished, you got to take so many mills three times a day and then you repeat and then. But you must follow it all the way through. And that little kid doesn't want to take it after three... 'ah I don't want that stuff, I hate that stuff' and so he doesn't take it so the mother gives in. So that little child doesn't take it. And then when he gets to [IPAC pharmacist] well that's not going to work anymore you know. And so this has got to be explained as well. And the doctors have that role and they do that. But out of sight out of mind. So having that follow up I believe is wonderful personally." (Carer).

The carer reported that the IPAC pharmacist had *"wonderful"* communication skills and was able to work well with Aboriginal people ***"[Her] bedside manners were wonderful for Aboriginal people."*** (Carer)

Patient Survey N-MARS

The patients participating in the focus group did not report any issues with understanding the questions in the patient survey.

The AHW assisting the IPAC pharmacist with the implementation of the N-MARS patient survey reported that it was a good tool to explore issues impacting on adherence: *"[IPAC pharmacist] and myself we've been using the N-MARS forms for patients and I find that form to be really useful in working out if there's any issues with the with patient's medications compliance."* The pharmacist concurred that responses to the patient survey *"provided a basis for further conversations."*

However, the pharmacist believed the N-MARS patient survey was not effective with the patients presenting at ACCHSs. She surmised that the patients were not honest in their answers

The Aboriginal Health Worker did implement the N-MARS patients survey, but the pharmacist commented that *"they [the AHWs surveys] were even more useless than mine … I would often stop and stare at them and go 'do you know what [patient]. I don't think that's actually right hey, let's think about it because you know when I went around to pick up your DAA and all those afternoon ones were still there. Why was that.' And he goes 'well whatever'. … So I was absolutely able to pull things apart and go 'you know what, we are going to start this again, let's start at the top right, let's do this.'" (*IPAC pharmacist*).*

The AHW also stated that patients did not always understand the questions or responses were not necessarily reliable: "there's a question about have they taken the medications in the last seven days and that you list the medications that they've taken. Some or few people may not know the medications that they're taking and I'm not sure whether I should take their word for it or read their chart because sometimes we might not have their chart up to date properly yet."

Patient adherence

Health service staff inferred that patients were being more adherent to their medications and they were seeing the results in blood tests. A nurse stated:

"With HbA1cs there's been some quite significant ones where they've always run high and then come right down … I mean there's been people being in the 14s, 14mmol, come right down to 7s, 8s. You know like there's been some really substantial ones. And then there's been ones for people who you would never expect them to have a drop at all. But we are getting drops with them as well. So no, it's been really it's really encouraging". (Nurse)

Educating staff around Medicines

The health service staff reported that the IPAC pharmacist coordinated a weekly education and training session. One nurse described these sessions:

"she's been really great cause she gives us training sessions. She does training for the staff here in her own time so it doesn't encroach on you know work time or anything like that. And those are actually fabulous, just general education. I find most of them are probably geared more towards the GPs because of the pharmaceutical side of things. So the Aboriginal Health Workers and the nurses aren't quite as interested I suppose in the drug interactions and so forth. But it's good for us to have a basic knowledge. But she goes in fairly in depth with the GPs because that's really important to them. But you know we sit in on those sessions and it's good. She's giving us some really good training in general, you know general conditions, hypertension obviously diabetes. Lots of things I can't remember off the top of my head but we've had lots of training sessions and she gives us a good general background and again uses those analogies to make it easier for us to understand so that we can then you know we're better able to explain to our patients. So her training sessions have been really, really good. I've really enjoyed those." (Nurse).

An AHW reported that *"we always have at least one doctor attending the weekly education sessions."* One GP said the sessions were *"invaluable".* He reported the formal and informal education from the IPAC pharmacist from invaluable: *"the Wednesday sessions which is a dedicated formal education time is always useful and across the board too from the health workers or the nurses, registrars and GPs alike. But also the informal education that we get all day every day has been useful as well."*

One of the nurses supported this saying the pharmacist *"had a really good impact on the GPs."* Even one of the patients suggested that things had improved through *"the re-education that she's done with [GP]."*

Quality/ Judicious Use of Medicines

The support the pharmacist provided to the GPs was invaluable. One GP commented that the pharmacist provided recommendations informally prior to, during or after a consult and from formal HMRs:

"[The recommendations were] excellent and even with home medication reviews. So if it's before a consultation I have a quick question or during or even after, that's fine. But if I think this person's medication list is a complete mess and it's going to take a lot longer than just a corridor consult then we refer for the HMR and then there is feedback and it's great to have the pharmacist in-house you can do the feedback in person in real time." (GP).

One nurse also commented that she had seen the pharmacist provide great assistance to the GPs:

"she's helped the GPs enormously because she's so up with the medications and she checks all through each patient's medications list. She can see where things need to be tweaked then she will liaise with the doctors and quite often particularly the registrars they're like 'oh look that's fantastic I didn't know that' ... So I mean sometimes patients have been taking drugs that they really didn't need to be. So it's been really, really helpful in that regard." (Nurse).

Another nurse also said the *"majority of the doctors here are very open and happy with [IPAC pharmacists'] input."* The nurse reported that they *"work well with her and take on board"* what she recommends. It was

also reported that the pharmacist "keeps an eye on their like how much they're prescribing [locums] and how often and she tries to work with them to decrease or take them take them off that."

A nurse reported that *"There was one doctor a training GP, he just idolized [IPAC pharmacist] and he even rings her now I think like for advice. So he used to come to the meetings as well all the time."*

Recommendations from medication reviews

The three GPs interviewed agreed that the pharmacist was *"making the recommendations most days she's here and even if she's not here she was sending us messages ... yes text message … even if she's not here so she is doing it all the time and it is really useful to us."* The GPs also agreed that the pharmacists' recommendations were *"really useful"* and *"very good."*

The GPs reported *"almost always"* making *"changes based on her recommendations"*. One of the GPs commented:

> *"She has a big focus on de-prescribing which I love. That's kind of my ethos as well. Just rationalizing and do we really need this. Where is the evidence for this? Is this actually giving you any benefit? Maybe not. Let's try without. And a lot of it has also been about things like chemical restraint as well. So where is the evidence, where's the appropriate diagnosis for this particular medication? If they don't have that diagnosis is this being provided with chemical restraint is not appropriate. So that's really important too."* (GP-A).

Another GP commented that medication reviews queried why patients were still on some medications for a long time and often there was no evidence for still taking that medication:

> *"Some of the medications, patients are on that medication for a long time and [I] haven't really looked into it. Since they want the medication you used to give them, but when [IPAC pharmacist] ask 'what is the rationale behind using that medication?' and you look in the past and seeing everything and looking more in depth."* (GP-S).

The GPs reported that after medication reviews they *"recall them [the patients] back. If we refer for a formal HMR that will come through as a result, a letter and then we recall via that, but [IPAC pharmacist] also has her own little recall system and she might say 'hey this person's been back three times and you haven't discussed the HMR' and it might have been because there was something more pressing at the time or we just forgot, so there is that second layer of safety there."*

Organisational/systems changes and collaboration

The health service already had policies in place regarding medication management. Having an in-house pharmacist was useful for reviewing these policies: *"as far as processes go if there was anything medication related as far as reviewing documents on our document management system I would often be like 'hey [IPAC pharmacist] can you review this for me and let me know what you think?'"*

A manager reported that the pharmacist was also involved in reviewing the health services *"QUMAX processes as well"*. Another manager stated:

> *"Yeah she was probably instrumental in us changing what we do with QUMAX … I suppose her being here now, we took that opportunity to use her knowledge to manage that [community] pharmacist so that we could make the change here and so went from Webster Pak to MPS [dose administration aid company]…"*

The manager described the process of changing pharmacies which the pharmacist had assisted with:

"So we've made a complete change. We had 3 pharmacies before … [we] went and met with the new pharmacist across the road here and from everything that we saw it was going to be more beneficial for the clients and the patients for us to be with them and streamline the one pharmacist to deal with. They were willing to do deliveries for all of our patients which hadn't happened in the past. They're across the road so if we've got any issues we can walk across the road they can cross the road. The other two pharmacies never had an issue. They just said 'Yep no worries, you're making that change' and we had informed them. The third one was the issue. But that relationship … the new pharmacist [IPAC pharmacist] certainly has managed that very well ... and her making sure that they've got that communication happening all the time. The QUMAX funding was very late this year. So we had to manage that 'we're not getting any money situation' because we only put the paperwork in like a week ago and that's how late it was. Not because of us but because of the system. So Manager T and [IPAC pharmacist] did a good job of managing that saying 'yes you will get paid but it's just a bit slow coming' and being a new pharmacy you know it's hard to manage that when they don't know the system."

The change in QUMAX provider was perceived to be successful from the health service perspective and from the patients. The GPs commented that patients had provided positive feedback about the change: *"they like dealing with that particular pharmacy and they like the MPS versus the Webster Paks … actually the feedback I've received is that it's so much easier to open … and you can take a round, like if you are going for a day or two, you know you can just take them. … I mean I think a lot of us that don't use Webster Paks think that you can just pop the medication out, but it doesn't work that way, or it does but you fire them across the room."*

One of the nurses in the focus group was managing the changeover of patients from the previous pharmacies to the MPS and reported: *"It's all been positive, like they're [the patients] really happy. They're happy with the pharmacy."*

During the observation work the community pharmacist commented that the IPAC pharmacist was a good communicator and used emails and texts effectively. Technology (mobile phone messages] was also used by the community pharmacy to advise patients that their DAAs were ready to be picked up. The pharmacy also provided a delivery service and dropped off DAAs to some patients from the health service. The driver would make three attempts to deliver the medication.

Challenges were experienced by the community pharmacist when patients go into hospital or out of town. This was an area identified where communication could be improved. The community pharmacist also stated they would be reluctant to continue working with the service if the IPAC pharmacist role ceased.

Impacts on staff

The pharmacist perceived that communication with other health staff within the service had been positive. Through the weekly education sessions, the IPAC pharmacist believed that health services staff were on a "more level playing field" and that there had been changes in medication management and discussions around medications within the team. She noted:

"Everything's been very positive. … More than that there's been a flattening of the team structure ... so at our meetings I sit out the front and do three minutes of didactic stuff but then we do lots and lots of role plays and peer tutoring and the doctors and the health worker are exactly the same. There's no, there's no strata. And I think that then carries over into our daily jobs here." (IPAC pharmacist)

The pharmacist also mentioned changes in the roles of the Aboriginal Health Workers and communicating issues to the broader team:

"There was big changes in the way that Aboriginal Health Workers were screening, asking questions and coming to me. Aboriginal Health Workers were coming to me saying 'I figured out that such and

such is living with such and such. I think that's where the tablets might be disappearing...' you know just really the sort of skills that I think that I have was starting to rub off on other people and they were coming back to me and saying 'I think I figured this out. I think I know why he does that'." (IPAC pharmacist)

The pharmacist reported observing the GPs using some of the strategies discussed in the weekly sessions in their practice:

> *"The doctors that would come to the sessions in the morning and there'd often be two or three doctors at our training sessions and they'd sit there and go 'oh that's an obvious way of finding out what's really happening'. And then I would catch them using my pedagogic techniques in their [consultations] because I go in there and there would be sheets of paper in there [with examples using the pharmacists' diagrams, see Figure 18]."* (IPAC pharmacist)

The GPs agreed that the transfer of the pharmacists' knowledge of medications was "incredibly effective" and had improved communication within the team. One GP commented:

> *"I think that's improved my medication knowledge. … I think it's improved communication with the rest of the team. I think a lot of us have been in that situation, like a lecture, where the lecturer asks the question to everyone sitting there and it's just dead silence until someone starts talking and there's a conversation then all these other people pop up and start communicating as well. I think [IPAC pharmacist] has done that for our team as well. We talk more."* (GP-A).

One of the nurses had observed the GPs seeking support from the pharmacist: *"I know the doctors always seek her out to talk to them about medications. Like even this morning when she was up here, Dr [GP] was like 'oh do you know where [IPAC pharmacist] is?' I was like, 'oh I think she's upstairs'. 'Oh I need to talk to her about a patient.' So she is, it is really handy for them to have her right there just to talk about medications."* (Nurse).

Relationships and Collaboration with other Providers (including community pharmacy)

A manager from the health service stated: *"I don't know if she's been involved directly with the hospital pharmacist but I know from an organization perspective she has been seeking discharge summaries, you know when a patient has been in hospital and it's evident that there's potentially been changes, where's the summary. How do I make sure that this patient chart reflects exactly what's happened in there? So, she's been very proactive in that sense."*

A GP stated that the hospitals had issues with accessing a patients current medications and quite often would contact the IPAC pharmacist at the health service to confirm these: *"It is worse on admission actually. I have seen a couple of patients where the admitting doctor had to contact [IPAC pharmacist] to get some information for patients. But that's when you need it. It's not a standard approach."*

The GP reported that the IPAC pharmacist had participated in *"some case conferences with allied health as well".*

The health services staff were generally not aware whether the IPAC pharmacist had had any contact with specialists in the hospital or the renal clinic. However, the IPAC pharmacist reported that she'd had contact with various stakeholders, particularly when the IT system had crashed and she was trying to obtain medicines lists for patients: *"during the data crash, it seemed to be all that I was doing. … I don't know but I think this phone was joined to my face most of the time. I ring renal clinic so I ring, I just. And because of the loss of data I just ring and ring. I get discharge summaries from all sorts of places and just pull information together from anybody that I can." (*IPAC pharmacist*).*

One manager reflecting said she was *"like amazing. And also I think when we had a few data issues at the start of the year, she was like Jesus when it came to … trying to sort out the medications, current medications and that sort of stuff and helping out the GPs in that instance."*

One of the patients said she "would like to see some sort of connection with the renal unit as well because those guys … that have to go to renal and they set up for hours and hours, and then half an hour conversation with them around their medications." (patient DA). She thought there would be benefit in having the support of the IPAC pharmacist.

The IPAC pharmacist reported that the relationship with the local community pharmacies was *"Excellent. Except for one."* The IPAC pharmacist stated that relationships had developed through achieving positive outcomes in a timely manner:

> *"I've become the first place 'sorter-outerer' of issues for many, many pharmacies. I get personal emails and personal texts, seven days a week from pharmacies saying 'should we do something about this now or can it wait till Monday?' 'No we need to do something about this now' and because I always make myself available 24 hours a day, 365 days a year to anyone. That means that problems can get solved when they're little and I'd much rather stop what I'm doing and take three minutes out to fix something on Sunday afternoon than have the patient end up in hospital on Monday night."*

The pharmacist felt that relationships with community pharmacy may have even improved. She commented:

> **"**I find that the pharmacies, I don't know but I think that the pharmacies feel like ... they're being taken notice of more. And I think that the more I work with them, the more likely they are now to contact here or contact any pharmacy or any doctor's now and go 'and I really think we need to look at this now'. So I think that's really good. You know the flattening of that structure as well."

Project – Enablers

Getting the right person

The health service staff reported that one of the enablers to the implementation of the project was the pharmacist being the right person for the job. One manager stated:

> *"I think it's about the person that you get in because I think that if you've got a young pharmacist who's never been out in the community it would be very difficult for them and they would sit in their room. So I don't think you'd get the benefits from that. Whereas with [IPAC pharmacist] who has been with us for quite a while and understands that it's about getting out and talking to people that you get the most work done." (*Manager*)*

The GP concurred saying *"If [IPAC pharmacist] was just in her own room doing your own thing and we didn't really have much communication, I don't know that we'd get as much value from it … I think finding someone who integrates into the team is really important."* The other staff agreed with a manager stating: *"It's not a role where you can just sit in the room or see a patient in the home and then not interact with the other staff. It needs to be that workplace culture that you're out talking to the patients, you're being opportunistic having discussions with the GPs etc."* The GP went on to say you need to *"get someone like [the IPAC pharmacist] who use the patient care as the most priority."*

A GP also felt *"it's a role more suited to an experienced pharmacist … you can't put experience in years can you, but probably not a new grad who has only worked in a city community pharmacy."* The group suggested someone who had some experience working in Aboriginal health in a *"community setting"*.

The IPAC pharmacist felt her teaching background had enabled her to embed into the primary health care team and facilitate team cohesion: *"having a much more cohesive primary care team and having somebody*

with the skills and I think this would go for most experienced pharmacists even without my teaching background because you end up teaching and even in community pharmacy end up teaching to pull all those bits together."

Patient relationships and empowerment

As mentioned above the health services staff described effective relationships had been developed between the IPAC pharmacist and the patients. A manager also stated that patients were now feeling more empowered and were taking more control of their health:

> *"I think there is a component of change management in there with the patients as well and empowering them to take ownership of their own chronic diseases through that increasing education and sort of looking at what are the barriers as far as compliance goes with that individual patients. So there's a lot of casework involved as well."* (Manager).

The ability of the IPAC pharmacist to use her "communication skills and the language that patients are understanding" enabled them to be more involved in decisions to participate in the project and in their health care.

Patients were understanding their conditions better and consequently were taking more control of their health. This was evident as one GP stated:

> *"I think [IPAC pharmacist] is open to what they can take all the time. So [with] the patients who are having an uncontrolled diabetes. She asked the patients to send that daily blood sugar readings to her by text. So most of the patients send the daily readings to her every day"* (GP – S).

The pharmacist had the ability to make connections with patients quickly: *"And that could be a five-minute meeting that could be me calling her in to briefly discuss something and then she'll say come and see me after the doctor's visit and I'll give you my number and we'll, you know so it doesn't have to be very long to establish that."* (GP – A).

Effective relationships with GPs

The majority of the GPs in the service highly valued the pharmacists' role and input. GPs were seeking advice from the pharmacist informally and through formal medicines reviews. The pharmacist also participated in three way interactions within consultations and case conferencing with other staff members. The pharmacist reported:

> *"So the four doctors that I've really worked with, three have been absolutely 100 percent supportive and one's becoming more and more willing to involve me early."* (IPAC pharmacist).

The nursing staff also identified that the GPs had effective relationships with the pharmacist: *"... It's majority of the doctors, we've only got a few, a majority of the doctors here are very open and happy with [IPAC pharmacist]'s input."* (Nurse)

The nurse also reported that one GP *"that's very old school and likes their own way, doesn't want to be told anything"* was more reluctant to use the pharmacist, but *"the doctors here work well with her … and they take on board what they can"* (Nurse)

Communication and support from the health service staff was *"very good ... I don't think I've had any issues at all. Everything's been very positive."* (IPAC pharmacist).

Even one of the patients commented that the IPAC pharmacist had *"helped to retrain some of the doctors here"* (patient DA). Another patient agreed *"Yeah"* (patient - CA)

Project – Challenges

Change of location – space and IT

Health service staff and the IPAC pharmacist mentioned that consult rooms and IT had presented challenges, particularly since the move to the new office building. One manager stated: *"Before we moved from [old clinic], she had her own consult room out the front and since we have been here we've sort of had a few teething issues with our IT … and have moved [IPAC pharmacist] around, but it's always been within that GP consult area. So and she makes sure everyone knows where she is".* A nurse concurred saying: *"Well of course, it was so unfortunate because we had a computer issue like a really bad one with some temporary data loss."*

The pharmacist also mentioned that the IT crash had impacted upon her ability to do her role and so had to redirect her tasks. An upshot of the data loss meant the pharmacist further developed relationships with external providers as data was tracked down*: "I don't know but I think this phone was joined to my face most of the time. I ring renal clinic ... And because of the loss of data I just ring and ring. I got discharge summaries from all sorts of places and just pulled information together from anybody that I could" (*IPAC pharmacist*).*

The pharmacist also said the more spacious layout of the new clinic meant staff had less contact with each: *"I find though that they're less inclined to use me here one because of the geographical isolate. You know we're so far apart where there's nowhere near the interaction that there was at M Street [old clinic]between all the staff and the customers"*.

Patient recruitment and follow-up is difficult. Appointment systems don't work.

A significant challenge for the pharmacist was getting patients to come and see her. The pharmacist stated is was *"Incredibly difficult. Incredibly difficult. But I don't think that that's any reflection on me and you know opportunistic conversations are the key in Aboriginal health"*.

The pharmacist went on to state: ***"****No Aboriginal place that I've been to... The appointment system doesn't work particularly well."* (IPAC pharmacist).

A nurse also said that failure to attend appointments was common at the health service: ***"****she'd like to try and get people as I say while they're here because it's quite hard and you can book them but they DNA [do not attend] … for all of us. It's just the nature of our clinic we get a lot of DNAs, so [IPAC pharmacist] was always very keen to get them [patients] pretty much immediately. And if she couldn't see them then and there she would come out and talk to them personally to I guess encourage them to come in for the appointment in the future".*

As noted previously a GP stated that some patients like to *"fly under the radar and are not complying with their medications"* with a manager verifying this saying they: *"just want to come in, get their script and get out the door"*.

Patients overwhelmed

Another barrier in the project was when patients, who may have been missing inaction for some time, did present to the health service, the clinicians would take advantage of this and try and do all of their catch up appointments which sometimes took a long time ***"****I think the other thing is that a lot of our patients when they come in, we try and do a lot while they are here. Quite often they are here for a long appointment. So seeing a pharmacist well adds that extra 20 minutes but that's quite a long time for the patient, when you put all the appointments together."* (Nurse)

Project and limited funding/Sustainability

Another challenge was the short term nature of the project. A nurse stated *"She has been fabulous. We'd like to have her permanently*, however the health services staff were aware that the project would cease at the

end of October. Several staff members commented to researchers during the observation that core funding was needed to continue the role. Other staff stated:

> *"No I don't want to think about [it]. [IPAC pharmacist] says 'oh I'm in this role until October, I think it is'. I don't want to think about that. I've just got her mobile number. I have a plan."* (GP – A)

> *"We could have her every day … it's fantastic to have her, even if it was one day, like that's better than not having her. So yeah whatever would fit around her. The more we could have her the better."* (Nurse)

Summary

The IPAC pharmacist role was valued by the health service staff and the management. One manager stated: "*I think it's just it's become normal for us to expect her to be here whereas in the past it was whenever she could make it. So it might have only been a half day a week. You know sometimes she couldn't come and she would just do the home visit first. But I think it's very, very much now that we are dependent on her to be here and we are not looking forward to the end."* Comments from the nursing staff included:

> *"Well it's been wonderful, wonderful."* (Nurse)

> *"It's really been good to have [IPAC pharmacist] in clinic to be able to access her because she's really knowledgeable. So pretty much any questions that we had to we can get an answer out of her. The program's quite Aboriginal and Torres Strait Islander based isn't it and monitoring and that sort of thing and making sure that we're improving Indigenous health."* (Nurse).

> ***"****Well like I say just having that knowledge you know because it's always up to date knowledge. She's got a thirst for knowledge herself so she's forever researching stuff. She never stops learning herself. Yeah. And just the way that she is so approachable. So approachable so knowledgeable so readily available. That's it fantastic. The way that she's so willing to share her knowledge with people. That's absolutely brilliant. She's really generous with her time. Really generous with sharing her knowledge that has been so incredible."* (Nurse).

A manager stated that their experience had been *"100% beneficial"* and would be willing to help other services thinking of introducing the role: *"I would definitely be open to … providing resources that we have shared and that sort of thing. It's hard to say what exactly I would give because what works for us might be very different in another centre. But by all means if someone said to me look we're thinking of bringing on a pharmacist. I would be like yeah let's set up a meeting and we'll have a chat and you can ask me any questions."*

Another manager concluded *"Yes we would we would like to share her. It's just that we don't want to share!"*

There was overwhelming support for the IPAC pharmacist. ACCHS staff agreed that the IPAC pharmacist was well integrated into the primary health care team and approachable. The staff had a good understanding of the role and referred patients to see the pharmacist. The IPAC pharmacist participated in clinical meetings and provided education sessions to all staff.

The pharmacist answered medication queries and provided information, as well as undertaking medication reviews. Uptake of the recommendations was high and the GPs reported they were always very good. The GPs valued the pharmacists input and often invited her into consultations with patients where a 'three-way interaction' could take place. The IPAC pharmacist developed relationships with patients and many reported that the pharmacist had changed their lives. The IPAC pharmacist empowered patients to take control of their health care by improving the knowledge and understanding of their conditions and their medications. The pharmacist would sit the patients in her seat and support them to read and understand their medical record. While low health literacy was a common issue, patients reported the pharmacist would draw diagrams and was able to explain things to them so that they understood.

The move to a new clinic location was a challenge in implementing the project as there was more competition for rooms in the new building. An IT crash also impacted upon the pharmacists' ability work in the role and hindered patient follow-up. An upshot of the data loss meant the pharmacist further developed relationships with external providers as medications data was re-acquired.

All participants valued the IPAC pharmacist role and believed there was a role for a non-dispensing pharmacists within ACCHSs.

3.6 Enablers and Challenges

Enablers and challenges to implementation of the role and aspects of the project emerged throughout the interviews and site visits. These are summarized in this chapter.

3.6.1 Enablers

Having the right person

Having a pharmacist with the right *'organizational fit'* and right personality was just as important as their skills and experience. As well as having clinical skills, pharmacists needed to be culturally appropriate, able to develop relationships and build rapport and to be flexible, non-judgmental and resilient.

> *"I think it's about the person that you get in…. [the IPAC pharmacist] who has been with us for quite a while and understands that it's about getting out and talking to people that you get the most work done... It's not a role where you can just sit in the room or see a patient in the home and then not interact with the other staff. It needs to be that workplace culture that you're out talking to the patients, you're being opportunistic having discussions with the GPs etc" (*Manager) *I think she's done really well to make herself... resilient* (Medical Director).

> *"I think the main thing that we've really become … is the conduit between pharmacies, community pharmacies, between hospitals, between doctors, between clients"* (Pharm17).

> *"This discussion could be a very different discussion if it was a different pharmacist. So the success for [name of health service] of this project is at least in part if not marginally about [IPAC Pharmacist] and her personality and professionalism"* (Director of Health Services).

> *"…we had people who'd had very sound experience in the [state], sound experience in remote, had had cultural training and, and in the organisation and also worked, [*IPAC pharmacist B*] worked in the organisation for some time which you learn a lot on the ground. And [IPAC pharmacist A] had been working at [remote community]. So, it was about getting the right people. And so that that goes to communication style and expectations and all that sort of stuff, not just with clients but also, we have all Aboriginal clinic managers so that that was part of fitting in the team*." (Clinical Director)

Pharmacists having had previous relationships with hospitals and local community pharmacies helped facilitate communication between the different health care providers and build better relationships.

> *"I think it really we have made a big effort to improve our relationship with the community pharmacy. I worked in the community pharmacy that had the QUMAX account for 10 years. I had a good relationship with them anyway and that was where I was doing my locum work mainly. But some of the others you know and [town] is a small place for pharmacists so we all know. But they all love having us here. It's made it much easier for them to do their Webster Paks mainly, that's the big thing"* (Pharm17).

> *"... I think she obviously got massive support around her from being in community for a long time. She's got ties everywhere. So she's the ideal person for that job."* (Medical Director)

Pharmacists' ability to translate the role into practice

The pharmacists who felt they were successful in the role understood the requirements of the role, were proactive, and initiated relationships and the provision of education to staff. They just got on with it, *"like a dog with a bone"* (Medical Director).

> *"We had orientation, but we were all heading into different settings and, I wasn't quite sure. My role here is much broader than I had expected. I had thought it was just going to be a clinically supported role to the GP essentially, patient education things like that, but so much more, which is great, I love*

it because there's the education and clinical going on here. There's a lot of patient care education that sort of stuff, monitoring pathology making sure that's all followed up" (Pharm02).

Possessing HMR accreditation

Some accredited pharmacists felt that HMR accreditation had provided them with extra knowledge and confidence to conduct medication reviews.

> *"I think you need to be accredited in HMRs. There's a lot of knowledge that you need from that … I don't think I would have had before I did that [HMR accreditation] training."* (Pharm04)

The outcomes from HMRs were valued by the clinical staff and also enabled the health services to obtain income. This was highly valued by the health services.

> *"recommendations were balanced and evidence based with a thorough understanding of not only the pharmacological reasons behind the changes but a deep understanding of the individual patient factors that influenced their suggested changes."* (GP)

Prior engagement/experience with pharmacist

Some services had prior experience with a pharmacist occupying different roles to the IPAC project. This helped with relationship building, and health service staff understanding of the pharmacist roles other than dispensing. Understanding the pharmacist's role resulted in more support from health service staff with patient recruitment into the project.

> *"We also both [approached] the patients that we already knew. So if we saw them in the clinic we went 'oh you know we're here now on this trial. Would you help us out because it'll help keep us in the clinic, this is what happens.' So, having that 18 months of already meeting some people helped a great deal to recruit people."* (Pharm11)

> *"[IPAC pharmacist] worked in the organisation for some time which you learn a lot on the ground. And [IPAC pharmacist] had been working at [another ACCHS]. So it was about getting the right people. And so that goes to communication style and expectations and all that sort of stuff, not just with clients but also we have all Aboriginal clinic managers so that that was part of fitting in the team."* (Clinical Director)

Support from the health service

Pharmacists reported the services implemented strategies to help them integrate into the primary health care team and the community:

- Introductions to staff in key roles and community members

> *"They encouraged me to go to the elders' group when I first started. So that was probably the best thing, because by going to the elders, if they accept you, they will spread the news and gossip like there's no tomorrow. So, I think being encouraged to go to that and going with me to introduce me to those key people. Definitely helps that situation to get into the community"* (Pharm04).

- Wearing the health service uniform or shirt helped embed the pharmacists into the team, gain respect and acceptance into the community.

> *"Man, it makes a big difference having the shirt. You are part of the team, you're one of the good guys. It's really good."* (Pharm20)

> *"As soon as you have this blue shirt on everyone knows that you're a safe person to talk to."* (Pharm11)

"I think actually just even being in a [health service] uniform actually gives people, you know sort of, there's some trust that comes with that. So and talking to one of the community pharmacists who was doing our Home Medicines Reviews she would say, she just felt like she couldn't really be effective because people felt on edge, even though they knew why she was there, she wasn't part of our team. Yeah she was sort of an outsider, so she might go to the house but they wouldn't let her inside the house. So then you know actually sort of decreases effectiveness. I think it makes a huge difference." (GP)

- Participation in health promotion days and social events helped pharmacists integrate into the team.

"They had a like a barefoot bowling staff social thing and the chronic care clinic and he invited us along to that, and we went along and it just it makes a big difference." (Pharm17)

"Unexpected pluses were: the information stands they did at our NAIDOC celebrations." (GP)

Stable workforce

A stable workforce, in particular GPs, enabled the pharmacists to undertake their role more effectively.

"[The Manager] is very organized around supporting staff and how everything's going. He's very good with that. Very good with looking after staff because if you don't look after staff then you're in a lot of trouble. [The health service is] unbelievably stable, a lot of staff have been there for years." (Pharm18)

Referrals from staff, in particular AHWs/AHPs and GPs

Approaches used to recruit and consent patients included referral from the clinical staff in particular GPs and Aboriginal Health Workers and Practitioners.

"The GPs… they have a lot of patients that come through and they go 'oh wow we could really do with a medicine review'. So then they come over to me and say 'oh [IPAC pharmacist], have you met Mrs So-and-so'. So it's kind of like a referral." (Pharm02).

"The office that we had was in the same corridor as a health worker so it was just like we were part of a team, just went from health worker, to the doctor, to the pharmacist" (Pharm17).

Accessibility

The option for patients to self-refer and book themselves in to see the pharmacists minimised accessibility barriers and helped build relationships with patients.

"I've rang up and asked to see [IPAC pharmacist] and yep, they even booked me in. They said 'oh we'll put you through to [IPAC pharmacist] and talk to [IPAC pharmacist]. Yep come in all right. Come in and walk in the office or knock on me door and [I will] see you'" (Patient).

AHWs/AHPs assisted pharmacist integration

Positive relationships with the Aboriginal Health Workers and Practitioners facilitated integration into the service and community.

"Oh for sure my number one champion would be [Senior AHW] who's amazing, an amazing health worker that probably volunteered in the first instance to help me out. And we sort of hit it off and kind of been mates ever since. We worked very closely together." (Pharm01).

"In terms of being included in the team, the Aboriginal Health Practitioners are really helpful and have been great at trying to find me patients." (Pharm10)

Cultural orientation and local cultural mentors

Pharmacists had generic cultural training facilitated by the PSA. Local cultural programs were available onsite for some pharmacists. Aboriginal Health Workers were commonly informal 'cultural mentors' or were available for pharmacists if they had questions or needed advice. Involvement in the community though elders' groups, NAIDOC week or health promotion activities (groups/community days) also appeared to facilitate better relationships with communities.

"Cultural induction had to happen. I had to really kind of be like 'oh I need it'. So, it happened a couple of months after I started. It was great. It just didn't happen straight away. But the Aboriginal Health Workers here are incredible and outstanding and have supported me whenever, yeah whenever and wherever I needed it. Which is great…. It was one of the elders at the [name of community keeping place] …… I was concerned about that because you know throughout [PSA] induction we were so well made aware of all of the barriers and cultural considerations that I was concerned and I felt like I wasn't prepared but then I kind of got here and was well supported by the Aboriginal Health Workers and the community" (Pharm02).

"They encouraged me to go to the elders group when I first started. So that was probably the best thing, because by going to the elders, if they accept you they will spread the news and gossip like there's no tomorrow. So I think being encouraged to go to that and going with me to introduce me to those key people. Definitely helps that situation to get into the community." (Pharm04)

Access to Clinical Information Systems (Best Practice and Communicare)

All pharmacists could access the clinical information systems used by the services. This was valuable to facilitate making appointments and referrals and accessing patient information to inform medication reviews. However, it was a challenge when the systems *"went down".*

"I don't think you could really do the project without access to the clinical software. Certainly for the purpose of gathering all the information that you need to do the med reviews. It's sort of been invaluable" (Pharm10).

Support from community pharmacists

Pharmacists further developed relationships with community pharmacy. They worked together to problem solve, access discharge summaries; confirm medication history, reconciliation and correcting errors, and supply of DAAs.

"I do spend a lot of time liaising with our community pharmacy…. I chat with the pharmacist there and problem solve with them every day I'm here… I'm kind of the translator between the doctors and the other members of the team and the community pharmacy because I speak 'pharmacist' and I speak 'doctor' so I kind of translate in that role a little bit and smooth out any issues" (Pharm01).

"… there's a pharmacist there that I've never met before now I just walk in and we have a joke and I say 'Oh hey I got this for you' and he's goes 'oh great, can you do a HMR on this patient while you're out there'. So, we just we get on really well. They value it... again there, there's a history between here, the clinic and the pharmacy and you know they've had their differences. So they've benefited because I know that I'm only a phone call away and I will pick up the phone nine out of ten times or they can shoot me an email and it's a way that they can get there answer very quickly and get that Webster Pak done or whatever because otherwise they waited for doctors until they're free or they get a return call" (Pharm02).

Induction to the role and ongoing support

Pharmacists were positive in their feedback about the induction training and felt they were prepared.

> *"It was good to have all the 10 aspects of the role explained and how it was to work. And it's good to have the cultural training as well because coming directly to [service] I wasn't really that aware of Aboriginal culture and all the history and everything. Yes, that was very useful"* (Pharm06).

Ongoing support was also provided by the PSA staff in relation to clarifying the core roles, answering queries and using the electronic systems.

> *"[PSA Staff] have been such good support that you can just flick an email, 'oh how do I do this or what did you say about this' and they'll come back with the answers, so they've got all the answers"* (Pharm11).

Support from Peers

Pharmacists highlighted being able to '*meet and greet' each other at the induction* allowed for relationships to be developed and peer support provided to each other throughout the project.

> *"…and to know, to meet the other people that are in the same roles. So, I use that at the beginning when I wasn't quite sure what I was doing, and I knew some of the pharmacists had already been working in services before. So, I was able to give them a call and question things and make sure I was doing what was right, and sometimes it's easy to talk to someone of the same level as you then asking to the people who employed you. "Am I doing this right?" type of thing to bounce ideas off. So, I found that really good, the meet and greet"* (Pharm04).

Access to mentors or shadow another pharmacist

The opportunity to shadow another pharmacist in an Aboriginal Medical Service as part of their orientation was excellent in helping a couple of pharmacists prepare for the role. Having a mentor who the pharmacists could contact at any time to discuss questions or issues was also useful.

> *"It was really useful day because I could see exactly how they were involved"* (Pharm05).

> *"We've had a couple of 'over the phone' meetings where I prepare my questions and she's a pharmacist who actually works at that Aboriginal service in Melbourne. So, she has huge experience and she was available … I just email her or … even sometimes we have about an hour conversation over the phone. But like I would probably add my questions, lots of things that you know about the culture. And she was very, very helpful"* (Pharm05).

Posters helped raise awareness

The posters provided by NACCHO and placed within the health service did help raise awareness of the project and the pharmacist for both staff and patients.

> *"The posters, that was great because they put them up in all the GP rooms and they were constant reminder to utilize the pharmacist"* (Pharm09).

> *"They [the patients] do know our faces from the poster, the poster was wonderful and if you ever do it again I reckon put a bigger picture of the faces, as much as we might not like it, but a bigger picture of the faces because they really do 'Oh I saw you on that poster' you know so it's the posters they're great!"* (Pharm11).

Space/clinical room

Many pharmacists, but not all, had their own dedicated room which enabled them to see patients. Some pharmacists shared spaces with other staff which assisting with team integration but restricted the ability to

have private consultations with patients. Others had to change rooms depending on other staff in the service on a particular day.

> *"I do but it's not always the same room. It just depends on how many staff they have and I sort of get the least important one for a room I guess. Yeah but yeah I always have a room"* (Pharm03).

Pharmacy technician support

One service had a pharmacy technician who was able to support the project implementation.

> *"Before IPAC started her role was to help with the referrals for HMRs. So, she did kind of all the background and the paperwork in forwarding the referral to the HMR pharmacist and then receiving the report and then letting the doctors know of the report. So, we just kind of modified that slightly for them, our referrals so she helps us. So, she gets a report of the referrals. She lets us know. We've actually recently changed it so that she actually contacts the referred clients and finds out where they'd like to see us and books them into us because that …takes up quite a lot of time that kind of admin stuff. So … she's been a big help there"* (Pharm21).

3.6.2 Challenges

Services not ready for the role/project

Some pharmacists perceived that their ACCHS was not necessarily ready for the pharmacists. Issues contributing to the degree of readiness of the health service included key people weren't at the service when the pharmacist started, staff turnover, physical space, *'political chaos'* and other current priorities such as building new facilities.

> *"I think the difficulty with this project has been that it's a very new role for a lot of these clinics and the staff out there had no idea what a pharmacist did"* (Pharm10).

> *"I just feel like the site was just a bit, they weren't prepared for the pharmacist"* (Pharm02).

> *"I think one problem was you know she just got dumped into this really. We had no idea what she was really going to do, and I think we made a lot of it up" (Medical Director).*

> *"And look I didn't even know much about the project when she first started either..." (Director of Health Services).*

Changes within health services posed challenges for some pharmacists including political chaos, restructures and sudden dismissal of staff members. In addition, Aboriginal and Torres Strait Islander patients were not necessarily choosing to seek health care from some ACCHSs.

> *"The day I started I was driving down the road to the news in the morning that said the board and the senior management at [health service] had just been sacked"* (Pharm12).

> *"There's been a lot of disharmony I suppose in the community in regards to the services that [health service] were providing and how they were providing their service which is why all of these changes have happened. Yeah. So, I guess there's generally a lot less people coming in to the clinic"* (Pharm19).

Staff engagement and not valuing the role

Staff members of the health services didn't understand the role of a pharmacist and what they could do. There were stereotypes that pharmacists just handed out medications. Staff members didn't see the value in the role, especially in the early stages. It took some time for pharmacists to prove their worth and settle in to the team.

"And even the staff in the clinic wasn't very welcoming in the beginning to the idea of having a pharmacist among them and they didn't know what I am doing and that that's why it took me from the beginning to just educate them and let them know about my role" (Pharm08).

"I was doing that over two days but I actually found that it was really hard to get the staff to see me as part of the team just being out there twice a week so I elected to spread my hours over three days." "Once I switched it to three days which I didn't sort of do until I think it was about five or six months into the project the staff started to think of me being there more often than not." (Pharm10)

"I received written information about this project prior to completing this survey, it would have been good to get that information at the beginning of the trial, prior to this all information I received was verbal and informal, I did not get any training." (GP)

"Challenges with implementing the IPAC project was educating staff/clients on what exactly was the project and how it worked. Also how clients were to access services. Getting everyone on board with the process." (manager)

*"I think she did struggle in the beginning. I don't think she was respected with what she was doing and especially down here [at this clinic]. She was forced around and there were a few bad days for her where you know people were pushing her out of rooms and didn't value her work. I think she's done really well to make herself [part of the team]." (*Medical Director)

However, it was noted by one service that the IPAC pharmacist had become one of the more stable staff members. This meant when other staff changed (e.g. locums, registrars), the pharmacist was already embedded into the service. Having a pharmacist in the team was 'business as usual' and the new staff didn't know any difference.

"When I started we had lots of locums as well. We weren't familiar with the patients or medications, so [IPAC pharmacist] was actually one of the stable people that was around all the time. She had seen patients before and she knows them and can tell me about what their medication issues are before I meet them. So that was really helpful." (GP reg)

Workforce retention and locums

Retention of staff within the health services, in particular GPs, was a challenge. Locums did not always understand the pharmacist's role.

"It's the most, the most challenging thing that was happening there was the doctor because a GP was coming every two weeks, a different GP with different experience" (Pharm08).

Limited flexibility to use the IPAC pharmacist as service required (considering project objectives)

Some services used the IPAC pharmacists to undertake other important tasks outside the 10 core roles.

"So, I guess from a project perspective what the intent of it was, was for it to be more client focused around quality use of medicines and quality prescribing and that kind of stuff. And I think we're finally kind of six months, seven months in, actually getting [the IPAC pharmacist] up to that point. But what we have to acknowledge first was that being such a big service across five different centres in four different communities there was a whole heap of systematic stuff internal that we needed sorted out first. Given that we're providing section 100 services out of four of our sites. We needed, I guess the pharmacies, the pharmacist's eye over what it was that we're doing and that took up at least the first half of [the IPAC pharmacists] workload. Now that we've started to get those systems in place and the management supported those systems, [the IPAC pharmacist's] actually finding time to spend with patients which is great" (Director Health Services).

"I think coming in I was very like no I need to meet these targets. I can't do anything, you know, very projects based. So, I think if I had my time over again, I'd just say you know use me as a pharmacist to the best of the capabilities that their service needs. I think early I kind of pushed back on a few logistical things… But now I've found that … I'm not probably as integrated as I could be ... I don't really understand how much scope we had to deviate from project protocol" (Pharm16).

Managing requests to participate in non-IPAC activities

Pharmacists mentioned that they did sometimes undertake activities outside of the 10 core roles.

"I think early I kind of pushed back on a few logistical things like resuss trolleys and like, following up every man and his dog who has a short prescription of metformin and swapping them over, and those types of things that I've said. You know guys, you kind of need a process and I can support it, but I can't do these things by myself because the project is patient based" (Pharm16).

"I guess my understanding of the project and what we have actually had [IPAC pharmacist] doing are two slightly separate things." (Director of Health Services)

Travel and time in remote communities

A challenge for some sites in the more remote locations was the need for the IPAC pharmacist to travel to the site and also to different communities. While this may have worked out quite well in some instances, it did take time and money.

"It actually wasn't based at the health service, it was the opposite. It was working in the community ... We were only there [at the health service] really one day a week. The rest of the week we were actually going out working within the communities … you carried all your boxes and [into] Hiluxes and a couple of RNs and myself if I was on that particular run would go out to a community and work out there. … the time to communicate one on one with people that was difficult, to have adequate time, because you'd only go to one community the nurses would stay a day. … you're going around with them, you just grab those opportunities when you can. But it does limit you. It's none of this appointment system or I'll take this number of hours with somebody and then some hours with somebody else." (Pharm22)

"The doctor goes there [community], it's every Thursday and only one day and then they come back in airplane the same day. So I go with them." (Pharm24)

"I have to get a ferry over to get to [town] from where I am on [town]. A lot of my time is travel as well. … So it's a one-hour ferry, sometimes a little bit longer so maybe an hour or so each way. And then driving, it's about a 20-minute drive from the wharf to [town], so it's about an hour and a half each way." (Pharm07)

Team spread across multiple sites/buildings

Some sites had multiple buildings and clinic sites which meant that it was sometimes difficult to have regular contact with all staff or even know all staff.

"There's two GPs that work at the health centre. So, the GP clinic, it's quite small. There's not enough room for us... And then the other site that we work from is which is mainly where the IPAC pharmacist is based. There it's called a healing centre. It's probably about 100 meters down the road. Maybe a little bit more, and that's where they have all the allied health people that come and visit" (Pharm14).

Pharmacists from Community Pharmacy balancing responsibilities

Pharmacists who owned or were employed by community pharmacies faced challenges balancing IPAC requirements with other business requirements.

"It was meant to be two days a week. Yeah. It was 0.4 [FTE]. But then we had one full time pharmacist resign from [town]. I had my intern resign from [town] and then a pharmacist resigned from [town] which we still haven't been able to replace. So, I couldn't do two days a week. So, I've done one day a week" (Pharm07).

No local induction

Just under half of the pharmacists stated that they did not receive a local induction when commencing at their local health service.

"Maybe induction into the health service wasn't... It was kinda, I was just like dropped in it. It would have been nice to have a more formal you know, introduced to everyone and their role and you know even the computer system and all that kind of stuff. I was just kind of left to my own devices because again everyone was busy. So that would have just been a bit nicer" (Pharm13).

Not knowing the local community or families

A challenge was also not knowing the local community or family's very well as the pharmacist was only in town for the IPAC role.

"For me it was a kind of learning process in the beginning about the patients trying to memorise names of the worst cases... knowing the families, which was a big part for me to learn, to understand that this family is having all these members. That was another challenge … the local knowledge would have helped with that. But there was no one who from the local professionals [pharmacists] there wanted to join the project. So that's why the PSA recruited me" (Pharm08).

Patient recruitment and follow-up

Issues related to health services included the small patient base (especially at smaller services), renovations, black-outs bringing down the IT systems, staff didn't understand the pharmacists' role and weren't valuing it. There was also staff turnover, staff shortages and locums. Reputation of the health service and a lack of trust were also issues raised by a couple of pharmacists. Comments from pharmacists included:

"The other thing that impacted and probably still continues to impact to a slight degree but I kind of now speak up, is the admin staff … they know to keep patients back for the nurse, they know to keep them back for the GP, but once they've seen a GP, if I'm with another patient they just let them go because they don't value pharmacy. Their admin probably don't know what we do and so I have to literally go out there and badger them every day. And sometimes like at no fault of their own the GP will, you know, I will say to them 'hey, I'm going to see that patient after you and then they forget" (Pharm02).

"I found out that Aboriginal people go everywhere [to lots of different health services] they don't just go to the Aboriginal Health Service … there was a question why they go to everywhere, if they have a lot of services coming to them in the health service, but there was no answer ... They don't know. It might be because of the locum GPs." (Pharm08)

Patient-related issues included transience, language barriers, sorry business, presenting opportunistically and being overwhelmed with appointments. Several pharmacists commented that patients moved around a lot including going to their homelands.

"There was no Aboriginal Health Worker. Nobody in the health service could speak more than a few words of the language" (Pharm22).

Other issues raised were the complexity of the consent process, time and the IPAC pharmacist being part-time and the effects of needing to prepare for cyclones. Comments made by managers were:

"less paperwork," "maybe shorter forms" and *"it needs to be less wordy." (managers)*

People not attending appointments was an issue cited by most pharmacists across all settings. However, patients who did not attend were common across the clinic, not just for pharmacists. Despite pharmacists accepting that failed attendances were to be expected, people not attending did impact on their ability to undertake their role.

> *"I found that booking appointments ahead of time didn't work well, with a number of people not attending these pre-booked appointments."* (Pharm15)

> *"You might make appointments with people but the number of no shows is the, probably the biggest challenge I think yesterday, it was a fairly full book and in the morning went along to the doctors there but I think 80 percent of them didn't show."* (Pharm12)

> *"I think one day I had like five booked in and not one turned up. But it happens in the allied health as well, so … I book them in on the day they come in for allied health thinking that's a good day to get them and they just don't turn up for anything*" (Pharm17).

> ***"**[IPAC pharmacist would] like to try and get people as I say while they're here because it's quite hard and you can book them but they DNA [do not attend] … for all of us. It's just the nature of our clinic we get a lot of DNAs, so [IPAC pharmacist] was always very keen to get them [patients] pretty much immediately. And if she couldn't see them then and there she would come out and talk to them personally to I guess encourage them to come in for the appointment in the future." (Nurse)*

Another reason for failed attendances cited by some pharmacists was the number of appointments that patients had to attend, particularly patients with kidney disease.

> *"Because they weren't coming as often, when they were here, they were already trying to do everything else. But then if they have already been here for three hours and then I'm sort of trying to tack on to the end of that it was like, do I have to? And of course not. So if there was an option there to, to leave then they would definitely take it"* (Pharm19).

> *"These patients get completely overwhelmed by the health system and have very little health literacy and no ability to navigate their way through multiple referrals and so I see my job more than anything, as pulling things together."* (Pharm23)

Logbook and data entry requirements

There were mixed responses regarding data entry and the logbook. There was confusion around where to log activities in the logbook including activities that were outside the project. Some activities weren't logged due to workload, the time it took for data entry, and limited internet access. One pharmacist reported issues tracking patients where data was documented in different logbooks due to a job share role.

> *"You know I still don't think we catch it all, especially in those early days because it was just so overwhelming. Trying to find spots to put stuff in I found was hard because it was a lot of stuff that we were doing that I couldn't really find"* (Pharm17).

> *"I think it's a very time consuming… It's question by question by question and I do this because it's best to obey anyway … [it's] the only way … you can measure you know our work. So, we have to do it"* (Pharm24).

Data entry was also a time consuming process with many pharmacists reporting they undertook this task in unpaid time.

"The logbook I think has been quite laborious and has perhaps sometimes taken away from time that I could have spent you know being more useful in the clinic." (Pharm10)

"I think it takes a lot of time compared to when you when I could be doing actual work." (Pharm19)

"Seems [the IPAC pharmacist] was spending very extended hours doing paperwork and working far more than she was paid for, potentially the referral process was difficult for her to keep up with?" (Manager)

Employment characteristics

Being part time impacted upon pharmacists' abilities to effectively recruit and follow-up patients, and also participate in other health service activities. There was also a perception that pharmacists were sometimes seen as external to the organisation. Due to pharmacists not being employees of the ACCHS, they were unable to utilise service vehicles.

"Was seen as an external person, not as an employee. Wasn't utilised well due to not being full time and being seen as external." (Pharm08)

"I haven't been given a work car which is kind of… as I'm about to take out a work car insurance policy … which is definitely a barrier." (Pharm02)

"Health promotion days if they had them on the days I'm here I'll get involved in that. In terms of, if I'm around on days when they're planning things and doing it then there's no problem. It's just a lot of stuff happens on days when I am not here" (Pharm12).

"We were not involved in the recruitment and have not had any management over [the IPAC pharmacist] which has posed some challenges for us." (Manager)

Short project length and funding

Availability of ongoing funding for the pharmacists' position was raised as a concern.

"It scares me to think. And I think it's, it hasn't scared patients but there's a lot of them have gone 'what do you mean [you will go in] November?'" (Pharm02).

"The only issue is the funding when the IPAC is finished. I'm not sure they would feel that there is any funding for me to carry on working with them. Although they would love to have me, I'm sure." (Pharm06)

"This shits me you know, you get a program and it works and bugger me dead if they don't pull the plug on it" (Patient).

"I mean my concern with those kinds of projects is that they funded for a specific length of time and it's almost like they're funded with the plan that they're not going to work, because there's no plan for ongoing funding. So yeah we'll get to the end of the project period, [and] we've already identified that we can't function as an AMS without a pharmacist. So the project stops. We then have to try and find the money to continue with that work, which is really hard to do there" (Director of Health Services).

4. Discussion

4.1 Role

Prior to commencement, the IPAC pharmacists had varying expectations of their roles as non-dispensing pharmacists in ACCHSs as part of the IPAC project. The induction training provided by the PSA provided an expected scope of practice and services to be carried out, although various challenges were experienced in practice. Certain aspects of the pharmacists' role were closely aligned with what they expected, such as the provision of medication-related information and performing HMRs, whilst other activities such as advocacy and participation in disease outbreaks and health promotion, were unexpected.

At the commencement of the project, most managers who responded to the survey reported having a good understanding of the aims of the IPAC project, and the roles and expected activities of IPAC pharmacists despite most health services having little or no experience with non-dispensing pharmacists. However, one manager felt there was uncertainty around the responsibilities of the service as they didn't manage the pharmacist so couldn't control the role and hours of work.

GPs reported a moderate or large difference between what they expected the IPAC pharmacists' role would be, and what it actually was in practice. GPs reported that the IPAC pharmacists' scopes of practice and their involvement in patient care had been far greater than what they had expected. These findings directly reflect literature from previous studies which evaluate pharmacists in primary care, as they also found that the role of a non-dispensing pharmacist is poorly understood [24, 51, 61].

Some community pharmacists were initially confused about the aims of the IPAC project, and the roles and expected activities of IPAC pharmacists. One community pharmacist perceived recruitment of IPAC pharmacists had been undertaken independently of the community pharmacy which worked with the local ACCHS. There was also the perception that the scope of practice of the IPAC pharmacist should be more 'specialised'. Meds checks and HMR's were considered community pharmacist roles.

At the end of the project the majority of GPs, health services staff and community pharmacists had a clear understanding of the project aims and the roles of the IPAC pharmacists. The IPAC pharmacists had been effective in communicating information about their role.

4.1.1 Usefulness of roles

IPAC pharmacists delivered the ten core roles (as listed in Figure 1) and believed that their physical placement within ACCHSs was essential in providing appropriate and patient-centred care. The most consistently performed roles were the provision of advice on appropriate medication prescribing, following-up and amending discharge summaries and prescriptions, conducting HMRs (and other medication reviews), improving patient adherence to medications through education, and the provision of staff education on medication-related topics. Most pharmacists felt fully utilised in their service, and their skill set was broadened by the experience in the IPAC project.

The most useful aspects of the IPAC pharmacists' role described by the GPs included medication reviews, counselling and education of patients about their medication use, timely GP access to a pharmacist's expert advice and knowledge about medications, and facilitating links with community pharmacists. Similarly, the most useful aspects of the IPAC pharmacists' role described by managers were the provision of medication reviews (including HMRs), education for patients and staff, following-up with patients, improving patients' medication adherence, improving relationships with stakeholders, and having access to a medicines expert. Community pharmacists also reported the IPAC role was helpful to facilitate communication with GPs, improve referrals for HMRs, increase the interest of patients in their own medicines, and facilitate eligible patients receiving a dose administration aid.

Half of the pharmacists felt that they had met the ACCHSs requirements. The other half were unsure, or stated that they were not able to meet expectations, which was perceived to be a result of being a person external to the health service. A few pharmacists indicated that they had exceeded the ACCHSs requirements and had become an integral part of the health service. Managers and GPs reported that the pharmacists had met the ACCHSs requirements with an average rating of 8.7 and 9.6 respectively (using a rating scale from 1 being not well at all; to 10 meaning very well). Both the Medical Director and the Director of Health Services at one site visit said that they could not imagine being able to run the health service without a non-dispensing pharmacist as part of their team. This sentiment conveys the value of the role and the understanding of the scope of practice.

4.1.2 Activity outside the role

The IPAC project's structured framework constrained the activities of some IPAC pharmacists. However, some pharmacists reported being involved in activities that were outside the scope of the ten core roles of the project. Roles perceived by the pharmacists to be outside this scope included advocacy for patients, responding to acute disease outbreaks, and other health promotion activity. Managers reported that they used the pharmacists to develop policies and procedures, manage pharmaceutical imprest systems, participate in clinical governance meetings, and visit other agencies not involved in the project as these were health service priorities at that point in time. The need for pharmacists to attend to these other health service demands explained why managers and some pharmacists perceived there was limited flexibility in the IPAC pharmacists' role. However, the IPAC pharmacists felt there was value in undertaking these activities to help facilitate their role and integration into the service. In one case study the Director of Health Services and Medical Director acknowledged that activities were outside the role of the IPAC pharmacist but needed to be undertaken so that the IPAC pharmacist could effectively deliver patient-centred care.

4.2 Integration

Non-dispensing pharmacists working within ACCHSs enables integration of medication services with the existing primary healthcare team [20, 21]. The co-location of pharmacists within ACCHSs facilitated processes that support better integration. These processes included shared access to electronic healthcare records, shared multidisciplinary healthcare team assessments, administrative support, a shared vision, and governance frameworks (such as formal partnerships),[21] to deliver a range of clinical services both directly to patients and to other health care professionals.

Whilst the majority of pharmacists felt accepted and well-integrated within the primary health care team at the time of their interview (approximately six months after commencement), not all pharmacists felt that way initially. About two-thirds of the pharmacists indicated that there were difficulties upon commencement due to staff misunderstanding the role of the IPAC pharmacist which resulted in them being underutilised. Over time, these issues were largely overcome, primarily due to the initiative of the pharmacists in educating staff members about their role in the team and their potential impact on health outcomes for patients. The pharmacists self-rated their level of integration into the primary health care team modestly with an average of 7.7 (on a rating scale from 1: not integrated into team; to 10: fully integrated into team;). Both GPs and managers rated the IPAC pharmacists' integration into the primary health care team higher at average of 8.3 and 8.9 respectively. In-depth exploration at a small number of sites found that health services staff felt the pharmacists had *'become part of the furniture'* and were valued members of the primary health care team.

4.3 Enablers and Challenges

The IPAC project incorporated enabling factors identified in the literature into the development and implementation of the intervention.

4.3.1 ACCHSs and staff

Preparing ACCHSs for the role of the pharmacist was an important task as the majority of sites participating in the IPAC project had not had a pharmacist integrated within the primary health care team prior to the project. The recruitment of health services and their introduction to the project was coordinated by the NACCHO Project Coordinators, whilst the recruitment of pharmacists and their induction was coordinated by the PSA Project Coordinators [58]. Recruitment of ACCHSs involved an expressions of interest process, signing of a contract, a site visit from Project Coordinators and a needs assessment to facilitate preparation for the project and the pharmacist role [58]. Selection criteria for pharmacists being recruited for the project including registration with the Australian Health Practitioners Regulation Agency (AHPRA); more than 2 years' post-registration experience; and post-graduate clinical qualifications or demonstrated clinical experience [58]. The majority of pharmacists participated in a formalised two-day induction program designed to introduce the pharmacists to the project and the IPAC role, facilitate key skills, and cultural training. Pharmacists who were recruited late participated in an individualised program covering the same topics.

After signing the contract and their site visit, some ACCHSs were prepared and had a good understanding of the project and the role of the IPAC pharmacist. However, just under half of the pharmacists reported that that they felt their service *'was not ready.'* Service staff did not fully appreciate the value that a pharmacist could bring into the primary health care team. One medical director stated: "w*e had no idea what [the IPAC pharmacist] was really going to do."* Not all service staff were aware of the pharmacists' roles and in which activities the pharmacist could contribute. The literature describes how orientation should be provided to prepare health services for pharmacist services, and also for pharmacists to fully understand their role and required competencies [40].

The IPAC pharmacists identified possible reasons for ACCHSs and staff not being prepared for the pharmacist role as being due to the high turnover of staff in the services, the absence of key personnel when pharmacists commenced, "political chaos", and other priorities such as building new facilities. Just under half of the pharmacists did not receive an ACCHS induction or local cultural training upon commencement. This meant that the pharmacist may not have met key staff or receive information on local processes and procedures. It was perceived that communication about the project and the pharmacists' role throughout some health services was inadequate. This impacted upon the pharmacists' ability to integrate quickly into existing teams subsequently limiting the number of patients recruited into the study.

Loss of key staff members (and project champions) and other staff turnover also meant the pharmacists had to continually educate and re-educate staff members on what they could do and which patients they should refer to them for the project. In some services, IPAC pharmacists perceived that ACCHS staff didn't understand the role and therefore didn't welcome them or help them settle in to working at the service. Aboriginal Health Workers and Practitioners were key in some services to integrating the pharmacist into the health service and also into the community. Their role in introducing the pharmacist to people in the community also helped to build relationships with patients.

Without the support of GPs in particular it made it much more difficult for the pharmacist to recruit patients and undertake the roles of the project. Instability of the workforce was a major challenge. Locums did not always understand the non-dispensing pharmacist role.

Lack of professional trust in the pharmacist was initially an issue at a couple of sites. This reflects findings in previous studies where GPs were reticent to refer their patients to the pharmacist [38, 40, 45-47]. However, as the project progressed and the pharmacists' capabilities were recognised, professional relationships grew and trust developed.

In retrospect, the project could have benefited from a lead-in period to provide time for the IPAC pharmacists to develop relationships with service staff and improve their understanding of the pharmacist's role. Services who had had a previous relationship with their pharmacist had a better understanding of the possibilities and value of the role and were able to implement the project slightly easier than others. The literature describes the time needed for rapport building within an ACCHS [44, 45]. The time pressures reported here are only of significance because of the tight time constraints of the IPAC project which put pharmacists under pressure to deliver results within a defined time period.

Many services supported pharmacist integration into the primary health care team through the provision of uniforms, consulting room space, promotion of the role in newsletters and social media, and involving the pharmacists in meetings and events being run internally and externally to the health services.

The provision of the service 'shirt' or uniform offered the perception that the pharmacist was part of the clinic team, and so that patients thought they were part of the service and could be trusted. Some pharmacists did not have a service uniform and while some reported having no issues integrating into the PHC team and feeling accepted by patients, others felt it did impact on how well they were accepted by staff and patients. There was competition for consulting room space in some services, however the majority of pharmacists reported they had access to a space, although this could change on a daily or weekly basis depending on other staff present in the service at the time. Some pharmacists shared spaces with other staff which was good to assisting with team integration but restricted the ability to have private consultations with patients. 'Strategic positioning' [40] or being in close proximity to the GPs was beneficial to integration into the PHC team, to facilitate communication, prompt referrals, and to provide medication advice. Some pharmacists reported having an office close to the GPs.

Pharmacists actively attended clinical team meetings and education sessions which assisted in building trusting new relationships [48]. Some pharmacists also attended women's groups, elders' groups, community events and social activities. A few pharmacists took the 'strategic loitering' strategy seriously and would regularly hang out in the waiting room to see which patients they could engage in discussions about medications while they were in the clinic. The majority of pharmacists were also willing to engage in corridor conversations with staff and be interrupted to discuss queries.

All pharmacists had access to the health services' CIS. Pharmacists reported that access to patient's medical records was essential for their role, in particular to conduct medication reviews as has been noted in other studies [32, 50-52]. Most pharmacists recorded their medication review recommendations and/or submitted their reports via the CIS allowing streamlining of processes and information transfer. Pharmacists in some sites experienced difficulty with setting up appropriate levels of access to the systems. Like other staff, pharmacists also experienced unstable internet connections and in some remote communities had no internet or access to the CIS while in outreach clinics. As many pharmacists were new to using the clinical information systems (Best Practice and Communicare) further training in induction would have enabled them to use the systems more efficiently.

Referrals from GPs and also Aboriginal Health Workers and Practitioners was a successful approach to recruiting patients for the project. Where there were locums or staff turned over regularly, and a lack of understanding of the non-dispensing pharmacist role, this impeded effective implementation of the project. Some pharmacists also reported there was confusion from other staff roles in the clinic, particularly nurses, who may have been tasked with pharmacy related roles prior to the project. This supports the literature which found nurses may feel threatened by the role [53]. One service employed a pharmacy technician who was able to support the IPAC pharmacist with administrative tasks including following-up referrals and making appointments for patients in relation to HMRs.

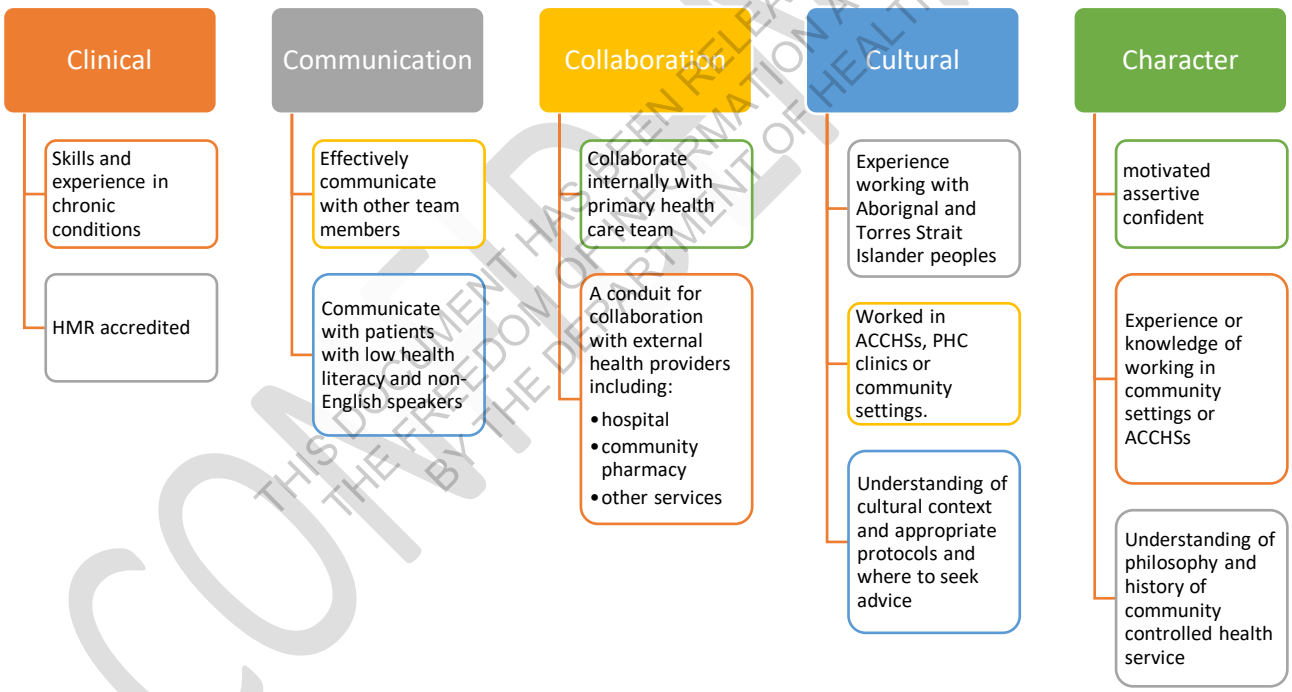
Many of the enablers identified in the IPAC project are similar to those described in the Integrating Models of Pharmacists Across Care Teams Framework. [1] Addressing these factors in preparation for an integrated pharmacist would facilitate better understanding of the role and minimise barriers.

4.3.2 The pharmacist

A recurrent theme identified from managers, GPs and other health service staff in this evaluation was the need to get 'the right person' for the role within ACCHSs. Having a pharmacist with the right *'organizational fit'* and right personality was just as important as their skills and experience. As well as having clinical skills, pharmacists needed to be culturally appropriate, able to develop relationships and build rapport and to be flexible, non-judgmental and resilient. They also needed to be confident and understand the need to proactively engage with people to make the role more effective. The IPAC pharmacists also identified these skills were required to effectively fulfil the role.

The IPAC study results were consistent with the findings of other studies where motivation, assertiveness and confidence were identified success factors in pharmacists integration within healthcare services [1, 48], [42]. Pharmacists having particular personality characteristics (designated as 'character') was considered one of five key factors required to be effective in the IPAC pharmacist role. The other factors were categorised as clinical, cultural, communication, and collaboration skills (see Figure 19).

Figure 19: Five key factors for pharmacists to be effective in the IPAC role within ACCHSs.



Strong **clinical** skills and prior experience working as a pharmacist were essential for the IPAC role. HMR accreditation was highlighted as an important asset both from the perspective of having skills to undertake medication review and counselling with patients, as well as from a billing perspective for the health service.

Some IPAC pharmacists had worked with Aboriginal and Torres Strait Islander people previously including some in remote communities, while others had very limited experience. Previous experience living or working in the community resulted in the pharmacist already having knowledge of the local **culture**, and established networks and support systems which also enabled them to settle into the role, and progress quickly and effectively.

Cultural training focused on the local community was valuable, as was access to a cultural mentor. All IPAC pharmacists were given generalised cultural training, but just over half of the IPAC pharmacists received additional local cultural training. A challenge for those pharmacists new to their service and town was not knowing the local culture, community or families very well. All IPAC pharmacists were given the option of being matched with an experienced Aboriginal Health Services pharmacist to act as a mentor throughout the first six months of the intervention phase. Eleven pharmacists opted to participate in this formal mentoring arrangement (arranged by PSA project coordinators via the PSA Mentor Hub) [69] while others felt they could seek out information to supplement what they had learnt at cultural orientation with a local staff member, including AHWs/AHPs. Mentors helped to answer pharmacists' questions about clinical and cultural matters, and where the mentor was a local AHW/AHP, also assisted with introductions to patients and the community. Some did not take up the offer of a formal mentor as they felt their prior experience prepared them well for the role. Patients and ACCHS staff did not report any significant evidence of the pharmacists being culturally incompetent or unsafe. Managers and GPs both rated the pharmacists as being highly cultural sensitive with an average of 9.3 out of 10 (on a scale where 1 was not sensitive at all to 10 being very sensitive). One GP indicated their pharmacist would benefit from further cultural training.

Communication skills were important when communicating with health services staff as was the ability to adopt different styles for different health professionals within the team and for patients. Being able to 'talk doctor' and 'talk pharmacist' was an advantage. Pharmacists also needed to be able to communicate well with patients with varied levels of health literacy, education and for some whose first language was not English. Pharmacists possessing listening skills was noted as an important aspect when communicating with patients.

The pharmacists being able to **collaborate** and work effectively with colleagues from various professions was important to being a part of the primary health care team. Some pharmacists reported being involved in case conferences with GPs and other health services staff. Relationship building and communication with external heath care providers including hospital staff, community pharmacists and specialists was also a significant part of the role. Relationships with were further strengthened through the project.

The pharmacists reported induction to the project and role was important and prepared them well. Previous experience with the service or local induction were enablers for some pharmacists and enhanced their ability to make immediate and rapid progress upon commencement, in services that were also prepared for the role. However, for just under half of the pharmacists who didn't receive a local induction, meet key staff or there was a lack of awareness of the project and the pharmacists' role, this impacted upon the pharmacists' ability to integrate into existing teams quickly. Some pharmacists were described by health services staff as 'dogged', and were persistent and resilient which helped them to navigate challenges they encountered.

Another enabler for pharmacist integration was the support provided to them by the PSA Project Coordinators. Responses to the pharmacists' queries was valuable and timely and allowed the pharmacists to continue their work without delay. Pharmacists participated in a peer support network established by the PSA Project Coordinators using app technology, which enabled them to develop supportive relationships with other IPAC pharmacists in the same role.

For some IPAC pharmacists, being part-time reduced the availability of opportunities to effectively recruit and follow-up patients, and also to participate in other health service activities. Travel to clinic locations in remote communities also impacted on the time a few pharmacists had available to see patients. The pharmacists in a small number of sites had to share travel arrangements with other staff, who only visited communities one day a week or less often which made patient recruitment and follow-up difficult. The research component of the role and the requirement for pharmacists to enter data on a daily basis was also a challenge in the project.

4.3.3 Community pharmacists

Many ACCHSs already had strong existing relationships with their local community pharmacies prior to commencing their participation in the IPAC project. Several pharmacies had QUMAX arrangements in place- a program that requires agreements with community pharmacy to support quality use of medicines activities and one reported relationships existed through Section 100 arrangements.

Whilst one community pharmacist stated that IPAC pharmacists were recruited independently of the community pharmacy, the project's recruitment algorithm demonstrated liaison with community pharmacy in the establishment phase, as well as the principal of self-determination enabling ACCHS selection of their preferred pharmacist. [69]

Some community pharmacy respondents reported being confused in the early stages of the project regarding the IPAC project aims and the roles of the IPAC pharmacists. However, IPAC pharmacists worked together with community pharmacists to problem solve, access discharge summaries, confirm medication histories, reconcile medication lists and correct medication errors, and supply DAAs for health service patients. Half of the community pharmacists responding to the online survey reported that contact with IPAC pharmacists was infrequent, however quantitative data collected in the project is evidence of significant interactions between the stakeholders. [70] Interactions further strengthened relationships with community pharmacy. Community pharmacists also stated that they felt patient knowledge of their medicines and adherence to medicines had improved since the IPAC pharmacist had commenced within the ACCHS.

From the viewpoint of the community pharmacists, the overall effectiveness of the IPAC pharmacists was high, scoring an average of 8.7 out of 10 (on a scale from 1 to 10 where 10 was very effective). The IPAC pharmacists were seen as being very helpful, useful, and a great conduit for communication with general practitioners within the ACCHSs. All community pharmacist respondents to the online survey believed that there are roles for non-dispensing pharmacists within ACCHSs.

Some of the IPAC pharmacists were seconded from their roles within community pharmacy to undertake the IPAC role. Whilst this worked well for some, for others it was a challenge as responsibilities remained in the community pharmacies which they owned or in which they worked. Staff retention in their pharmacies impacted upon their abilities to fully participate in the IPAC role.

One community pharmacist reported that a strategy to continue the role within ACCHSs would be for the section 100 community pharmacy allowance to be increased to facilitate the community pharmacy being able to provide additional support to the team and patients of the health service. The benefit of this model would ensure the pharmacist also had support and back-up from colleagues and would reduce professional isolation.

4.3.4 Patients

IPAC pharmacists across many services reported that patients who did not attend appointments posed a challenge to meeting recruitment and follow-up targets for the IPAC project. Appointment schedules were commonly used by clinics, together with opportunistic care. However, appointment schedules may not always be appropriate for Aboriginal and Torres Strait Islander people. This was a challenge for many health services as a whole not just for the IPAC pharmacists.

One reason for failed attendances cited by some pharmacists was the number of appointments that patients had to attend, particularly patients with kidney disease. Another reason was that patients often presented irregularly to health services and often resulted in patients being seen by many health professionals when they did present, in order to deliver opportunistic care.

At one ACCHS, health system changes led to increased patient attendances, but the backlog in patient follow-up meant that it was hard to add-on a pharmacist consultation when these patients had already been assessed by other staff who had taken up all the patients time.

At another service it was reported that a portion of their clientele only ever presented opportunistically and liked to *"fly under the radar"* and *"just want to come in, get their script and get out the door"*. These patients were very hard to engage in the health system generally, and consequently for the project.

Other patient-related issues that influenced follow-up included patient mobility, language barriers, and 'sorry business' that required patients to attend to funerals and other community obligations. Several pharmacists commented that patients moved around a lot including going back to their homelands or to visit family.

A couple of pharmacists also stated that Aboriginal patients were subjected to numerous projects and experienced a revolving door of health practitioners. One IPAC pharmacist reported that many of the local Aboriginal people attended other local health services with the likely reason being due to the continuous engagement of locums at their ACCHS. Reluctance from Aboriginal people to become involved in 'yet another short term project' was also experienced in a couple of sites.

The complexity of the consent process and the need for written consent by patients enrolled in the IPAC project was identified by some ACCHSs as a barrier to patient recruitment, particularly in areas where health literacy or language was an issue.

Some patients were initially confused about the role of the IPAC pharmacist. However, patients who had been exposed to a non-dispensing pharmacist or had a HMR previously, had a better understanding of the IPAC role. An enabler to follow-up was that some patients felt comfortable to see the IPAC pharmacist, and to make appointments, after their initial interactions with them. Many of the IPAC pharmacists developed trusting relationships with patients who would ring the pharmacists with queries. The pharmacists also reported patients were actively engaging in their consultations. This was particularly evident at one site where the pharmacist would seat the patient in their chair, invite them to read their files and facilitate the patients' contribution into decisions about their care by participating in their consultations with the GPs.

4.3.5 External factors

The limited time frame and lack of surety about project sustainability were ongoing challenges for this project. The uncertainty about how pharmacists' positions would continue to be funded beyond the end of the project impacted upon some GPs willingness to refer to the pharmacist when the role would only be there to provide services for a short time. There was also considerable concern from pharmacists as to who would provide pharmaceutical input including following-up patients and providing education once their roles had finished.

4.4 Benefits

ACCHS staff, patients and pharmacists identified many benefits to having a pharmacist integrated within the ACCHS.

4.4.1 ACCHS Staff

Health services staff cited that having access to an in-house medicines expert was very beneficial as it enabled them to seek advice quickly about medication queries through informal conversations and in-depth feedback through formal medication reviews. The IPAC pharmacists stated their ability to access the patient's history and information in the CIS enabled them to undertake a more informed review of medicines, relevant to the patient, and taking into account their social situation and other contextual factors. GPs and IPAC pharmacists also highlighted the benefits associated with pharmacists undertaking other medication reviews, for example 'medication appropriateness' audits. Both IPAC pharmacists and GPs reported that recommendations were commonly made by the IPAC pharmacists as a result of medication reviews. The recommendations were perceived to be of high quality and take-up of the recommendations by prescribers was said to be high.

As a result of these reviews, patients were recalled using various methods, dependent on the urgency, and prescribing changes were made. Urgent changes to medications based on pharmacist recommendations

were generally communicated in person or by phone to the patients' GP either as soon as the review was completed or while the patient was still in the clinic. Non-urgent recommendations were implemented by making an appointment for the patient with the GP, or made the next time the patient presented. The IPAC pharmacists and GPs reported that working relationships between themselves were enhanced through this process.

GPs reported that having a pharmacist as part of the health services team saved them time as the pharmacists were able to provide education to patients around their conditions and how their medications worked. They answered GPs medication queries. On some occasions the GP could then resolve patients issues whereas previously they may have referred the patient to see a specialist. The in-house role of the IPAC pharmacist meant GPs at some sites were saved time as they could refer patients to the IPAC pharmacist for HMRs. A couple of IPAC pharmacists previously conducted HMRs for their service as an external provider. This sometimes expedited the process time for patients and clients and the HMR was perceived by some GPs to be completed quicker. The pharmacist would inform the GP of the medication review results earlier (usually in person), and any medication changes could be implemented immediately.

Some health services staff had ideas to improve their medicines services. One manager stated they would like to see the cap on HMRs lifted so that ACCHSs could have as many HMRs done for their patients as they needed. One GP suggested that patient consultations conducted by the pharmacists could attract an MBS item for the work attended by the pharmacist (time based) thereby assisting to fund such a position.

Health services staff benefited from the pharmacists having input into their clinical team meetings and providing education sessions. The pharmacists contributed to medicines safety and quality assurance activities by conducting drug utilisation reviews and assisting in developing and reviewing policies. As noted earlier, GPs at one site invited the pharmacist to participate in consultations with patients. At another site, the Medical Director facilitated the pharmacists' input in clinical governance meetings and drug reviews. The critical enabler for these activities was the pharmacists up to date knowledge on medications.

4.4.2 Patients

Stories told by patients and carers related evidence of their interactions with the IPAC pharmacist, how they had worked with their other health care providers, in particular GPs, and the positive outcomes that had resulted. On several occasions patients reported that the pharmacist had been able to suggest alternative or a different combination of medications that has resulted in them *'feeling better'*. The IPAC pharmacists took a holistic approach to patient care and listened to patients. This meant they better understood their lives and could adapt medication regimes to suit the patients' lifestyle. Patients also reported that their biomedical test results confirmed that their management of their health conditions had improved. The pharmacist and other health service staff concurred that patients' management of the health conditions had improved as had their biomedical test results.

Analysis of biometric measures relating to potential improvements in medicines management and consequently the quality of the care received by Aboriginal and Torres Strait Islander peoples with chronic diseases will be presented separately to this report.

Patients at one case study site identified that having the pharmacist sitting in with them and the GP in their consultations, and being able to discuss the treatment options and be involved in decision-making, was a benefit arising from the project. Patients reported that being able to discuss and negotiate with the clinical staff about what medications to try and the times that suited them to take their medications, meant that they were more likely to be adherent. Patients felt empowered to better manage their health conditions. They better understood why they needed to take their medication and what it was doing to their bodies. In addition to feeling better, patients also reported other benefits of changes in their medications such as losing weight, being motivated to exercise more and engaging with other support groups and the community.

Pharmacists believed that time was also saved for patients as they could be directed to see the pharmacist for queries about their medications instead of sitting in the waiting room for hours waiting to see the doctor.

4.4.3 Pharmacists

The majority of IPAC pharmacists were able to develop meaningful relationships with patients and empower them by developing their health literacy and knowledge about their medicines. A benefit from the pharmacists' perspective was having the time "*to sit down with the patient"* and *"spend a bit more time with patients".* The pharmacists' roles were designed to be predominantly patient-centred and the majority of pharmacists enjoyed this aspect of the role. It was evident that many of the pharmacists had a passion for providing health services to Aboriginal and Torres Strait Islander peoples and all of the pharmacists asked, indicated they would stay on, if their role was continued. The IPAC pharmacists enjoyed their role and experienced personal and professional satisfaction in the service they were providing. Patients reported telling family and friends about their positive interactions and encouraged them to also see the pharmacist. This indicates the pharmacists were accepted and valued by their patients.

4.4.4 Community Pharmacists

Community pharmacists reported a number of systems benefits arising from the IPAC project. These included an increase in, or improvement in the efficiency of processes for medicines supply; facilitation of communication with GPs regarding prescriptions; improvements in the clinical appropriateness of prescribed medicines; and an increase in dose administration aid preparation and supply.

With regard to patient care, community pharmacists reported that patient participation in HMRs improved, the number of referrals for HMRs increased; there was more support for ACCHS patients; patients had more interest in their own medicines; and more eligible patients were receiving a dose administration aid. The IPAC pharmacist role was seen as being very helpful and useful, and all community pharmacists who participated in the study felt there was a role for IPAC-type (non-dispensing) pharmacist within ACCHSs.

4.5 Project Implementation

In addition to the implementation of the ten core roles, IPAC pharmacists were required to consent patients to be a part of the IPAC project and to collect data on patient interactions, medication reviews and other activity. Induction training provided by the PSA prepared IPAC pharmacists for these aspects of the project. Feedback on this training was positive and the pharmacists felt prepared for their role.

Feedback from pharmacists suggested that training could have included information on how primary health care clinics work and Medicare billing processes used by ACCHSs. It was reported a couple of pharmacists had not worked in a general practice, ACCHS or other primary health care setting previously and they struggled to understand how some aspects of practice worked. Additional training could have included practical advice on 'fitting into' the primary health care team and clinic as this was an initial challenge for some pharmacists. In addition, the provision of local induction to the ACCHS and the local community was important and has been discussed previously.

4.5.1 Patient Recruitment and Consent

Pharmacists found that seeking informed, written consent from patients to participate in the IPAC study was a challenge. Whilst the research team endeavoured to make the information sheet and consent form as short and simple as possible, and plain language forms were approved by ethics committees and NACCHO, the use of these forms was still challenging for some pharmacists, particularly in remote communities where English is not the primary language of patients. Interpreters were not always readily available at these sites. Patients who had low health literacy also were reluctant to sign the consent form.

4.5.2 Resources

The various promotional resources developed for the project were not always used, particularly in remote communities, where health literacy and language were barriers. The posters were used in most sites and feedback found they were a good way to promote awareness of the project or even to just show the face of the pharmacist. Only a few sites used the brochures or videos. Word of mouth was identified as the best way to communicate about the project and the role of the IPAC pharmacist.

4.5.3 Data Entry

All pharmacists were required to enter data for the project in the CIS and a bespoke electronic logbook that was designed specifically for the purpose of the project. All pharmacists had access to the CIS and reported this was valuable to facilitate making appointments and referrals, and accessing patient information to inform medication reviews. However, some pharmacists experienced challenges in setting up appropriate levels of access and utilizing various functions within the systems such as booking appointments, knowing how to put in recalls and generating reports. It was also a challenge when the systems "went down". As many pharmacists were new to using the clinical information systems (Best Practice and Communicare), further training would have enabled them to use the systems more efficiently.

Pharmacists expressed mixed responses regarding their experiences with data entry and the logbook. There was some confusion around where to record activities in the logbook including whether activities that were outside the scope of the project should be documented. Support was provided from the PSA and JCU Project Coordinators who were able to clarify issues and assist the pharmacists with use of the logbook and correcting errors. Pharmacists reported some activities weren't logged due to workload, the time it took for data entry, and sometimes unstable internet access. This meant that the activity recorded by pharmacists in the logbook for the project is a conservative account of the actual activity they performed. One pharmacist reported problems tracking patients where data was recorded in a different logbook due to a job share role.

4.6 The Future

The majority of managers, GPs, other health services staff, and community and IPAC pharmacists overwhelmingly supported the integration of pharmacists within ACCHSs. Participants could see the value of pharmacist integration within the primary health care team and agreed there was a role for pharmacists to be integrated more generally in other ACCHSs. Participants observed clear and direct benefits to patients in having a member of the primary healthcare team with the unique knowledge and skills that pharmacists have, particularly in reducing medicines-related incidents, and in providing essential education to patients about their medicines.

Pharmacists generally felt the ten core roles defined in the project were quite broad and did not limit them in any activities they performed within the service, although it was felt that the roles should be expanded to include all ACCHS patients, not just those with chronic disease. The IPAC pharmacists and managers reported that pharmacists were also involved in developing policies and procedures, managing pharmaceutical imprest systems, participating in clinical governance meetings, advocating for patients and visiting sites not involved in the project as these were priorities of the health service at that point in time. Although the IPAC project did not collect data on this activity, this function may be included in future role definitions to enable pharmacists to fully meet the ACCHSs needs.

The recommended number of days per week, or FTE that pharmacists should be employed in this type of position, depended on the size of the health service, the number of active patients within that service, and the number of days GPs work at the health service. Participants suggested flexibility was needed with the option to split days so that pharmacists were available for busy time-periods in the clinic, staff meetings, when GPs were working, and to be able to potentially capture patients when they presented. Many pharmacists felt that it was a full-time position, particularly given the challenges in patient follow-up and the need to be available opportunistically. Future contract models need to be flexible to meet the needs of the ACCHS including those with alternative modes of service delivery in remote communities.

ACCHS staff and GPs said that they found the pharmacists' role very beneficial for patients and the health service and that it should be continued. Staff from one of the sites were happy to support other health services who were interested in recruiting an integrated pharmacist. The IPAC pharmacists suggested shadowing a pharmacist already in the position and attempting to obtain as much information as possible, beforehand, would be ideal steps to prepare themselves for the role. Maintaining contact with other pharmacists working in similar roles also provided a good support network, particularly if working in remote

areas. IPAC pharmacists used technology (teleconference and phone apps) to establish and maintain a support network between them. Involvement with the community outside the clinic was advised, as well as participating in cultural training and developing relationships with the other members of staff, particularly Aboriginal Health Workers and Practitioners.

All of the pharmacists who were asked if they would continue their employment contracts if their role was continued within their health service, stated that they would. Overwhelmingly, the most common reasoning for this amongst the pharmacists was the enjoyment they received from the role, and personal and professional satisfaction they felt from the service they were providing. This is a key indicator of the successful implementation of the non-dispensing pharmacist role.

4.7 Strengths and Limitations of the Research

4.7.1 Strengths

The project used a community-based participatory research design, to ensure clear benefits to project sites, to ensure acceptability and sustainability of the intervention within ACCHSs, and ultimately, transferability to other ACCHSs. Accordingly, ACCHSs participating in the project were invited to nominate to be a site for the qualitative evaluation. The Project Reference Group members (which included representatives from all participating ACCHSs, NACCHO Affiliates and NACCHO) endorsed recommendations for site selection and also had the opportunity to provide input into the patient and health service staff proformas used in focus groups and interviews.

Pragmatic projects such as this are better able to determine if interventions work under usual conditions rather than under ideal conditions. Gathering data in these real-world environments allowed common issues to be examined in more detail and gather data based on real life stories of patients, which is a powerful and sometimes more valuable approach than gathering purely quantitative data.

The qualitative component of this research drew data from multiple sources, including the IPAC pharmacists based within ACCHSs, the staff of these health services and local community pharmacies with whom the services generally worked. Patients from three ACCHSs told their stories and provided feedback on their experiences. This allowed a more complete picture of the impact of non-dispensing pharmacists and assessment of the enabling factors and barriers on the provision of medication-related support and information. The proformas and surveys used were pre-tested to minimise participant confusion. This resulted in the evaluation identifying a number of strong emerging themes.

The same members of the qualitative team were responsible for conducting the interviews, focus groups and site visits, as well as the coding and analysis of data. This allowed these team members to become immersed in the data and identify key themes, and interactions between the themes, within the large dataset. This process ensured the consistency and the quality in the interpretation of findings from the data. In addition, notes were taken immediately after each interview and focus group to document the major themes identified.

4.7.2 Limitations

The qualitative research component of the IPAC evaluation was limited by the time and resources available to conduct the evaluation. A few of the pharmacists who had been in their role for shorter periods of time, due to having resigned, or being recruited following a resignation, could not fully answer some interview questions.

Some transcription errors occurred due to poor internet connectivity during interviews with pharmacists, and one focus group being conducted outside, which affected the quality of recordings. In general, these errors were able to be corrected and were not significant enough to effect thematic coding. However, it may have affected the grammar of some quotes.

The researchers acknowledge that all ACCHSs are unique organisations serving Australian Aboriginal peoples and Torres Strait Islanders with diverse cultures. The selection of three different ACCHSs for site visits may have highlighted different experiences in the project. Themes from the data collected at the site visits aligned with themes from individual interviews and online surveys supporting the generalizability of outcomes.

As all patient and staff interviews were organised by the IPAC pharmacist and health services staff, this may have led to selection bias, where invited participants may have been more likely to give positive responses. However, participants were also more likely to have been users of the pharmacist's services which is more reflective of the experience. Patients who participated were not influenced by the financial incentive as the gift card was not offered until the conclusion of the interview or focus group. Patients were unaware that this gift would be offered.

Selection bias was unlikely to have impacted other participants as CEOs, Managers, GPs and community pharmacists were invited to participate in the online survey via email. Those participants invited were nominated by the Project Coordinators as they were directly involved in working with the IPAC pharmacist and were in the best position to provide feedback on the role and the project. Not all ACCHSs were represented by participants who responded in the online surveys.

The focus groups were predominantly led by non-Indigenous researchers, which may have resulted in some participants not being comfortable in disclosing aspects of the interactions they had with the IPAC pharmacists, and not wishing to openly criticise the project. However, one of the investigators was an Aboriginal person who also attended the interviews and focus groups with Aboriginal and Torres Strait Islander people, and this may have helped to minimise the impact of this type of discomfort.

5. Conclusion

IPAC pharmacists worked within ACCHSs for 12-15 months implementing ten core roles. The qualitative evaluation obtained data on perceptions of the IPAC pharmacists, health service staff and patients of having an IPAC pharmacist, and from community pharmacists. It also explored project effectiveness including an in-depth assessment of implementation in an urban, regional and remote setting. Data informing these outcomes was collected through interviews with pharmacists, and online surveys with GPs, CEOs and managers, and community pharmacists. Site visits enabled stories and in-depth perspectives to be collected through interviews and focus groups with patients and health service staff. Observation provided opportunities to understand how the IPAC pharmacists worked within the participating ACCHSs.

Numerous benefits were reported. Benefits for health services staff included access to an in-house medicines expert for informal advice and medication reviews. IPAC pharmacists saved GPs time as they could answer their medication related queries quickly and also respond to queries from patients in place of the GP. Health services staff also benefited from the pharmacists having input into their clinical team meetings, providing education sessions, and their contribution to medicines safety and quality assurance activities by conducting drug utilisation reviews and assisting in developing and reviewing policies.

Benefits for patients from interactions with the pharmacist resulted in them *'feeling better'*. Patients were able to try alternative or different combinations of medications, or different regimes, suggested by the pharmacist. Patients reported that their biomedical test results had improved. Some patients had the pharmacist involved with them in consultations with the GP and were involved in decision-making. Patients felt empowered to better manage their health conditions and better understood why they needed to take their medications and how they worked. Patients also reported other benefits from changing medications such as losing weight, being motivated to do more exercise and engaging with other support groups and the community.

The IPAC pharmacist role was designed to be predominantly patient-centred and the majority of pharmacists enjoyed this aspect of the role. Pharmacists benefited through the role which provided them with new experiences resulting in personal and professional satisfaction in the service they were delivering. They developed meaningful relationships with patients and enjoyed the opportunity to have more patient contact.

The primary factor enabling the integration of the IPAC pharmacist role within ACCHSs was recruiting the right person for the role. It was important that the pharmacist had the right 'organizational fit' and personality for working in the ACCHS. In addition to possessing clinical skills, pharmacists needed to be culturally appropriate, able to develop relationships and build rapport and to be flexible, non-judgmental and resilient. They also needed to be confident and be proactive. Pharmacists with experience working in an ACCHS previously or a community setting settled into their roles more quickly. Possessing HMR accreditation was also an advantage in undertaking comprehensive medication reviews and resulted in financial benefits for ACCHSs. Support from ACCHSs included induction to the service, cultural induction to the community, access to the clinical information system, provision of a uniform, allocation of consulting space, promotion of the role and support from staff in particular Aboriginal Heath Workers and GPs, and enabled the IPAC pharmacist to fulfil their role. Staff stability meant the IPAC pharmacist could develop relationships and understanding of their role with other staff, which resulted in patient referrals for their services.

Many ACCHSs already had strong existing relationships with their local community pharmacies and through the IPAC project these relationships were strengthened. The IPAC pharmacists worked together with community pharmacists to problem solve, access discharge summaries; confirm medication history, reconciliation and correcting errors, and facilitate supply of DAAs.

Challenges were experienced in implementing the IPAC pharmacist role and project within ACCHSs. While some services were prepared and managers reported having a good understanding of the project aims and the roles of IPAC pharmacists, just under half of the pharmacists felt their service wasn't ready. The pharmacists perceived there was a lack of understanding of the integrated pharmacist role. High turnover

of staff in the services, the absence of key personnel when they commenced, 'political chaos', and other priorities such as building new facilities were also cited as factors impacting upon the project.

Just under half of the pharmacists reported not receiving a local induction upon commencement. This meant that the pharmacist had not met key staff and were unfamiliar with local processes. For some sites communication about the project and the pharmacists' role was inadequate. Some IPAC pharmacists perceived that initially ACCHS staff didn't understand the role and didn't assist them settle in to working at the service. For the IPAC pharmacists who were supported by AHWs and AHPs rapport building and integration was easier. Staff turnover (and loss of project champions) also meant the pharmacists had to continually be proactive in educating staff about what they could do and which patients they should refer for the project. This limited the number of patient's recruited into the study. Some pharmacists didn't receive a local cultural induction, however support from Aboriginal heath workers assisted with developing relationships within ACCHSs and with patients. At the time of the qualitative evaluation the majority of managers, GPs, other health services staff, and community and IPAC pharmacists overwhelmingly supported the integration of pharmacists within ACCHSs.

Without the support of GPs in particular, the IPAC pharmacists experienced difficulties in recruiting patients and conducting the project roles. Lack of professional trust in the pharmacist was initially an issue at a couple of sites. However, as the project progressed and the pharmacists' capabilities were recognised, professional relationships grew and trust developed. The project could have benefited from a lead-in period to provide time for the IPAC pharmacists to develop relationships with service staff and improve their understanding of the pharmacist's role.

The IPAC project's structured framework constrained the activities of some IPAC pharmacists, however others participated in activities they perceived out of the scope of the project to facilitate relationship building with health services staff and assist them integrate into the team. Other challenges in remote communities included the time it took for travel and reliable access to the internet and clinical information systems. A few of the IPAC pharmacists experienced challenges in balancing project work with their responsibilities in community pharmacy.

Overall, the qualitative evaluation of the IPAC project has demonstrated overwhelming support for a non-dispensing pharmacist to be integrated within the primary health care team of ACCHSs. The recommended number of days per week, or FTE that pharmacists should be employed in this type of position, depended on the size of the health service, the number of active patients within that service, the number of days GPs worked at the health service and remoteness. Flexibility would allow pharmacists to work during busy time-periods, participate in meetings and education, and potentially see patients opportunistically when they presented to the health service. Future models need to be flexible to meet the needs of the health service, especially in remote areas. Recommendations have been made to enhance future implementation and are detailed in the following section.

Summary of recommendations from qualitative evaluation participants

The following table summarises suggestions from participants in the qualitative evaluation on future policy and implementation of integrated pharmacists in ACCHSs.

Suggested actions for sector development	Owner and key partners	Potential pathways to implementation	Intended industry impacts
1. Support policy to integrate the role of a non-dispensing pharmacist within ACCHSs.	**Federal Government**	1.1 Participants in the qualitative evaluation suggested options to support ACCHSs implement an ongoing integrated pharmacist model of care: 1.1.1. Core services funding be increased to enable ACCHSs to implement the role.	Implementing this recommendation will lead to: • Enhance quality of care outcomes for Aboriginal and

Suggested actions for sector development	Owner and key partners	Potential pathways to implementation	Intended industry impacts
		1.1.2. In remote settings explore increasing the section 100 pharmacy support allowance to fund integrated pharmacist time onsite within the clinic to deliver patient-related services. 1.1.3. Consideration for other Federal Government sources of financial support for an integrated pharmacist within ACCHSs such as the creation of an MBS item for integrated pharmacist patient-related services (time based). 1.2 Participants in the qualitative evaluation suggested that the cap on the number of funded HMRs should be removed to enable ACCHSs to facilitate as many HMRs as is needed by their patients. Current HMR Program Rules as defined by the Sixth Community Pharmacy Agreement limits HMRs which can be conducted by an accredited pharmacist to 20 per month.	Torres Strait Islander peoples with chronic disease • Continuity of care provided by pharmacists integrated into the team • Improved prescribing quality • Improved cost effectiveness • Improved medication adherence
2. Advocacy and support to ACCHSs to facilitate processes for integrating pharmacists	**NACCHO and Affiliates**	2.1 NACCHO and Affiliates support the development of processes and resources for pharmacists to be integrated in the primary health care teams of ACCHSs. Processes and resources should support ACCHS staff to be informed on the value of having a pharmacist in the team, to implement change management processes to introduce and embed the pharmacist and develop referral processes. 2.2 Resources to guide preparation should consider the IMPACT Framework [1] and assist ACCHSs for the pharmacist role. 2.3 ACCHSs that will be most ready to establish an integrated pharmacist role are those with systems established for quality improvement (eg. Referral, CIS). 2.4 Develop the capacity of Aboriginal Health Workers/Practitioners and Outreach Workers to facilitate referral for patients needing support from the integrated pharmacist.	• ACCHSs are prepared for the pharmacist role • All staff are aware of value and benefits of the role and facilitate integration into the primary health care team
3. Co-design of the pharmacist role with the ACCHS to ensure it meets their needs	NACCHO, **ACCHSs** and PSA	3.1 Policy guiding the implementation of the pharmacist role should allow flexibility for ACCHSs to use the role to best meet the needs of the health service and promote self-determination. 3.2 ACCHSs should be actively involved in the co-design of the integrated pharmacist role to ensure it suits their needs and seek support from NACCHO and their Affiliate where necessary. 3.3 The recruitment of pharmacists to be integrated within ACCHSs should be flexible and be led by, ACCHSs so that pharmacists have the 'right organisational fit' and are skilled in key areas (character, clinical skills, communicator, collaborator and culturally responsive).	• Pharmacist services are tailored to the local ACCHS and meets patients' needs

Suggested actions for sector development	Owner and key partners	Potential pathways to implementation	Intended industry impacts
		3.4 Future projects to assess outcomes from integrated pharmacists within ACCHSs or alternate new models, need to allow a lead-in time to allow pharmacists to develop relationships with staff and patients and develop a deeper understanding of the local community and health service culture.	
4. Training and support to prepare pharmacists for a non-dispensing, integrated role within ACCHSs	**PSA,** NACCHO, and ACCHS, pharmacist training providers	4.1 Support pharmacists to develop career pathways for integrated pharmacist roles. [2, 3] 4.2 Prepare pharmacists for integrative roles within ACCHSs through the development of a training program that includes the conduct of medication reviews, working with internal and external stakeholders, team-based collaboration, patient counselling, preventive health care, transitional care arrangements, medication adherence assessment of Aboriginal and Torres Strait Islander patients, the provision of education and training and medicines information to staff and patients, and undertaking drug utilisation reviews. The program should also include comprehensive training on clinical information systems including all basic functionality, how to generate quality improvement reports and how to set up patient recalls. 4.3 Ensure opportunities for pharmacists to undertake cultural safety training responsive to their place of practice prior to commencing activity within ACCHSs. 4.4 ACCHSs to provide pharmacists with induction to the service and the local community including introduction to staff members in key roles and cultural orientation to the local population. 4.5 Facilitate a community of practice network to enable knowledge sharing and peer support. Mentors can assist with clinical and/or cultural aspects of integrated practice and development of career pathways.	• Pharmacists and ACCHS staff are prepared and effectively deliver patient-centred care
5. Facilitate continuous improvement through further research and evaluation	**Federal Government,** Academic Institutions, NACCHO and affiliates, ACCHSs	5.1 Funding should be made available for further research and evaluation of integrative pharmacist programs to facilitate continuous quality improvement. 5.2 Research involving patients receiving services from pharmacists should use simplified information sheets and consent forms for patients and consider formal translation into local languages. 5.3 Future research projects may consider the use of the pharmacist logbook in order to facilitate data collection about the activity of integrated pharmacists. Some design improvements to simplify data entry, and comprehensive training, are suggested. 5.4 In the design of future research projects consider the time required for data entry and ensure this element is adequately factored into the allocation	• Improve evidence base and continuous improvement of role and service delivery

Suggested actions for sector development	Owner and key partners	Potential pathways to implementation	Intended industry impacts
		of working hours. 5.5 Mechanisms need to be established to support the continuation of trials, beyond the trial period, if they have been found to be successful. Short term projects have detrimental impact on Australian Aboriginal peoples and Torres Strait Islanders who have historically been over-researched, and on ACCHSs work processes.	

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Appendices

See Appendices Document

Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Project

QUALITATIVE EVALUATION REPORT APPENDICES

Appendix A: Literature review search strategy - enablers and challenges

Appendix B: IPAC Pharmacist Interview Proforma

Appendix C: Online Survey – CEOs and Managers

Appendix D: Online Survey – GPs

Appendix E: Online Survey – Community Pharmacists

Appendix F: Focus Group / Interview Proforma – Health Services Staff

Appendix G: Focus Group / Interview Proforma – Patients

Appendix H: Observation Framework

Appendix I: Letter of invitation to nominate for field/site visits

Appendix J: Site Recommendations Report

Appendix K: Site Visit Overview and Preparatory Tasks

Final Report
February 2020

Appendix A: Literature review search strategy - enablers and challenges

Medline and Emcare data bases were searched. Searches were conducted in OVID Medline (1946-October 23 2019) and Emcare on OVID (1995-October 23 2019) using relevant subject headings from each database, exploding subject headings where appropriate. Medline subject terms included (Patient care team/or Delivery of health Care, Integrated) AND General Practice (exploded) and (Pharmaceutical Services or Pharmacists) (exploded), yielding 65 results. In Emcare searches were conducted on the subject headings ("integrated health care system/or intersectoral collaboration /or primary health care") AND (pharmacy (shop)/or hospital pharmacy/or mail order pharmacy/or online pharmacy/or speciality pharmacy OR Pharmacist (exploded)) AND (professional practice/or general practice/ or health care practice/or medical practice or private practice), which resulted in 169 references.

One author read the abstracts of all 234 papers, excluding 123 papers, including 6 duplicates. The remaining 111 papers were screened in full (with 2 excluded as a full text paper could not be sourced) and x papers made the final review. An additional 10 papers were found from hand searches (reference list of papers). Data was extracted into a table with the headings:

- Author (year)
- Title
- Type of article
- Context
- Intervention
- Outcomes
- Enablers
- Barriers

Results

From this extraction, 26 papers were chosen for the final review and themes were identified. This review focused on pharmacists integrated in primary health care or general practice and the enablers and barriers for integration.

Appendix B: IPAC Pharmacist Interview Proforma

IPAC Project – Qualitative Evaluation
Draft Interview Template – IPAC Pharmacists

The interview will be a conversation. Taking notes, Can view transcript if you like

Themes	Questions and Prompts
Background	**Tell me about yourself and your career?**
	– Any prior experience working, living or student placement in current community? (time) – Worked in association with the IPAC site prior to program participation? Explore, for how long (how many hours per week or visits per year)? – Where did you complete your training; university? – Previous health care professional experience working in any Australian remote location – Previous experience working with Aboriginal and/or Torres Strait Islander people? In what capacity? – Can you give me a picture of the service? eg how many GPs, locums, visiting specialists, context of the town
Role	**Tell me about your role as the IPAC Pharmacist in an ACCHS?**
	– Has it been what you expected? – Which aspects do you feel were the most beneficial? – Were there aspects that you feel weren't worthwhile? – How well were you able to fully utilise your skills and expertise? – Were you able to meet the organisations requirements? – What other roles were you asked to do (outside of the 10 core roles)? Explain – How many days a week do you think you actually need to perform your role? – Were there other roles/activities you would have liked to have been involved with increase your effectiveness or that should have been included in the role?
Preparedness Orientation	**Tell me about the induction program?**
	– How well did it prepare you to fulfil your role? (PSA training and local induction) – Was the cultural orientation adequate to prepare you for working with Aboriginal and Torres Strait Islander co-workers? – Was local induction was available/provided at the site? How prepared did you feel to work with Aboriginal and Torres Strait Islander patients? – Were there any gaps? – Could anything have been improved?
Integration into the PHC team	**Tell me how you worked in the primary health care team?**
	– To what extent did you feel part of the PHC team? – Were there any 'champions' [leaders] at your site who lead communication and facilitated integration? – How well did other members of the primary health care team understand your role? – Were you involved in meetings? – Were any staff members available to support your work [eg. Aboriginal Health Worker or community liaison workers]? How useful was this? **What strategies did the service implement to help you feel part of the team?** – Were you provided with a uniform?

	– Was a room specially created for you by the practice? – Were you promoted in newsletter or in other media eg. radio, social media? – Were you involved in events? eg. Planning days and events, eg. NAIDOC – Were there other things that helped you feel included? – **Overall on a scale of 1-10 (1 being not successful to 10 being very successful) how well do you feel you integrated into the primary health care team?**
Cultural Competence	**Tell me about your relationship with the local community/ies?**
	– Do you feel you had a good understanding of local people and their culture? – Did you know what was important to them? – Did you have a local cultural mentor? Would you have liked one? How well did this work? – How welcomed do you believe you were by the community? What might have influenced this? – can you give an example
Consent process	**How would you describe recruitment and the consent process?**
	– How often did clinic staff refer patients to you? – How much support did you receive from the ACCHS staff to recruit patients? – How comfortable did you feel approaching patients? – **Did you have many patients who didn't provide consent? Estimate?** – Do you know what might have influenced their choice? – Were there any common characteristics of those who didn't consent? Eg. Working, M/F – Were there any local issues that impacted on recruitment?
Relationships	**Tell me about the working relationships you developed with your patients?**
	– How well do you think your patients understood your role? – How easy was it to get patients to come and see you? – Did patients make appointments but then not show up? Do you know why? – How long do you think it took to build rapport [trusting relationships] with patients? – Were you able to communicate effectively? – How freely did patients discuss their medicines? – Did you feel your patients understood the information you were providing them? How was this confirmed? – Do you feel that the patients were just saying things to please you?
Changes	**To what extent do you think things changed in the health service as a result of your role?**
	– What changed? – How has clinical care of patients changed? – Do you think your patients' knowledge about their medicines has changed? What might have influenced this? Can you give an example? – Have you seen any evidence of patients being more adherent? What might have influenced this? – Has communication regarding patients medications improved within the service as a result of your role?

	– How often did you suggest any prescribing or other recommendations to the GPs after completing a MAI, HMR and non-HMR)? – How were these suggestions made? Eg. Written report, notes in the CIS, discussion, case conference/team meeting; other – How often did the prescriber take on board your recommendations? – What actions did the prescriber take? Eg. Patients recalled? telephoned? letters? Followed-up opportunistically (next time they presented?) – **Overall, how would you rate the effectiveness of your role on a scale of 1-10 (with 10 being most effective)? What worked? Were there any barriers?**
Collaboration with other providers	**Tell me about interactions you have with other healthcare providers**
	– Do you feel that your communication has been effective with the GPs within the service? – Were the GPs supportive of your role? [All or some] – How effective do you believe your communication has been with other health staff within [eg. Diabetes educator, Aboriginal Health Worker] the service? – Has communication regarding patients medications improved between the service and external providers such as hospitals, non-ACCHS GPs and specialists? – What is your relationship like with the local community pharmacies? Has this relationship changed over the project duration?
Resources	**Tell me about any resources you used or did you need to develop new ones?**
	– Did you use any resources developed through the IPAC Project? [eg. posters, brochures] – Which resources were the most appropriate? – Why did you have to modify them? What did you have to develop? – How did your patients find these?
Medication Adherence	**One of the tools provided was the N-MARS patient survey to measure adherence. How easy did you find it to implement this survey?**
	– Did you engage an Aboriginal Health Worker (or another person) to assist with the survey? How? – Could patients answer the questions easily? (effort to implement) – Do you feel that your patients' responses changed once your relationship developed? – Did it give you basis for further conversations regarding education/strategies to improve adherence? – There is evidence dose administration aids make it easier for patients to be more adherent. **Approximately what proportion of the IPAC consented patients were using dose administration aids at commencement?** Do you believe DAAs improve adherence?
Project General	**Tell me about how the project has operated at this site overall?**
	– What worked well? – What were the challenges? – How useful was it to be able to access clinical information on a patient from the clinical software? – Tell me about your experience with data entry?

	– How much travel did you have to do to undertake activities eg. HMRs? How did this impact on your role? – How much support did you receive from the Affiliates? [AMSANT/VACCHO/QAIHC] – Have you practiced outside of your IPAC role? If yes, is this within the IPAC site, the local community or another town? – **Did you have any out of pocket costs doing your job? If yes, Could you estimate what these might have totalled?** –
Future	– Do you think there is a role for non-dispensing pharmacists within ACCHSs in the future? Yes/no and comment – What type of skills do you think are required for this role? – If this role was continued would you stay? What are your main reasons for this choice? – What changes to the role should be considered? – How many days a week do you think the role is required in this service? – What advice would you give someone who was going to do this role? – Is there anything else you would like to add?

Appendix C: Online Survey – CEOs and Managers

IPAC

Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management

JAMES COOK UNIVERSITY AUSTRALIA

NACCHO

Pharmaceutical Society of Australia

IPAC Project: CEO and Managers Survey

IPAC Project: CEOs and Managers Survey

Introduction

Project Leaders:
Ms Dawn Casey (NACCHO), Mr Mike Stephens (NACCHO), Associate Professor Sophia Couzos (JCU), Ms Deb Bowden (PSA).

Evaluation Organisation:
Evaluation Team led by James Cook University (College of Medicine and Dentistry)

The IPAC project is a large project that will determine if including a registered non-dispensing practice pharmacist as part of the primary health care team within Aboriginal community controlled health services (ACCHSs) leads to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples. It is a partnership between the Pharmaceutical Society of Australia (PSA), the National Aboriginal Community Controlled Health Organisation (NACCHO), and James Cook University (JCU) College of Medicine and Dentistry.

Detailed information on the project is available in the information brief emailed with the invitation to participate in this online survey. This survey will take approximately 30 minutes to complete.

For more information or to make a complaint, you can contact the NACCHO Project Lead: Mike Stephens, Tel: 02 6246 9300; Email: mike.stephens@naccho.org.au. Other Project staff to contact include: Deb Bowden from the Pharmaceutical Society of Australia: Tel: 02 6283 4740; Email: Deb.Bowden@psa.org.au. You can also contact the NACCHO Deputy Chief Executive Officer: Ms Dawn Casey at dawn.casey@naccho.org.au.

The Human Research Ethics Committees (HRECs) continue to provide oversight as the project progresses. If you have any concerns or complaints regarding the ethical conduct of the study, you are invited to contact the appropriate HREC:

NT: Ethics Administration, Human Research Ethics Committee of the NT Department of Health and Menzies School of Health Research. (HREC Ref 2018-3072) Tel: 08 8946 8600 or email ethics@menzies.edu.au

Vic / Qld: St Vincent's Hospital Melbourne, Human Research Ethics Committee: Executive Office of Research, St Vincent's Hospital Melbourne. (HREC Ref 252/17) Tel: 03 9231 2394, or email: research.ethics@svhm.org.au

Informed Consent

1. The purpose of the Project, as outlined in the Information Brief is clear and I have had the opportunity to ask questions about the project.

2. I understand that my participation will involve the completion of an online survey and I agree that the researcher may use the results as described.

3. I acknowledge that:

- Taking part in this study is voluntary and I am aware that I can stop taking part in it at any time without explanation or prejudice;

- Any information I give will be kept strictly confidential and that no names will be used to identify me in this study;

- I have been advised as to what data is being collected, the purpose for collecting the data, and what will be done with the data upon completion of the research.

- As participation in this study involves completion of an online questionnaire, thecompletion of the questionnaire will be considered evidence of consent to take part in this study.

* 1. Please indicate whether or not you are willing to participate in the study. Clicking the YES button below indicates that you have decided to participate. You can say no.

Do you agree to participate in this study?

- [ ] No
- [ ] Yes

IPAC
Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management

JAMES COOK UNIVERSITY AUSTRALIA

NACCHO

Pharmaceutical Society of Australia

IPAC Project: CEO and Managers Survey

Background

2. In which ACCHS do you work?

3. What is your role within this ACCHS?

- ◯ Chief Executive Officer
- ◯ Senior Medical Officer / Clinical Director
- ◯ Practice Manager
- ◯ Chronic Disease Coordinator
- ◯ Other (please specify)

4. How long have you been working at this service (years)?

5. On average, how many hours per week do you work at the service?

6. Have you worked in any other ACCHSs?

- ◯ No
- ◯ Yes

If yes - for how many years?

7. Are you:

- ◯ Male
- ◯ Female

8. Which age group do you fall into?

- ◯ 30 years or under
- ◯ 31-40 years
- ◯ 41-50 years
- ◯ 51-60 years
- ◯ 61 years or over

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Roles and Responsibilities

9. At the commencement of the IPAC project, how would you rate your understanding of the:

	Not clear				Very clear
IPAC project and its aims	○	○	○	○	○
IPAC pharmacists' role/s and expected activities	○	○	○	○	○

Do you have any comments regarding your understanding of the the IPAC project and the IPAC pharmacists' roles?

10. What were you hoping to achieve by participating in the IPAC project?

11. How broad were differences between what you expected the IPAC pharmacists' role would be and what it was in practice?

No difference				Big difference
○	○	○	○	○

What were the differences?

12. How would you rate your understanding / the clarity between the roles of the IPAC pharmacist and:

	Not clear				Very clear
GPs and nurses in this clinic?	○	○	○	○	○
Community pharmacist/s?	○	○	○	○	○

Do you have any comments regarding the clarity between roles?

13. How clear was the IPAC pharmacists' communication with you about their role?

Not clear — Very clear

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Integration

14. Were there any 'champions' or leaders who facilitated the pharmacists' integration into the primary health care team where the IPAC pharmacist worked?

- ◯ No
- ◯ Yes

If yes, who was the champion? Can you explain what they did?

15. What support was provided by the health service, for the IPAC pharmacist:

	No	Yes
Allocated a room or space	◯	◯
Uniform provided	◯	◯
Promoted in newsletter and/or other media	◯	◯

Other (please specify) or Comments

16. Did an Aboriginal Health Practitioner or another staff member support the IPAC pharmacist?

- ◯ No
- ◯ Yes

How well did this work out? What type of support was provided? How important was this?

17. To what extent did the IPAC pharmacist participate in meetings within the ACCHS and discuss issues and ideas about medicines?

- ◯ Daily
- ◯ Weekly
- ◯ Fortnightly
- ◯ Monthly
- ◯ Irregularly
- ◯ Never

What sort of topics were discussed?

18. How valuable was the IPAC pharmacists' participation in meetings to discuss issues and ideas about medicines?

Not valuable at all — Very valuable

19. How often was the IPAC pharmacist involved in any team meetings with health care team members to talk about any patient's care plans?

- ◯ Daily
- ◯ Weekly
- ◯ Fortnightly
- ◯ Monthly
- ◯ Irregularly
- ◯ Never
- ◯ Not sure

20. What did you think about having an IPAC pharmacist within the team/service?

21. What did your staff think about having an IPAC pharmacist within the team/service?

22. How would you rate the IPAC pharmacists' communication with other staff members?

Not effective at all — Very effective

23. To what extent did the IPAC pharmacists' relationship with other health staff change over their time within the service?

Not at all — Great extent

24. To what extent has there been any changes in workload for other staff since the IPAC pharmacist started?

Not at all — Great extent

25. How would you rate the IPAC pharmacists' integration into the primary health care team?

Not integrated into team — Fully integrated into team

26. What aspects of the IPAC pharmacists' role did you find most useful?

27. What barriers impacted upon the IPAC pharmacists' ability to fully implement their role, if any?

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Cultural Appropriateness

28. Was a local cultural induction available to the IPAC pharmacist?

- ◯ No
- ◯ Yes

If yes, can you outline briefly what was provided?
If no, were there any reasons why induction wasn't provided?

29. Did the IPAC pharmacist have a local cultural mentor or person to support their work?

- ◯ No
- ◯ Yes

How well did this work out?

30. How culturally sensitive was the IPAC pharmacist?

Not sensitive at all — Very sensitive

31. Do you have any comments about how the IPAC pharmacist worked with Aboriginal staff and patients?

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Relationships

From your observations...

32. How effective was the IPAC pharmacist's communication with patients?

Not effective — Very effective

33. How effective was the IPAC pharmacist in developing rapport (trusting relationships) with patients?

Not effective — Very effective

34. How willing were patients to see the IPAC pharmacist?

Not willing — Very willing

35. How would you rate acceptance of the IPAC pharmacist by patients?

Not accepted at all — Very well accepted

36. How often did you personally recommend patients, family or friends to see the IPAC pharmacist?

Not at all — Very often

37. Can you provide any examples of positive communication or relationships?

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Referral and Consent Processes

38. Which roles in your service RECRUITED/REFERRED patients for the project? (Select all that apply)

- [ ] IPAC Pharmacist
- [ ] Reception staff
- [ ] GPs
- [ ] Nurses
- [ ] Aboriginal and/or Torres Strait Islander Health Practitioners
- [ ] Liaison officers
- [ ] Other ACCHS staff members
- [ ] Specialists
- [ ] Allied Health professionals (community-based)
- [ ] Other (please specify)

39. Which roles in your service CONSENTED patients including signing the consent form for the project? (Select all that apply)

- [ ] IPAC Pharmacist
- [ ] Reception staff
- [ ] GPs
- [ ] Nurses
- [ ] Aboriginal and/or Torres Strait Islander Health Practitioners
- [ ] Liaison officers
- [ ] Other ACCHS staff members
- [ ] Specialists
- [ ] Other (please specify)

40. How would you rate the referral and consent process?

Very difficult — Very easy

41. What referral or consent processes worked well?

42. How could referral or consent processes for enrolment of patients in the study have been improved?

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Patient Recruitment

43. Are you aware of any eligible patients who were not referred to be a part of the IPAC project?

- ◯ No
- ◯ Yes

If yes, were there any common characteristics of these patients? Why weren't they referred?

44. Are you aware of any patients who did not consent to be a part of the IPAC project?

- ◯ No
- ◯ Yes

If yes, were there any common characteristics of patients who didn't consent? eg. working, age, gender. Do you know what might have influenced their choice?

45. Were there any service or systems issues within the ACCHS that impacted on patient recruitment for the IPAC project?

- ◯ No
- ◯ Yes

If yes, can you describe the issues?

46. Were there any local community issues that impacted on patient recruitment for the IPAC project?

- ◯ No
- ◯ Yes

If yes, can you describe the issues?

47. Did you receive a briefing or training in relation to the IPAC project and patient consent processes?

- ◯ No
- ◯ Yes

If yes, who provided this training?

48. How effective was the training for the IPAC project?

Not effective — Very effective

49. Do you have any comments on recruitment processes and training for the IPAC project?

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Working with the IPAC Pharmacist

50. How often did you have contact with the IPAC pharmacist?

- ◯ Daily
- ◯ Weekly
- ◯ Fortnightly
- ◯ Monthly
- ◯ Irregularly
- ◯ Never

51. The IPAC pharmacist had a set of core roles within the health service. How would you rate their role in the following:

	Not effective at all				Very effective	N/A or Don't Know
Conducting Home Medicines Reviews	○	○	○	○	○	○
Conducting medication reviews outside the home (non-HMRs)	○	○	○	○	○	○
Reviewing the appropriateness of medications and assessing for prescribing omissions	○	○	○	○	○	○
Addressing medication adherence issues	○	○	○	○	○	○
Participating in team–based meetings/activities	○	○	○	○	○	○
Quality assurance with the use of medicines (undertaking drug reviews)	○	○	○	○	○	○
Providing patient education	○	○	○	○	○	○
Providing staff support and education	○	○	○	○	○	○
Further developing relationships with community pharmacists	○	○	○	○	○	○
Providing a medicines information service	○	○	○	○	○	○
Supporting transitional care (eg. checking medication list after patient discharge form hospital)	○	○	○	○	○	○

Do you have any comments about the above roles?

52. To what extent did the following work processes change when the IPAC pharmacist started in the health service?

	Decreased significantly		Remained the same		Increased significantly	N/A or Don't Know
Opportunity to discuss individual patient therapies	○	○	○	○	○	○
Availability of the IPAC pharmacist for a Home Medicines Review	○	○	○	○	○	○
Item 900 claims for a Home Medicines Review	○	○	○	○	○	○
Assistance with updating medication lists	○	○	○	○	○	○
Opportunity to ask for information about medicines	○	○	○	○	○	○
Follow up of medication supply with Community Pharmacy	○	○	○	○	○	○

53. To what extent do you think the IPAC pharmacist influenced...

	Not at all				Great extent	N/A or Don't Know
Medicines-related priorities with the health service (eg. encouraging adherence)	○	○	○	○	○	○
Positive clinical care outcomes for patients	○	○	○	○	○	○
Communication processes between health staff, regarding patients medication or treatment	○	○	○	○	○	○

Comments

54. To what extent do you think having the IPAC pharmacist in the health service impacted upon patients'...

	Great extent				Not at all	N/A or Don't Know
Knowledge about the role of an IPAC pharmacist	○	○	○	○	○	○
Knowledge about their medicines	○	○	○	○	○	○
Adherence to taking their medications	○	○	○	○	○	○
Confidence to ask more questions about their medicines	○	○	○	○	○	○

Comments

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Collaboration

55. **PRIOR** to the IPAC pharmacist commencing, how would you rate communication regarding patients and their medications, between this health service and...

	Not effective				Very effective	Don't know or N/A
Hospitals (such as at the time of patient admission and discharge)	○	○	○	○	○	○
Specialists	○	○	○	○	○	○
Allied health professionals	○	○	○	○	○	○
Community pharmacies/pharmacists	○	○	○	○	○	○

56. **SINCE** the IPAC pharmacist commenced, how would you rate communication regarding patients and their medications, between this health service and...

	Not effective				Very effective	Don't know or N/A
Hospitals (such as at the time of patient admission and discharge)	○	○	○	○	○	○
Specialists	○	○	○	○	○	○
Allied health professionals	○	○	○	○	○	○
Local community pharmacies/pharmacists	○	○	○	○	○	○

How have these relationships changed?

57. To what extent was the health service able to fully utilise the IPAC pharmacists' skills and expertise?

Not utilised at all — Fully utilised

58. How would you rate your confidence in the IPAC pharmacists' professional capabilities?

Low confidence — High confidence

59. How would you rate the IPAC pharmacists' role overall?

Not effective — Very effective

60. Do you have any comments regarding the IPAC pharmacist role?

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Resources

61. How would you rate the resources provided for promoting the IPAC project?

	Not effective at all				Very effective	N/A or Don't Know
Posters	○	○	○	○	○	○
Brochures	○	○	○	○	○	○
Video clips	○	○	○	○	○	○

Other (please specify)

62. Which resources worked best for patients? Why?

63. Which resources did patients have difficulty with, if any? Can you describe the difficulties?

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General Project

64. How well was the IPAC project able to be implemented at this site?

Not well at all — Very well

65. How well did the IPAC pharmacist role meet the requirements of the health service?

Not well at all — Very well

66. Which aspects of the IPAC project worked well?

67. What challenges were experienced in implementing the IPAC project?

68. How much support did your health service receive from the State/Territory Affiliate (eg VACCHO, QAIHC, AMSANT) in relation to the implementation of the IPAC project?

None at all — A great deal — N/A

How useful was this support?

69. How much support did the clinic/service receive through the NACCHO support network?

A great deal				None at all	N/A
◯	◯	◯	◯	◯	◯

How useful was this support?

70. Is your health service participating in the Health Care Homes (HCH) initiative?

- ◯ No
- ◯ Yes

If yes, can you describe any overlap between the IPAC pharmacist activities and the HCH initiative?

71. Does your service participate in, or has it commenced participation in any other initiatives that may have impacted on the work of the IPAC pharmacist? eg. workforce incentives programme

- ◯ No
- ◯ Yes

If yes, can you describe any overlap between the IPAC pharmacist activities and these other initiatives?

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In the future

72. Would you like the IPAC pharmacist role to continue in this ACCHS beyond the project?

- ◯ No
- ◯ Yes

Please explain your response

73. How many days per week would this health service require the professional services of an IPAC type* pharmacist?

* An IPAC-type pharmacist is “a non-dispensing pharmacist within Aboriginal community-controlled primary health care services, that undertakes any or all of the 10 core roles as outlined in the IPAC project".

74. Do you think the roles of the IPAC pharmacist need to be changed?

- ◯ No
- ◯ Yes

If yes, in what way?

75. Do you think there is a role for an IPAC-type (see Q74 for definition) pharmacist within ACCHSs in the future?

- ◯ No
- ◯ Yes

Please explain your response

76. What advice would you give another health service who was going to introduce an IPAC-type pharmacist role?

77. Is there anything else you would like to add about the IPAC project or IPAC pharmacists' role?

Appendix D: Online Survey – GPs

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IPAC Project: GP Survey

IPAC Project: GP Survey

Introduction

Project Leaders:
Ms Dawn Casey (NACCHO), Mr Mike Stephens (NACCHO), Associate Professor Sophia Couzos (JCU), Ms Deb Bowden (PSA).

Evaluation Organisation:
Evaluation Team led by James Cook University (College of Medicine and Dentistry)

The IPAC project is a large project that will determine if including a registered non-dispensing practice pharmacist as part of the primary health care team within Aboriginal community controlled health services (ACCHSs) leads to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples. It is a partnership between the Pharmaceutical Society of Australia (PSA), the National Aboriginal Community Controlled Health Organisation (NACCHO), and James Cook University (JCU) College of Medicine and Dentistry.

Detailed information on the project is available in the information brief emailed with the invitation to participate in this online survey. This survey will take approximately 25 minutes to complete.

For more information or to make a complaint, you can contact the NACCHO Project Lead: Mike Stephens, Tel: 02 6246 9300; Email: mike.stephens@naccho.org.au. Other Project staff to contact include: Deb Bowden from the Pharmaceutical Society of Australia: Tel: 02 6283 4740; Email: Deb.Bowden@psa.org.au. You can also contact the NACCHO Deputy Chief Executive Officer: Ms Dawn Casey at dawn.casey@naccho.org.au.

The Human Research Ethics Committees (HRECs) continue to provide oversight as the project progresses. If you have any concerns or complaints regarding the ethical conduct of the study, you are invited to contact the appropriate HREC:

NT: Ethics Administration, Human Research Ethics Committee of the NT Department of Health and Menzies School of Health Research. (HREC Ref 2018-3072) Tel: 08 8946 8600 or email ethics@menzies.edu.au

Vic / Qld: St Vincent's Hospital Melbourne, Human Research Ethics Committee: Executive Office of Research, St Vincent's Hospital Melbourne, (HREC Ref 252/17) Tel: 03 9231 2394, or email: research.ethics@svhm.org.au

Informed Consent

1. The purpose of the Project, as outlined in the Information Brief is clear and I have had the opportunity to ask questions about the project.

2. I understand that my participation will involve the completion of an online survey and I agree that the researcher may use the results as described.

3. I acknowledge that:

- Taking part in this study is voluntary and I am aware that I can stop taking part in it at any time without explanation or prejudice;

- Any information I give will be kept strictly confidential/anonymous and that no names will be used to identify me in this study;

- I have been advised as to what data is being collected, the purpose for collecting the data, and what will be done with the data upon completion of the research.

- As participation in this study involves completion of an online questionnaire, thecompletion of the questionnaire will be considered evidence of consent to take part in this study.

* 1. Please indicate whether or not you are willing to participate in the study. Clicking the YES button below indicates that you have decided to participate. You can say no.

Do you agree to participate in this study?

- [ ] No
- [ ] Yes

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Background

2. In which health service (ACCHS) do you work?

3. What is your role within this health service?

- ◯ Clinical practitioner
- ◯ Management only
- ◯ Part clinical / Part management
- ◯ Other (please specify)

4. How long you have been working at this service (years)?

5. On average, how many hours per week do you work at the service?

6. Have you worked in any other ACCHSs?

- ◯ No
- ◯ Yes

If yes - for what length of time? (accumulated in years eg. 0.5FTE for 4 years = 2 years)

7. Are you:

- ◯ Male
- ◯ Female

8. Which age group do you fall into?

- ◯ 30 years or under
- ◯ 31-40 years
- ◯ 41-50 years
- ◯ 51-60 years
- ◯ 61 years or over

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Roles and Responsibilities

9. At the commencement of the IPAC project, how would you rate your understanding of the:

	Not clear				Very clear
IPAC project and its aims	○	○	○	○	○
IPAC pharmacists' role/s and expected activities	○	○	○	○	○

10. How broad were differences between what you expected the IPAC pharmacists' role would be and what it was in practice?

No difference				Big difference
○	○	○	○	○

What were the differences, if any?

11. How would you rate your understanding / the clarity between the roles of the IPAC pharmacist and:

	Not clear				Very clear
GPs and nurses in this clinic?	○	○	○	○	○
Community pharmacist/s?	○	○	○	○	○

Comments

12. Were there any ‘champions’ or leaders who facilitated the pharmacists’ integration into the primary health care team where the IPAC pharmacist worked?

- ◯ No
- ◯ Yes

If yes, who was the champion? Can you explain what they did?

13. To what extent did the IPAC pharmacist participate in meetings and discuss issues and ideas about medicines?

- ◯ Daily
- ◯ Weekly
- ◯ Fortnightly
- ◯ Monthly
- ◯ Irregularly
- ◯ Never

What type of topics were discussed?

14. What aspects of the IPAC pharmacist’s role did you find most useful?

15. What barriers impacted upon the IPAC pharmacists ability to fully implement their role, if any?

16. How would you rate the IPAC pharmacists’ integration into the primary health care team?

Not integrated into team — Fully integrated into team

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Relationships and Cultural Appropriateness

From your observations at locations where you worked with the IPAC pharmacist...

17. How effective was the IPAC pharmacist's communication with patients?

Not effective — Very effective

18. How effective was the IPAC pharmacist in developing rapport (trusting relationships) with patients?

Not effective — Very effective

19. How willing were patients to see the IPAC pharmacist?

Not willing — Very willing

20. How culturally sensitive was the IPAC pharmacist?

Not sensitive at all — Very sensitive

21. In your opinion, how would you rate acceptance of the IPAC pharmacist by patients?

Not accepted at all — Very well accepted

22. Can you provide any examples of positive communication or relationships involving the IPAC pharmacist?

23. Do you have any comments about how the IPAC pharmacist worked with Aboriginal and Torres Strait Islander staff and patients?

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Referral Processes

24. How often did you refer patients to see the IPAC pharmacist (during the recruitment phase)?

- ◯ Daily
- ◯ Weekly
- ◯ Fortnightly
- ◯ Monthly
- ◯ Irregularly
- ◯ Never

25. How would you rate the process of referring patients for enrolment in the IPAC project?

Very difficult — Very easy

26. What processes for referral of patients in the IPAC project worked well?

27. What factors influenced your readiness to refer?

28. Were there any eligible patients that you didn't refer for enrolment into the IPAC project?

- ◯ No
- ◯ Yes

If yes, were there any common characteristics of these patients? eg. working, age, gender

29. How could patient referral processes for enrolment in the IPAC project have been improved?

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Consent Processes

30. Did you ever directly enrol patients into the IPAC project (and ask them to sign the consent form)?

- ◯ No
- ◯ Yes

31. Are you aware of any patients who did not consent to be a part of the IPAC project?

- ◯ No
- ◯ Yes

If yes, were there any common characteristics of patients who didn't consent? eg. working, age, gender

32. What worked well within your service in relation to gaining consent from patients to participate in the IPAC project?

33. How could patient consent processes for enrolment in the IPAC project have been improved?

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Training on Recruitment and Consent Processes

34. Did you receive a briefing or training in relation to the IPAC project and patient referral and consent processes for enrolling patients into the study?

- ○ No
- ○ Yes

If yes, who provided this training?

35. How effective was the training on referral and consent processes for the IPAC project?

Not effective — Very effective

36. Do you have any feedback regarding the training on referral and consent processes for the IPAC project?

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Patient Recruitment

37. Were there any health service or systems issues within the ACCHS that impacted on patient recruitment for the IPAC project?

- ◯ No
- ◯ Yes

If yes, please describe the issues?

38. Were there any local community issues that impacted on patient recruitment for the IPAC project?

- ◯ No
- ◯ Yes

If yes, please describe the issues?

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Working with the IPAC Pharmacist

39. How often did you have contact with the IPAC pharmacist?

- ◯ Daily
- ◯ Weekly
- ◯ Fortnightly
- ◯ Monthly
- ◯ Irregularly
- ◯ Never

40. To what extent did the following work processes change for you, when the IPAC pharmacist started in the health service?

	Decreased significantly		Remained the same		Increased significantly	N/A or Don't Know
Opportunity to discuss individual patient therapies	◯	◯	◯	◯	◯	◯
Availability of the IPAC pharmacist for a Home Medicines Review	◯	◯	◯	◯	◯	◯
Item 900 claims for a Home Medicines Review	◯	◯	◯	◯	◯	◯
Assistance with updating medication lists	◯	◯	◯	◯	◯	◯
Opportunity to ask for information about medicines	◯	◯	◯	◯	◯	◯
Follow up of medication supply with Community Pharmacy	◯	◯	◯	◯	◯	◯

41. The IPAC pharmacist had a set of core roles within the ACCHS. How would you rate their role in the following:

	Not effective at all				Very effective	N/A or Don't Know
Conducting home medication reviews	○	○	○	○	○	○
Conducting medication reviews outside the home	○	○	○	○	○	○
Reviewing the appropriateness of medications and assessing for prescribing omissions	○	○	○	○	○	○
Addressing medication adherence issues	○	○	○	○	○	○
Participating in team–based meetings/activities	○	○	○	○	○	○
Quality assurance with the use of medicines (undertaking drug reviews)	○	○	○	○	○	○
Providing patient education	○	○	○	○	○	○
Providing staff support and education	○	○	○	○	○	○
Further developing relationships with community pharmacists	○	○	○	○	○	○
Providing a medicines information service	○	○	○	○	○	○
Supporting transitional care (eg checking medication list after patient discharge from hospital)	○	○	○	○	○	○

Comments

42. To what extent do you think the IPAC pharmacist...

	Not at all				Great extent	N/A or Don't Know
Influenced medicines-related priorities within the health service? (eg. encouraging adherence)	○	○	○	○	○	○
Provided **relevant** medicines information through education and support with queries?	○	○	○	○	○	○
Provided **useful** medicines information through education and support with queries?	○	○	○	○	○	○

43. To what extent do you think having the IPAC pharmacist in the ACCHS impacted upon...

	Not at all				Great extent	N/A or Don't Know
The clinical care of patients	○	○	○	○	○	○
Patients' knowledge about their medicines	○	○	○	○	○	○
Patients' adherence to taking their medications	○	○	○	○	○	○

Can you describe any evidence of changes in patients' knowledge and/or adherence? What might have influenced this?

44. What proportion of your time was saved by having the IPAC pharmacist help you with managing patients and their medications?

0 50 100

45. Did the IPAC pharmacist suggest any changes in prescribing or make other recommendations to you as a result of undertaking any medication reviews or assessments?

- ○ No
- ○ Yes

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Feedback on Medication Reviews

Home Medicines Reviews (HMRs) and non-Home Medicines Review (non-HMR)

46. Did the IPAC pharmacist suggest any changes in prescribing or make other recommendations to you as a result of undertaking a Medicines Review either within or outside the home?

- ○ No
- ○ Yes

47. How did the IPAC pharmacist communicate these suggestions?

- ☐ Written report
- ☐ Notes in the patient's record
- ☐ Discussed directly with me in person or via telephone
- ☐ Case conference/team meeting
- ☐ Other (please specify)

48. How fitting were the IPAC pharmacists' recommendations from the medicines review?

Not appropriate — Very appropriate

49. How often did you act on the IPAC pharmacists' recommendations from the medicines review?

Never — Always

50. What actions did you take?

- [ ] I contacted and recalled patient for appointment
- [ ] I telephoned the patient to provide information
- [ ] I sent a letter to the patient to provide information
- [ ] I visited the patient in their home
- [ ] I arranged for another health professional to visit the patient at home
- [ ] I followed-up with the patient opportunistically (the next time they presented)
- [ ] I changed/updated the patients medications list
- [ ] None
- [ ] Other (please specify)

Assessments for Medication Appropriateness and Potential Omissions

51. Did the IPAC pharmacist suggest any changes in prescribing or make other recommendations to you as a result of undertaking an assessment of the appropriateness, or potential omission of medications?

- ( ) No
- ( ) Yes

52. How did the IPAC pharmacist communicate these suggestions?

- [ ] Written report
- [ ] Notes in the patient's record
- [ ] Discussed directly with me in person or via telephone
- [ ] Case conference/team meeting
- [ ] Other (please specify)

53. How fitting were the IPAC pharmacists' recommendations from the assessment of medication appropriateness and identification of potential omissions?

Not appropriate — Very appropriate

54. How often did you act on the IPAC pharmacists' recommendations from the assessment of medication appropriateness and identification of potential omissions?

Never Always

55. Do you have any comments about the recommendations you received from the IPAC pharmacist or actions you took?

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Collaboration

56. How would you rate communication between yourself and the IPAC pharmacist, regarding patients and their medications?

Not effective — Very effective

57. How often was the pharmacist involved in any team meetings with yourself and/or other healthcare team members to talk about any patients' health care plans?

- Daily
- Weekly
- Fortnightly
- Monthly
- Irregularly
- Never

58. How would you rate the input provided by the IPAC pharmacist at team meetings to discuss patients' health care plans?

Not valuable — Very valuable

59. **PRIOR** to the IPAC pharmacist commencing, how would you rate communication regarding patients and their medications, between this Health Service and...

	Not effective				Very effective	Don't know or N/A
Hospitals (such as at the time of patient admission and discharge)	○	○	○	○	○	○
Specialists	○	○	○	○	○	○
Allied health professionals	○	○	○	○	○	○
Community pharmacies/pharmacists	○	○	○	○	○	○

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Overall

60. **SINCE** the IPAC pharmacist commenced, how would you rate communication regarding patients and their medications, between this service and...

	Not effective				Very effective	Don't know or N/A
Hospitals (such as at the time of patient admission and discharge)	○	○	○	○	○	○
Specialists	○	○	○	○	○	○
Allied health professionals	○	○	○	○	○	○
Local community pharmacies/pharmacists	○	○	○	○	○	○

How have these relationships changed?

61. To what extent were you able to fully utilise the IPAC pharmacists' skills and expertise?

Not utilised at all — Fully utilised

62. How would you rate your confidence in the IPAC pharmacists' professional capabilities?

Low confidence — High confidence

63. How would you rate the IPAC pharmacists' role overall?

Not effective — Very effective

64. Do you have any comments regarding the IPAC pharmacist role?

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General Project

65. How well was the IPAC project able to be implemented at this site?

Not well at all — Very well

66. Which aspects of the IPAC project worked well?

67. What challenges were experienced in implementing the IPAC project?

68. How well did the IPAC pharmacist role meet the requirements of the ACCHS?

Not well at all — Very well

69. How much support did your health service receive from the State/Territory Affiliate (eg VACCHO, QAIHC, AMSANT) in relation to the implementation of the IPAC project?

None at all — A great deal — N/A or Don't Know

How useful was this support?

70. Does your service participate in, or has it commenced participation in any other initiatives that may have impacted on the work of the IPAC pharmacist? eg. Health Care Homes, workforce incentives programme

- ◯ No
- ◯ Yes

If yes, can you identify the initiative/s and describe any overlap with the work of the IPAC pharmacist?

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In the future

71. Would you like the IPAC pharmacist role to continue in this health service beyond the project?

- ◯ No
- ◯ Yes

Please explain your response

72. How many days per week would this health service require the professional services of an IPAC-type* pharmacist?

* An IPAC-type pharmacist is “a non-dispensing pharmacist within Aboriginal community-controlled primary health care services, that undertakes any or all of the 10 core roles as outlined in the IPAC project".

73. Do you think the roles of an IPAC pharmacist needs to be changed in the future?

- ◯ No
- ◯ Yes

If yes, in what way?

74. Do you think there is a role for an IPAC-type (see Q72 for definition) pharmacist within ACCHSs in the future?

- ◯ No
- ◯ Yes

Please explain your response

75. Is there anything else you would like to add about the IPAC project or IPAC pharmacists' role?

Appendix E: Online Survey – Community Pharmacists

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IPAC Project: Community Pharmacists Survey

IPAC Project: Community Pharmacists Survey

Introduction

Project Leaders:
Ms Dawn Casey (NACCHO), Mr Mike Stephens (NACCHO), Associate Professor Sophia Couzos (JCU), Ms Deb Bowden (PSA).

Evaluation Organisation:
Evaluation Team led by James Cook University (College of Medicine and Dentistry)

The IPAC project is a large project that will determine if including a registered non-dispensing practice pharmacist as part of the primary health care team within Aboriginal community controlled health services (ACCHSs) leads to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples. It is a partnership between the Pharmaceutical Society of Australia (PSA), the National Aboriginal Community Controlled Health Organisation (NACCHO), and James Cook University (JCU) College of Medicine and Dentistry.

Detailed information on the project is available in the information brief emailed with the invitation to participate in this online survey. This survey will take approximately 15 minutes to complete.

For more information or to make a complaint, you can contact the NACCHO Project Lead: Mike Stephens, Tel: 02 6246 9300; Email: mike.stephens@naccho.org.au. Other Project staff to contact include: Deb Bowden from the Pharmaceutical Society of Australia: Tel: 02 6283 4740; Email: Deb.Bowden@psa.org.au. You can also contact the NACCHO Deputy Chief Executive Officer: Ms Dawn Casey at dawn.casey@naccho.org.au.

The Human Research Ethics Committees (HRECs) continue to provide oversight as the project progresses. If you have any concerns or complaints regarding the ethical conduct of the study, you are invited the appropriate HREC:

NT: Ethics Administration, Human Research Ethics Committee of the NT Department of Health and Menzies School of Health Research. (HREC Ref 2018-3072) Tel: 08 8946 8600 or email ethics@menzies.edu.au

Vic / Qld: St Vincent's Hospital Melbourne, Human Research Ethics Committee: Executive Office of Research, St Vincent's Hospital Melbourne. (HREC Ref 252/17) Tel: 03 9231 2394, or email: research.ethics@svhm.org.au

Informed Consent

1. The purpose of the Project, as outlined in the Information Brief is clear and I have had the opportunity to ask questions about the project.

2. I understand that my participation will involve the completion of an online survey and I agree that the researcher may use the results as described.

3. I acknowledge that:

- Taking part in this study is voluntary and I am aware that I can stop taking part in it at any time without explanation or prejudice;

- Any information I give will be kept strictly confidential and that no names will be used to identify me in this study;

- I have been advised as to what data is being collected, the purpose for collecting the data, and what will be done with the data upon completion of the research.

- As participation in this study involves completion of an online questionnaire, thecompletion of the questionnaire will be considered evidence of consent to take part in this study.

* 1. Please indicate whether or not you are willing to participate in the study. Clicking the YES button below indicates that you have decided to participate. You can say no.

Do you agree to participate in this study?

- [ ] No
- [ ] Yes

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Background

2. With which ACCHS (health service) do you primarily work?

3. What is your role in the Community Pharmacy?

- [ ] Owner
- [ ] Manager
- [ ] Pharmacist employee
- [ ] Other (please specify)

4. How long you have been working in this pharmacy (years)?

5. On average, how many hours per week do you work at the pharmacy?

6. Have you worked in/with the local ACCHS previously?

- ( ) No - skip the next question
- ( ) Yes

7. What work did you do?

- [ ] Contracted/employed to work generally in the ACCHS
- [ ] Home Medication Reviews
- [ ] s100 visits
- [ ] QUMAX site visits
- [ ] Other (please specify)

8. Are you:

- ◯ Male
- ◯ Female

9. Which age group do you fall into?

- ◯ 30 years or under
- ◯ 31-40 years
- ◯ 41-50 years
- ◯ 51-60 years
- ◯ 61 years or over

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Roles and Responsibilities

10. At the commencement of the IPAC project, how would you rate your understanding of the:

	Not clear				Very clear
IPAC project and its aims	○	○	○	○	○
IPAC pharmacists' role/s and expected activities	○	○	○	○	○

11. How would you rate the clarity between the roles of the IPAC pharmacist and Community Pharmacist/s?

Not clear				Very clear
○	○	○	○	○

Comments

12. How broad were differences between what you expected the IPAC pharmacists' role would be and what it was in practice?

No difference				Big difference
○	○	○	○	○

What were the differences?

13. How would you rate your working relationship with the health service**PRIOR** to the commencement of the IPAC pharmacist?

Not effective at all — Very effective

14. **PRIOR to** the IPAC pharmacist commencing, how would you rate (ACCHS) patients levels of...

	Very low				Very high	Don't know or N/A
Knowledge about their medicines	○	○	○	○	○	○
Adherence to taking their medicines	○	○	○	○	○	○

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Referral

15. Did you refer any patients to see the IPAC pharmacist?

- ◯ No
- ◯ Yes

16. How would you rate the process of referring patients to the IPAC pharmacist?

Very difficult				Very easy
◯	◯	◯	◯	◯

17. Approximately how many patients did you refer to see the IPAC pharmacist?

18. What benefit did you think patients would receive from seeing the IPAC pharmacist?

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About Referrals

19. Were there any situations where you did not refer eligible patients to see the IPAC pharmacist?

- ◯ No
- ◯ Yes

If yes, what were the reasons why?

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Relationships

From your observations...

20. How effective was the IPAC pharmacist in developing rapport (trusting relationships) with patients?

Not effective — Very effective

21. How willing were patients to see the IPAC pharmacist?

Not willing — Very willing

22. Can you provide any examples of effective relationships you saw the IPAC pharmacist develop?

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Working with the IPAC Pharmacist

23. How often did you have contact with the IPAC pharmacist?

- ◯ Daily
- ◯ Weekly
- ◯ Fortnightly
- ◯ Monthly
- ◯ Irregularly
- ◯ Never

24. To what extent have the following work-related activities changed your work, since the IPAC pharmacist started in the health service?

	Decreased / Declined		Stayed the same		Increased / Improved	N/A or Don't know
Frequency of contact with the ACCHS	◯	◯	◯	◯	◯	◯
Efficiency of processes for medicines supply	◯	◯	◯	◯	◯	◯
IPAC Pharmacist facilitated communication with the GPs regarding prescriptions	◯	◯	◯	◯	◯	◯
IPAC Pharmacist facilitated communication with the GPs regarding interventions	◯	◯	◯	◯	◯	◯
IPAC Pharmacist facilitated communication with the GPs for advice	◯	◯	◯	◯	◯	◯
Support provided to ACCHS patients	◯	◯	◯	◯	◯	◯

	Decreased / Declined		Stayed the same		Increased / Improved	N/A or Don't know
Clinical appropriateness of medications prescribed	○	○	○	○	○	○
Delivery of medicines to the clinic.	○	○	○	○	○	○
Discussions re discharge medications.	○	○	○	○	○	○
Notification of Closing the Gap (CTG) script eligibility.	○	○	○	○	○	○
Receipt of Home Medication Review reports	○	○	○	○	○	○
Requests to source a particular medication.	○	○	○	○	○	○
Dose-administration aid preparation and supply.	○	○	○	○	○	○
Sourcing pricing advice.	○	○	○	○	○	○
Dispensing of medicines.	○	○	○	○	○	○
Queries about medication related information.	○	○	○	○	○	○
Giving educational sessions to staff within the clinic.	○	○	○	○	○	○
Onsite (ACCHS) medicines stock control.	○	○	○	○	○	○

25. To what extent have the following patient-related activities changed since the IPAC pharmacist started in the health service?

	Declined		Stayed the same		Improved	N/A or Don't Know
Involvement/interest of patients with their own medications	○	○	○	○	○	○
Eligible patients received dose administration aids	○	○	○	○	○	○
Participation by IPAC pharmacist in Home medicines reviews.	○	○	○	○	○	○
Patient referral for Home medicines review.	○	○	○	○	○	○
Assistance with script collection.	○	○	○	○	○	○
Home delivery of medicines to patients.	○	○	○	○	○	○

Comments

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Collaboration

26. How would you rate the IPAC pharmacists' communication regarding their role with yourself?

Not effective | Average | Very effective

27. How would you rate communication between yourself and the IPAC pharmacist, regarding managing patients and their medications?

Not effective | Average | Very effective

28. How would you rate your working relationship with the health service **SINCE** the commencement of the IPAC pharmacist?

Not effective | Average | Very effective

29. How could your community pharmacy further support the local health service (ACCHS)?

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Overall

30. How would you rate your understanding **NOW** of the:

	Not clear				Very clear
IPAC project and its aims	○	○	○	○	○
IPAC pharmacists' role/s and expected activities	○	○	○	○	○

31. **SINCE** the IPAC pharmacist commenced, how would you rate (ACCHS) patients levels of...

	Very low			Very high	Don't know
Knowledge about their medicines	○	○	○	○	○
Adherence to their medicines	○	○	○	○	○

32. In your opinion, has the IPAC pharmacist had any influence on patients' adherence to their medications?

No influence — High influence

33. In your opinion, how would you rate the IPAC pharmacists' role overall?

Not effective — Very effective

34. Do you have any comments regarding the IPAC pharmacists' role or impact?

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In the future

35. Do you think there is a role for an IPAC-type* pharmacist within ACCHSs in the future?

* An IPAC-type pharmacist is "a non-dispensing pharmacist within Aboriginal community-controlled primary health care services, that undertakes any or all of the 10 core roles as outlined in the IPAC project".

- ◯ No
- ◯ Yes

Please explain your response

36. How many days per week would the local health service (ACCHS) require the professional services of an IPAC-type (see definition in Q36) pharmacist?

37. How interested would you be in taking on the IPAC pharmacist role in the future?

Not interested at all				Very interested
◯	◯	◯	◯	◯

What are your reasons for this choice?

38. Do you think the roles of the IPAC pharmacist need to be changed in the future?

- ◯ No
- ◯ Yes

If yes, in what way?

39. Is there anything else you would like to add about the IPAC project or the IPAC pharmacists' role?

Appendix F: Focus Group / Interview Proforma – Health Services Staff

IPAC Project – Qualitative Evaluation
Draft Focus Group / Interview Template –Aboriginal Health Workers/Practitioners/Management
(use GP template for practicing GPs)

(6-8 staff members purposively selected for knowledge of role of the pharmacist and patient journey)

- Welcome and introduce research team
- Acknowledgement of country or ask if Elder can welcome
- Yarn about the project and your experience, no right or wrong answers
- Ask that people don't take anything talked about outside the room
- Everyone will be de-identified in our report, there will not be any names
- You can have a copy of the discussion today or if you want to stop something from being reported you can.

[use IPAC pharmacists name and service name where appropriate]

TAILOR QUESTIONS TO ROLE OF INTERVIEWEE

Themes	Questions (and prompts)
Introductions	– Please tell me your role and how long you have been working in the health service? – How long have you been working in health
Preparedness Orientation	– What is your understanding of the IPAC Project? – Can you explain what **[pharmacist name]** the IPAC pharmacist did? – How did the pharmacist communicate their role and this project to the team? Was this adequate?
Integration into the PHC team	**To what extent did the pharmacist work as a part of the primary health care team?**
	– How did you feel about a pharmacist joining the team? Explore acceptability/issues – How long did it take for the pharmacist to settle in? – Were there any 'champions' [leaders] who facilitated communication and integration of the pharmacist? – Was a room allocated for the pharmacist? [don't ask if observed] – Were they provided with a uniform? [don't ask if observed] – Were they promoted in newsletter and other media?[don't ask if observed] – Were you able to fully utilise their skills and expertise? – Can you give any examples of initiatives implemented by the pharmacists? [eg Drug utilisation reviews] – How effective do you think pharmacist's role was? What worked well? What could be improved?
Team collaboration	**How effective was the pharmacists' communication with other health staff within the service?**
	– To what extent did the pharmacist participate in meetings and discuss issues and ideas? What sort of things were discussed? How often? – Was the pharmacist invited to participate in events or clinics? Eg. NAIDOC Did they participate willingly? – Could the pharmacist relate on an interpersonal level to other staff? – Has the information the pharmacist provided been helpful and assisted you in the management of the patients? What type of information has been provided? Would you like to have had less, more or different information? – Has there been any changes in workload for other staff since the pharmacist started? – Did an Aboriginal Health Worker, or another staff member, support the pharmacist? In what ways? How important was this?

	– Was the pharmacist an effective communicator? How did the pharmacist communicate - patient notes/verbally/case discussions? – Has the relationship of the pharmacist with other health staff changed over their time within the service? If so, How? – What did you think about having a pharmacist within the team/service?
Cultural Competence	**How well did the pharmacist understand the local people, their priorities and culture?**
	– Was local cultural induction available to the pharmacist? Can you tell me about it? – Did they have a local cultural mentor or local person to support their work? How did this work out? – Do you feel the pharmacist was accepted by the community – can you give an example – In your opinion were there any issues around cultural safety?
Relationships	**Tell me about the pharmacists' relationships with patients?**
	– Tell me about the pharmacists' communication with patients? What did you observe? Do you think patients understood the pharmacist? – Did you see people developing trusting relationships with the pharmacist? – How willing were people to see the pharmacist? (approachability) – Did you recommend patients/ friends to visit the pharmacist?
Consent process	**How would you describe recruitment and the consent process for the project?**
	– Was this done by an ACCHS staff member or the pharmacist or both? – What role did Aboriginal Health Workers have in this process? – How effective was this process? What worked? How could this have been improved? – …If done by ACCHS staff: o What training did you receive in relation to the project and consent processes and who provided this? o Were there any patients that you didn't refer/consent? Why? What type of patients were these? o Were there many patients who decided not to be involved in the project [didn't consent? o Do you know what influenced their choice? o Were there any common characteristics of those who decided not to be involved in the project [didn't consent]? Eg. Working, M/F – Were there any local issues that impacted on recruitment?
Changes	**What has changed since the pharmacist started in the health service?**
	– Has clinical care of patients changed? – Have you observed any changes in knowledge about the role of the pharmacist in patients? – Do you think patients' knowledge about their medicines has changed? How? – Have you seen any evidence of patients being more adherent to taking their medicines? What might have influenced this? – Have you seen patients asking more questions about their medicines after spending time with the pharmacist? Do you have any examples of this? – Have communication processes regarding patients' medication/treatment changed between health staff?

	– Did you or any other staff members assist with the implementation of the N-MARS patient survey? What assistance was provided? (show proforma) – In your opinion, how accurate do you think patients were when responding to the questions? How do you know? – *Overall on a scale of 1 to 10 (with 10 being very effective and 1 being not effective) how effective do you think the pharmacists' role was?*
Collaboration with other providers	**Tell me about interactions the pharmacist had with other healthcare providers?**
	– Was the pharmacist able to assist with the transfer of information (or work processes) regarding patients medications with other health providers? Examples – What role did the pharmacist play in multi-disciplinary clinics or team care arrangements? – Can you tell me about any patient group or staff education that the pharmacist facilitated? – Has having a pharmacist at the service changed your relationship with your community pharmacy? If so, how?
Resources	**Tell me about any resources you had for the pharmacist or did you need to develop any new ones? Eg. Brochures, flyers and meds info sheets (present copies)**
	– Why did you have to modify them? What did you have to develop? – How useful did your patients find these? What did they have difficulty with?
Project General	**Tell me about how the project has operated at this site?**
	– What worked? [How successful was the introduction of a pharmacist?] In what way? – Were there any challenges? – How well did the IPAC pharmacist meet the health services requirements? – Can you describe any support you received from your NACCHO state Affiliate [AMSANT, VACCHO, QAIHC}? – Can you describe any support you received through the NACCHO support network? Eg. Email lists – Since the pharmacist commenced has your service started participating in any other initiatives that impacted on, or overlapped with, the IPAC Project (eg. Health Care Homes, workforce incentives programme (WIP)? …If yes, can you describe any overlap between these activities?
Future	– Do you think pharmacists should be as part of the team to provide holistic care to Aboriginal patients? – Would you like this role to continue beyond the project? Why? – How many days a week do you think the pharmacist is needed for in the service? – Do you think the roles of the pharmacist needs to be changed? In what way? – What advice would you give another health service who was going to introduce a pharmacist role? – Is there anything else you would like to add?

Appendix G: Focus Group / Interview Proforma – Patients

IPAC Project – Qualitative Evaluation
Draft Focus Group / Interview Template –Patients

Focus Group of 6-8 patients and 1 in-depth individual
Purposively selected who have had experience with the Pharmacist

- Welcome and introduce research team
- Acknowledgement of country or ask if Elder can welcome
- Yarn about the project and your experience, no right or wrong answers
- Ask people to not take anything talked about outside the room
- Everyone will be de-identified in our report, there won't be any names
- Let us know if you would like a copy of the discussion today or if you want to stop something from being reported.

[insert IPAC pharmacist name and service name where appropriate]

THEMES	QUESTIONS (and prompts)
Introductions	– Can you tell us about you? – Are you a local or where is your country? – How happy are you with your life right now [life-satisfaction] scale 0-10? (10 being most satisfied) – How long you have been coming to this health service? – Before the project started did you see a pharmacist here or in the community? – Can you tell me about whether you talked about your medicines with the community pharmacist?
Understanding	**How do you feel about having a pharmacist here at your health service?**
	– Do you know why the pharmacist was here? – How often have you been to see the pharmacist here at the service? – Can you tell me what the pharmacist did? – Do you know why you saw the pharmacist?
Consent process	**Can you tell me about how you heard about the pharmacist? How were they introduced to you?**
	– Who suggested you see the pharmacist or did you ask to see the pharmacist? Or did the pharmacist contact you? – How well did this work? Would you have preferred this to be done differently? – How did you feel about signing the consent form to be included in the research project?
Cultural Competence	**Can you say whether the pharmacist understood you and your culture?**
	– Did you feel the pharmacist was respectful? – Did the pharmacist understand what was important for you? – Did the pharmacist listen to your story? – Do you think the pharmacist was welcomed by the community? Why/why not?
Relationships	**Tell me about how well the pharmacist worked together [interacted] with you?**
	– How did you feel about seeing the pharmacist? – How easy was it to get to see the pharmacist? – Did you make an appointment? Were you able to attend your appointment? – Does making an appointment work for you or do you prefer another way? – How did you feel about talking to the pharmacist? (approachability)

	– Did the pharmacist understand and listen? – Did the pharmacist explain things well and use words you understood? – How did you feel when telling the pharmacist your medicines story? (trust) – Did you talk about your visit to the pharmacist with family and friends / you mob? What did you tell them? – Did you encourage them to see the pharmacist?
Changes	**Tell us about anything that has changed with your medicines since the pharmacist started in the health service?**
	– How did you feel about talking to the pharmacist about your medicines? – What information did the pharmacist give you about your medicines and your health? – After seeing the pharmacist has anything changed in the way you handle your medicines? – Can you take your medicines at the right time? – How do you feel about taking your medicines? Has this changed since you saw the pharmacist? – How likely are you to ask questions about your medicines? Who would you ask about your medicines? (? increase confidence) – How has seeing the pharmacist assisted you in taking care of your health? – Do you feel your health has changed since seeing the pharmacist? How? – Do you think the pharmacist is good for the community? (only if appropriate) why?
Collaboration with other providers	**Can you tell me about any times that the pharmacist talked to other health staff [eg. GP, renal doctor, diabetes educator] with you, or for you?**
	– Have you met with your health team to talk about your health care plan? How did this go? – Has anything changed with your usual community pharmacist? Eg. how often or why you see them [may not be relevant for S100 sites]
Resources	**Can you tell me about any flyers or written information the pharmacist gave you or that you saw in the clinic? (show poster/brochure)**
	– What did you think about these? – Did you understand them? Did you have any trouble?
Patient Survey (N-MARS)	**Can you remember the pharmacist asking you lots of questions (for the patient survey) about your medicines? How did you feel answering these questions?**
(show template)	– Could you understand the questions? – How much time did it take to answer them? (too long or too short)
Prescription history	**Can you tell me when you get a prescription from the doctor, how do you then get your medicines**? [S100 site: when the doctor wants you to start a new medicine, how do you get it?]
	– Do you get it from the ACCHS? Or from the community pharmacy? – Did the pharmacist in the clinic help you get your medicines? How? – How long does it usually take to fill your prescription when you get it (or get your new medicine)? *Explore any delays* – Where do you usually go for repeat prescriptions (or more medicines)? The GP at the ACCHS or another clinic? Why do you go there? – Do you ever ask your community pharmacy about your medicines?

Future	– How would you say the pharmacist was for 'you' if you had to give them a score out of 10? [effectiveness] – Would you like to keep seeing the pharmacist at the clinic? Why? [pos and neg] – How many days a week do you think the pharmacist should be at the clinic? – What things could the pharmacist do better or differently? – Is there anything else you would like to add?

Appendix H: Observation Framework

IPAC Project – Qualitative Evaluation
Site and Pharmacist Observation

Site:

Site Observation
Photographs, collection of relevant documents outlining the role of the Pharmacists or the Project

Items	Description of observations	Evidence Collected
Signs		
Posters		
Brochures / flyers		
Newsletters		
Information Briefs		
Other promotional materials eg. Pens		
Layout eg. Accessibility, appropriate spaces		
Location of community pharmacy (onsite?) (Pharmacy vs drug room important to establish)		
waiting room		
location of pharmacist room (usual room?)		
Use of CIS		

Practice Pharmacist
The researcher will "shadow" the Pharmacist for one day taking detailed field notes and recording observations of workflow and patient interactions. Things to look out for…

Activity within the 10 core roles:	Notes
1. Medication Management Reviews (HMR, non-HMR, follow-up) 2. Team-based collaboration 3. Medication adherence assessment & support 4. MAI audit, and AoU 5. Preventative health care 6. Drug Utilisation Review 7. Education and training 8. Medicines information service 9. Medicines stakeholder liaison 10. Transitional care	
Activity OUTSIDE the 10 core roles	
Relationships with staff (approachability, interactions)	
Communication with staff	
Relationships with patients (approachability, honesty, trust, power)	
Communication with patients	
Resources available vs Resources used with staff and patients (staff, CIS, brochures etc)	
Time needed for IPAC Project data capture (CIS, logbook)	

Appendix I: Letter of invitation to nominate for field/site visits

8th January 2019

Dear CEOs and IPAC site representatives,

The JCU Evaluation Team would like to invite ACCHSs that are participating in the IPAC project to nominate for involvement in the qualitative evaluation of the project. This will involve a visit to your service to interview and observe the activity of relevant staff working on the IPAC project. We will also be asking if we can interview patients. The information collected will help us to understand how the IPAC pharmacist is actually making a difference and what the community thinks of this new role.
We are inviting three (3) services in total, one in each jurisdiction (Queensland, Victoria and the Northern Territory), to be involved. The visits and data collection activities will be undertaken by Dr Robyn Preston, a qualitative researcher from JCU, who is experienced in health services research, with assistance from other qualitative researchers. The visits will take place in July and August 2019.
If your service would like to take part, we will ask for your help to recruit appropriate patients who would be willing to be part of a focus group or interview, and to assist them to attend. This will need to be coordinated prior to the visit. Some ACCHS staff will also be asked to participate in a focus group or interview.

How will services be selected?
We are keen to work with services that would like to be involved. As well as having one service from each jurisdiction, we also need to make sure that we have a service from each setting (urban, regional and remote) to obtain an understanding of how the pharmacist's role might vary in different locations.

What will happen during the visit to your service?
The qualitative researcher/s will be at your service for **3-4 days**. Activities will be undertaken with the IPAC pharmacist, site staff and patients.
This includes:

Participants	Data collection activity
IPAC Pharmacist	In-depth semi-structured interview, recorded (approx. 1 hour)
Observations of the IPAC Pharmacist	Non-participant observation of Pharmacist for one work day (Shadowing)
Patients (6-8 patients, purposively selected who have experience with IPAC Pharmacist)	Focus group discussion or individual interviews if preferred (recorded, approx. 45-60 minutes)
Individual Patient One (1) patient purposively selected having experience with IPAC Pharmacist	In-depth semi-structured interview (recorded, approx. 45-60 minutes)
Aboriginal Health Workers/Practitioners/GPs (6-8 staff members purposively selected for knowledge of role of the IPAC Pharmacist and patient journey)	Focus group discussion or individual interviews (recorded, approx. 45-60 minutes)
Observations at the Site by the Researchers	Photographs e.g. Posters, signs Collection of relevant documents, e.g. Flyers, newsletters

All information and data collected from participants will be de-identified and the names of participating services will not be disclosed in any public reports or presentations, unless prior permission has been granted. If you would like any further information, please email or give us a call. If you would like to nominate your organisation, please send an email to Dr Deb Smith, JCU Project Manager at: deb.smith@jcu.edu.au
Nominations close on Monday 4th February, 2019.

Appendix J: Site Recommendations Report

IPAC Project - Qualitative Evaluation
Site Recommendations Draft 13/02/2019

ACCHSs participating in the IPAC project were invited to nominate to be considered for a site visit as part of the qualitative evaluation of the project. Evaluation activities will be undertaken with the IPAC Pharmacist, staff members and patients as outlined in the invitation. The visits will take place over 3-4 days in July and August 2019.

Six (6) ACCHSs nominated to be involved in the qualitative evaluation: one each from the Northern Territory and Victoria, and four from Queensland. The table below lists the sites and selected details:

State	Organisation	S100 or QUMAX	Service reported active patients	FTE Allocated	ASGS-RA	MMM	Active Pts *	Recruited Patients GRHANITE 31/01/19	Recruited Patients Logbook 31/01/19
NT		QUMAX	13000	1.4	**RA3**	2	13,000	78	79
QLD		S100	7000	1.0	**RA4**	6	7,000	28	18
QLD		QUMAX	7000	1.2	RA3	2	7,000	200	205
QLD		QUMAX	4000	0.6	**RA2**	2	4,000	161	104
QLD		QUMAX	3600	0.4	RA3	5	3,600	44	43
VIC		QUMAX	2000	0.4	RA3	4	2000	8	8

Source: Doctor Connect (Australian Statistical Geography Standard-Remoteness Area (ASGS-RA), and also the Modified Monash Model (MMM). Active Patients data from NACCHO. Recruited patient's data from GRHANITE data extractions and Pharmacist Logbook.

Selection Criteria

The Qualitative Evaluation Team will work with services that would like to be involved and have nominated. We also need to make sure that we have a service from each setting (urban, regional and remote) to obtain an understanding of how the pharmacist's role might vary in different locations. The criteria used in site selection were:

1. Work with sites who have nominated
2. Geographical dispersion – must have remote and regional
3. Well performing site
    a. good patient recruitment
    b. high level of pharmacist activity
4. Pharmacist FTE

Recommended Sites

Based on the above criteria we recommend selection of the following ACCHSs:
Urban:
Regional:
Remote:

These services fulfil the above criteria. The site has been a well performing site and has a high number of patients and activity. It is the closest to an urban location (RA2) from those who nominated based on the AGSC-RA classification. This allows the acceptance of as a regional site (RA3) and a representative from the Northern Territory. is recommended as the only remote site who nominated (RA4). Both of these sites have acceptable patient numbers and pharmacist activity. We have not recommended the only Victorian site to nominate due to low patient numbers and pharmacist activity. Pharmacist FTE is adequate at the recommended sites to enable visits to be conducted in the timeframe outlined. The Qualitative Evaluation Team seek endorsement of the recommended sites from the PRG.

Appendix K: Site Visit Overview and Preparatory Tasks

IPAC Project – Qualitative Site Visit
Draft Information and Plans

Health Service
July – August 2019

Draft Schedule to be discussed

Tuesday	Meet briefly with site contacts Observation of IPAC Pharmacist for one work day (Shadowing) Photographs, collection of relevant documents
Wednesday	Interview with IPAC Pharmacist morning Focus Group discussion with 6-8 patients at lunchtime In-depth interview with 1 patient (afternoon)
Thursday	Focus Group discussion with 6-8 site staff (lunchtime) Any individual interviews with staff in morning/afternoon (if required)

Staff Focus Groups / Interviews

- Identification of relevant staff members based on selection criteria (see below)
- Invitation to participate, allow 1 hour, confirm verbal consent (CEO/Managers and GPs have the option of an online survey if they are unavailable during the visit)
- Schedule time and ensure staff are rostered to be available (refreshments will be provided by JCU)
- Formal consent will be done prior to participation (can be done by Site Contact/IPAC Pharmacist)

Criteria for staff selection (purposive sampling)

- 6-8 staff members of the service for focus group discussion (Aboriginal Health Workers, Clinical Staff, Practitioners, Managers)
- Include members of the primary care team
- Worked with or had regular contact with the pharmacist
- Employed at the clinic for the duration (or majority) of the project (and preferably prior to pharmacist commencement but not essential)
- Determine whether any staff members would prefer an individual interview (e.g. CEO);

Participant Focus Groups / Interviews

- Identification of appropriate patients based on selection criteria
- Invitation to participate, allow 1 hour, confirm verbal consent
- Schedule time
- Ensure participants are able to get to the ACCHS at the designated time ($20 gift card provided to participants to compensate them for their time and travel, plus refreshments by JCU – planning on obtaining platters from Coles/Woolworths)
- Formal consent will be done prior to participation (can be done prior by Site Contact/IPAC Pharmacist)

Criteria for participant selection (purposive sampling)

- Identify 6-8 consented participants (patients) for focus group discussion; and 1 for an in-depth interview
- Must be regular patients and have presented at the clinic at least 3 times in the past 2 years
- Seen the pharmacist on at least 1 occasion, preferably 2 occasions
- Has knowledge of the pharmacists' role

Further information to be provided by the ACCHS:

- Identify suitable dates for 3-4 day site visit in July/August
- Is permission required from Traditional Owners?
- Does the Service require any support (or attendance) from NACCHO or the Affiliates during the visit?
- Is there a private room we can use for focus groups and interviews (seat 8 people for focus groups)?
- Will any staff members prefer an individual interview?
- What is the best day/time for staff focus group/interviews?
- What is the best day/time for patient focus group/interviews?
- Does the ACCHS have a fridge and kettle we can use? We will bring tea bags/milk etc.
- Preference for patient compensation - vouchers from Woolworths Wish Group or Coles Myer Group?
- Will interpreters be needed (only for individual interview)?

Schedule of activities to be finalised 2 weeks prior to visit.

NET COST TO THE PBS OF MEDICATION CHANGES ARISING FROM THE IPAC INTERVENTION: METHOD USED TO ASSESS HEALTH SYSTEM COSTS FOR ECONOMIC ANALYSIS

Supplement to the Economic Evaluation for the IPAC Project

Report, December 2019.

Prepared by: Couzos S, Drovandi A, Hendrie D, Biros E. College of Medicine and Dentistry, James Cook University, on behalf of the IPAC Project Team.

Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project.

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INTRODUCTION

In this report we outline the method used to determine the net cost of changes to Pharmaceutical Benefits Scheme (PBS) medications for a subset of study participants during the follow-up period of the IPAC intervention (study period), in order to inform the economic evaluation. The net cost was calculated as the difference in the total cost of new medications prescribed from the cost of prior medications that were ceased over this period. These changes in patient medications were initiated following a medication review (medication appropriateness index, MAI, and an assessment of underutlisation, AoU). In this analysis, the costs assigned to medications pertain to the estimated cost of prescribed medications as sourced from MAI assessments.

METHOD

Participants:

Participants who were assessed for medication appropriateness with the MAI and for AoU were enrolled in the IPAC study and were a subset of all enrolled participants. Pharmacists selected patients who may best benefit from an assessment of their medications as per usual care consistent with a pragmatic trial. In a separate report, the characteristics of the MAI subset of participants did not meaningfully differ from the remaining IPAC participants based on a range of patient, demographic, and biomedical characteristics.[1]

Data on 353 study participants for whom an MAI and AoU assessment was completed at baseline and again at the end of the study was used to determine the net cost of changes in prescribed medications. The flow diagram for n=353 participants is included in a separate report.[2] The date of the first MAI was defined as the index date for measuring prescribing changes to medicines. The baseline MAI was completed within the first 100 days of participant enrolment for almost all participants. The date of the end of the study was set for the 31st October 2019. For each participant, the follow-up MAI was completed close to the study end date (mean time to repeat MAI was 268 days and mean time to the end of the study was 308 days).

Prescribed medications:

Pharmacists completed and reported the assessments in an electronic logbook. Pharmacists were required to name every medication that was currently prescribed for the participant in order to complete this assessment. To limit the reporting burden with logbook data entries, pharmacists were not required to list the dose, number, and frequency of prescribed medication doses. Moreover, electronic prescribing data was not used to source medication lists due to the high probability this data was inaccurate. By relying on pharmacist data entry at the time of a medication review, the medication list was validated by pharmacists who had access to the participants electronic health records, as well as access to prescribers to clarify any uncertainty about medications. The pragmatic approach to data collection therefore necessitated the adoption of a method to assign a 'standard dose' per medication to enable this analysis.

Assigning medication cost:

We estimated the cost of 'new medications started' and the estimated cost-saving from 'old medications stopped' for every MAI-assessed participant. This was able to be determined by comparing medication lists from the baseline MAI assessment with the end of study MAI for each participant.

The study could inform on the number and type of 'new medication started' or 'old medication stopped', but not the dosage of medication, clinical indication, nor the date when the medication

change occurred. An assumption was made that the medication change was instigated from the date of the baseline MAI and continued until the end of the study (31st October 2019).

Using best practice prescribing recommendations contained within the Australian Medicines Handbook, a standard medication dosage for each prescribed drug was assigned by a pharmacist. Where prescribing recommendations were unclear, advice was also sourced from a clinician and hospital pharmacist to derive a conservative 'standard dosage' that was neither the maximum nor minimum dosage for the main clinical indication of each medication. The time between the baseline MAI assessment and the end of the study was reported as 'days' for each participant.

Medications were categorised as continuous-use, single- expense, or privatively purchased (designated 'private'). A private prescription referred to a medication that was not on the PBS and could also be continuous-use or single-expense but would result in out-of-pocket expenses for the participant. These three categories were used to ensure that medication costs were not incorrectly assigned to the PBS, and that the duration was not expanded to encompass the whole of the intervention period if the medication was likely to be used only for acute problems or within 30 days. For example, all antibiotics were assigned to the 'single-expense' category even if the antibiotic was potentially used for the treatment of tuberculosis or recurrent urinary tract infection. This provided a conservative estimate of health system costs related to changes in prescribed medicines.

The cost of each medication change was derived using the 'dispensed price per maximum quantity' (DPMQ) for each medicine as reported for the PBS. The DPMQ "is the price for dispensing the maximum quantity of a product under a given prescribing rule and incorporates the price ex-manufacturer, all fees, mark-ups and patient contributions." The maximum quantity of a product is listed on the PBS for each medication and equates to the maximum number of units of the pharmaceutical item that may, in one prescription, be permitted to be prescribed and supplied on any one occasion.[3 4]

At the standard dosage defined for each medication, and using the PBS defined maximum quantity of the medication that can be dispensed plus the DPMQ, the cost of each medication could be derived. Each medication that was categorised as continuous was assumed to be taken continuously for the whole study period. We also assumed complete participant adherence over this period.

Analysis:

A list of all started and stopped medicines from each participant was used to generate a master-list of unique medications and each was assigned a standard dosage.

If the medication was listed on the PBS, the unique drug code, maximum quantity, and DPMQ (as specified by the PBS) was recorded on the master-list. For non-PBS medicines (private), a DPMQ was assigned based on commercial prices publicly available.

Using the standard drug dosage, the DPMQ for a period of 30 days (DPMQ30) was able to be derived from the DMPQ for each medication. The DPMQ30 cost was assigned to every medication that was to be used continuously per participant. The formula used for the DPMQ30 was:

$$\text{DPMQ30 (\$)} = \frac{30 \times \text{DPMQ (\$)} \times \text{assigned standard number of units per day}}{\text{maximum quantity of units (number)}}$$

For most single-expense medications (e.g. antibiotics), the DPMQ was used rather than the DPMQ30. In addition, the maximum quantity for most single-expense medications either lasted for one month (e.g. promethazine) or could be continued for at least one month (e.g. antifungal creams). In these instances, the DPMQ was the same as the DPMQ30. If the supplied maximum quantity of the medicine exceeded 30 days, the DPMQ30 was derived and used to adjust the cost downwards (e.g. varenicline).

Some single-expense medicines were deemed to be required for at least one month and the DPMQ30 was then assigned (e.g. liquid antacids, steroids, prophylactic colchicine, certain benzodiazepines).

The total cost for medications used continuously for the duration of the follow-up period was summated. The formula used to determine the total cost of medicines used continuously was:

$$\text{Total medication cost} = \frac{\text{number of follow-up days per participant X DPMQ30}}{30}$$

Private script medication costs were separated from the single-expense and continuous-use medication costs to avoid double counting.

The total medication cost, the cost of medications sourced from non-PBS (private) sources, and the cost of single-expense items was summated for both started and stopped medications. This provided an estimate of the total cost of changes made to prescription medications over the study period. The total cost of all the medications ceased were subtracted from the total cost of all the medications that were started, in order to determine the net cost of these changes. The net total estimated cost of medications to the PBS over the study period was then annualised.

No costs were assigned for participants for whom medications did not change during the follow-up period. The denominator for the cost per participant was the total MAI and AoU participant subset.

RESULTS

All new medications started, and medications stopped were assigned standard dosages and the DPMQ30 was estimated for each medication to determine medication costs over 30 days. Examples of the assigned standard dosages to determine medication costs is shown in Table 1.

A total of 1,151 medications were newly started in 300 (85.0%) participants (Table 2). A total of 1,004 medications were stopped in 304 (86.1%) participants. The mean study period for all participants in this analysis from baseline MAI to the end of the study was 308 days.

For the purposes of this study, if the medication was deemed to be for continuous use, a new medication was assumed to have been started after the baseline MAI, and to have continued until the end of the study for each participant. It was similarly assumed that if a medication was ceased, this occurred after the baseline MAI and remained ceased until the end of the study.

For both newly started and ceased medications, these prescribing changes applied to a total of 245 unique individual PBS medications for continuous use, 52 unique PBS single-expense medications, and 24 unique medications that were not on the PBS (where 5 were categorised as a single expense).

Table 1. Examples of standard medication dosages applied to selected medications

Medication name	PBS drug code	Strength	Standard dose (number of daily units)	Maximum quantity units (PBS)	DPMQ (PBS) ($)	DPMQ30 ($)
PBS continuous use medication						
Amlodipine	2752W	10mg	1	30	13.06	13.06
Frusemide	2412Y	40mg	2	100	13.16	7.90
Glibenclamide	2939Q	5mg	4	100	15.80	18.96
Metoprolol	1325R	100mg	2	60	13.91	13.91
PBS single-expense medication						
Clotrimazole (cream)	4004R	1%		20g	13.24	13.24
Flucloxacillin	1527J	500mg	4	24	20.17	20.17
Private prescription medication						
Nicotinamide	NA	250mg	3	100	26.39	23.75
Lorazepam	NA	1mg	2	50	23.99	28.79

NA: not available; PBS: Pharmaceutical Benefits Scheme; DPMQ: Dispensed price per maximum quantity; DPMQ30: DPMQ for 30 days' supply.

The estimated total cost to the PBS of newly started continuous-use medications from the MAI subset of 353 participants was $503,316, whilst the similarly derived estimated cost-saving from ceased continuous-use medications was $371,054 (Table 2). The estimated net increase in the cost of continuous-use PBS medications during the period of the study was $132,262. The outcome of the prescription change following baseline medication review was an estimated net increased cost of approximately $375 per person for continuous-use medications over the study period.

The estimated total cost to the PBS of newly started single-expense medications was $4,208 whilst the similarly derived cost-saving from ceased single-expense medications was $3,264 (Table 2). This is a net increase in the cost of single-expense medications during the period of the study of $944, or approximately $2.70 per person.

There was also an estimated net increase in participant out-of-pocket (non-PBS) costs attributed to medications of $4,665 (Table 2). This equates to approximately $13 per person for the whole study follow-up period. Most of these costs were for: dietary supplements such as iron, nicotinamide, and multivitamins; antacids; antihistamines; and medications that were not available on the PBS such as lorazepam (antianxiety), agomelatine (antidepressant), and bumetanide (loop diuretic).

An estimated total net cost to the PBS of medication change of +$133,206 over the study period, equates to $157,858 when annualised from 353 participants ($447 per participant).

Table 2: Cost of new medications started and medications that were stopped following medication review (Medication Appropriateness Index, MAI) in 353 participants. Data pertains to MAI and AoU participant subset with paired data (N=353) for a mean follow-up period of 308 days.#

	Number of participants with medication changes (N, %)	Total number of prescribed medications (N)	Range in number of prescribed medications per patient	Total cost of all continuous-use PBS medications * ($)	Total cost of non-PBS medications (private scripts)** ($)	Total cost of single-expense PBS medications *** ($)	Total PBS cost ($)
Medications started	300 (85.0%)	1,151	1-21	$503,316	$9,805	$4,208	$507,524
Medications stopped	304 (86.1%)	1,004	1-13	$371,054	$5,140	$3,264	$374,318
Net Total PBS cost ($)				+$132,262			+$133,206
Net Total non-PBS cost ($)					+$4,665		
Net Total PBS single-expense cost ($)						+$944	

PBS: Pharmaceutical Benefits Scheme

Pertains to the period from the baseline MAI until the end of the study (31st October 2019).

*Based on an applied standard dose for continuous-use medications. Dispensing is assumed to continue or cease for the whole follow-up period.

**These costs are borne by either the patient or the health service.

***These PBS costs are not continuous and were assumed to represent a single expense during the follow-up period.

DISCUSSION

We estimated that the IPAC intervention increased PBS medication use by a net $157,858 per annum for 353 participants. Medication use increased because medication review led to prior medications being replaced by alternative and more appropriate medications.[5] This net figure excludes the costs of changes to medications that were not listed on the PBS. If this cost increase is extrapolated to the complete IPAC cohort of 1,456 participants, the estimated total net cost to the PBS of medication changes per annum would be $651,108. In a separate analysis, the characteristics of the MAI subset of participants did not clinically meaningfully differ from other IPAC participants,[6] which supports the generalisability of these findings more broadly.

According to the IPAC project theory of change,[7] these increased costs are attributed to the influence of the intervention on prescriber behaviour. During the intervention period, pharmacists were integrated in health service teams with prescribers and other health service staff. Pharmacists participated in the completion of medication reviews for prescribers, participant assessment of medication adherence, the provision of education and training and medicines information, team-based collaborations such as care plans and case conferences, supported participant transitions of care for medicines reconciliation, and communication with community pharmacy.[8]

These activities were conducted across 22 health service sites (18 ACCHSs) and involved the whole IPAC cohort. In a separate analysis involving this MAI subset of participants, we showed that the intervention significantly reduced the mean MAI scores per participant (p=0.003); the mean MAI score per individual medication (p=0.004); the proportion of participants receiving medications rated as inappropriate (p<0.001); and the proportion of medications with the following prescribing risks: incorrect dosage, impractical directions, unacceptable therapy duration, drug-disease interactions; and unnecessary medications due to absent clinical indications, or lack of clinical effectiveness (all p <0.05). There was also a 34.3% relative reduction in the number of participants with medications meeting ≥ 1 medication overuse criteria. These significant changes to the quality use of medicines occurred between the baseline MAI and the repeat MAI that was completed at the end of the study – a median period of 270 (IQR 218-316) days between assessments.

In this analysis, we assumed that the medication changes continued until the end of the study for the duration that each participant was involved in the study. Together with the other cost assumptions, we are likely to have overestimated the cost of medication changes arising from the IPAC intervention.

For the Aboriginal and Torres Strait Islander population, an increased health system cost following improvements to medication appropriateness (and broader intervention impacts) is not an unexpected finding. In Australia, Aboriginal peoples and Torres Strait Islanders are five times more likely to die from chronic disease before the age of 75 years (premature mortality) than other Australians (2011-15).[9] Yet, despite their higher burden of disease, medicines underutilisation is significant. The Indigenous Australians per person expenditure for medicines through the PBS has been a fraction (33% in 2013-14) of the expenditure for non-Indigenous Australians.[10] The per-person PBS (benefit-paid) expenditure for Indigenous Australians in 2013-14 was $182.50 compared with $439.30 for non-Indigenous Australians but these figures are not disaggregated by age or chronic disease. If they were, we would expect higher per capita costs for both Indigenous and non-Indigenous Australians, but the gap in expenditure would remain. We reported an estimated net increase of $447 per person per annum following improved prescribing arising from the integrated pharmacist intervention within ACCHSs, which in effect means superior health care service utilization (towards equity) by Aboriginal and Torres Strait Islander patients with chronic disease when compared to usual care.

Limitations:

This analysis focussed on the potential health system cost of dispensing the medications prescribed for this subset of IPAC participants. The cost of medications that were actually dispensed during the study period was not able to be directly ascertained as dispensing data was not collected for this study.

Consequently, assumptions were applied when estimating the cost of changes to prescription medicines. A conservative approach was taken. It is likely that each of the following assumptions had the effect of overestimating the cost of medication changes during the study period. Costs were assigned to continuous-use medicines (at a standard dosage) for: a) the whole study period; b) assumed complete participant adherence over this time; and c) assumed that prescribing changes occurred immediately following the date of the baseline medication review.

Given that there are delays in patients filling prescriptions from community pharmacy, and a usual non-adherence rate of at least 30% for Aboriginal peoples and Torres Strait Islanders,[11] the actual cost of medications dispensed for the whole follow-up period would most likely have been less than what was assumed. The same assumptions were applied to ceased medications to offset the cost of newly started medications. This may have overestimated the costs saved, as medications may not have been ceased immediately after the baseline MAI. The net effect of these competing assumptions would favour an overestimation of medication costs as it is easier to cease a medication than to take it.

The costs of single-expense medications may also have been overestimated by extending the cost period to 30 days for some items according to the defined standard dosages, but this applied to only a few medications. An assumption was made that these single-expense items were not prescribed at repeated intervals during the study and this may have had the effect of underestimating the costs of these type of medications. In this case, the net effect is a more balanced set of assumptions.

The PBS patient co-payment did not factor into any of the medication cost estimates as most participants were concessional and the co-payment for Aboriginal peoples and Torres Strait Islanders in this situation is waived. In addition, some participants were from remote locations sourcing their medications directly from the ACCHS under the section 100 (of the National Health Act, 1953) scheme that also waives a co-payment. The few remaining participants not in either of these situations may have paid a reduced co-payment of $6.90 (2019 prices) per medication dispensed. If the patient contribution was able to be factored into these estimates, the direction of the net effect on patient 'out of pocket' expenses arising from the medication changes is unclear given that new medications were started as well as ceased.

These assumptions provide a conservative estimate of the costs of medication changes that may be attributed to the pharmacist intervention.

Conclusion:

Integrating pharmacists into Aboriginal community-controlled health services led to medication changes in a subset of IPAC participants who received a prescription quality review for appropriateness and an assessment for medication underutilisation. The estimated annual total net cost to the PBS of these medication changes was +$133,206 in 353 participants ($447 per participant per annum).

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INTEGRATED PHARMACISTS WITHIN ACCHSs: SUPPORT FOR PRACTICE-BASED ACTIVITIES

REPORT TO THE PHARMACEUTICAL SOCIETY OF AUSTRALIA FOR THE IPAC PROJECT

Final Report, April 2020.

Prepared by: Smith D, Couzos S, Biros E. College of Medicine and Dentistry, James Cook University, on behalf of the IPAC Project Team.

Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project.

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Abstract

Objective

To measure and describe the practice-based activities of pharmacists integrated within Aboriginal Community Controlled Services (ACCHSs). Integrated pharmacists delivered ten core clinical, non-dispensing roles targeting Aboriginal and Torres Strait Islander adult patients with chronic disease, health care staff and systems support (the IPAC project).

Design and participants

Eighteen ACCHSs across multiple sites in Queensland, Northern Territory and Victoria participated in a non-randomised, prospective, pre and post quasi-experimental community-based, and pragmatic study that integrated registered non-dispensing pharmacists within ACCHSs. Pharmacists delivered the ten core roles including medication management reviews, assessments of appropriateness and adherence, education and preventive health advice, participated in team-based collaborations and stakeholder liaison, conducted drug utilisation reviews and supported transitional care. Activity data was entered into a bespoke electronic pharmacist logbook to record core activities related to participants, healthcare providers, and health service systems. De-identified patient-related data was entered only for IPAC consented participants. The logbook had dual functionality for data entry and reporting. Raw activity data was downloaded from the logbook into Microsoft Excel and analysed using pivot tables with content analysis of free text questions to categorise and count responses.

Results

Twenty-six integrated pharmacists provided an aggregated 12.3 full-time equivalent (FTE) services in 18 ACCHSs, for up to 15 months, from the 2nd August 2018 to 31st October 2019. Patient-related activity included at least two self-reported patient medication adherence response surveys (N-MARS) for 1,127 participants, paired Medication Appropriateness Index (MAI) audits for 357 participants, and paired Assessments of Underutilisation (AoUs) for 353 MAI participants. A total of 639 Home Medicines Reviews (HMRs), 757 other comprehensive medication management reviews (non-HMRs), and 1,548 follow-up assessments to either a HMR or non-HMR, were also conducted. Activities provided for healthcare providers or systems-related work included provision of medicines information on 1,715 occasions, 358 occasions of formal education and training services, 47 completed stakeholder liaison plans, 3,233 contacts with community pharmacists, 1,901 occasions of transitional care services, and 26 drug utilisation reviews. Approximately 62.5% of the integrated pharmacists' time recorded in the logbook was spent on patient-related activities. .

Conclusion

Integrated pharmacists delivered the ten core roles as defined in the IPAC project exhibiting a high level of activity as documented in the logbook. Extensive collaboration and communication with other healthcare providers was evident through team-based collaboration, transitional care for participants, the development and implementation of stakeholder liaison plans and extensive contact with community pharmacy. Integrated pharmacists were pivotal as a point of contact for stakeholders involved in medicines-related care such as community pharmacists, and staff in local hospitals, rehabilitation and dialysis units. Pharmacists also provided medicines-related information, education and advice. Drug utilisation reviews and medication management reviews facilitated improvements in prescribing quality and other supports for participants. Analysis of these activities in the IPAC project provided evidence that delivery of non-dispensing pharmacist services was feasible within ACCHS settings, and contributed to the integration between the pharmacist and other health care staff, as well as enhancing communication and collaboration with community pharmacy

and other stakeholders. These findings are generalizable to other Aboriginal Health Services in urban, regional and remote settings.

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Introduction

The integration of pharmacists within healthcare teams has been found to enhance quality prescribing,[1 2] biomedical outcomes,[3] and to reduce hospitalisation.[4 5] Pharmacists are increasingly becoming integrated into general practices internationally and in Australia.[6 7] There is evidence that the delivery of multifaceted interventions and interprofessional collaboration through face-to-face communication is most effective.[8],[9] A recent study undertaken in Australia found the role of practice pharmacists (defined as those integrated within mainstream general practices), included undertaking Home Medicines Reviews (HMRs) and medication reconciliation, providing medicines information, patient counselling, monitoring medication adherence, and providing advice on complementary and alternative medicines. In addition, education for staff and patients was provided, as well as medication use evaluations (internal audits of prescribing patterns of specific medications), support for clinical audits and the transition of patients from hospital back into the community, and the supply of medication only in remote Aboriginal Health services.[10] The study found that medication reviews conducted by the practice pharmacists were highly valued and led to better outcomes in relation to addressing inappropriate prescribing and patient adherence. Other studies have also reported that pharmacists in general practices conduct a variety of clinical and non-clinical roles related to medicines.[11 12]

Whilst co-location of pharmacists within general practice has enabled greater communication, collaboration and relationship building among healthcare providers,[13 14 15 16] there is little evidence that this intervention has been appropriately evaluated in Aboriginal health settings before. Other studies have shown there is an association between the degree of integration and benefits for patient-specific pharmacist services (for patients with co-morbidity). This is consistent with evidence that shows that collaborative care optimises the management of patients with chronic disease as in the 'chronic disease care model'.[17 18] Collaborative and holistic care is also a hallmark of the Aboriginal community controlled health service (ACCHS) model of care.[19]

The *Integrating Pharmacists within ACCHSs to improve Chronic Disease Management* (IPAC) Project was developed in partnership between the National Aboriginal Community Controlled Health Organisation (NACCHO), the Pharmaceutical Society of Australia (PSA) and the James Cook University (JCU) School of Medicine and Dentistry. It commenced in 2018 and explored if the integration of a non-dispensing pharmacist within ACCHSs led to improvements in the quality of the care received by Aboriginal and Torres Strait Islander adults with chronic diseases. It was anticipated that pharmacists integrated within these settings would facilitate increased access to medication-related expertise and assessments, which when coupled with increased engagement with participants, staff and other stakeholders, would result in improved services and quality use of medicines as outlined in the proposed the theory of change for the IPAC Project (Appendix A).

This descriptive analysis reports on the range of activities undertaken by integrated pharmacists that primarily targeted healthcare providers and primary healthcare service systems during the IPAC project.

Methods

Study setting and Intervention

The IPAC project was a community-based, participatory, pragmatic, non-randomised, prospective, pre and post quasi-experimental study implemented in three jurisdictions: Victoria, Queensland and the Northern Territory (Trial Registration Number and Register: ACTRN12618002002268). Registered non-dispensing pharmacists were integrated within the primary health care (PHC) teams of 18 ACCHSs for up to a 15-month period with data collected between 2nd August 2018 and 31st October 2019. The integrated pharmacists delivered ten core roles through a coordinated, collaborative and integrated approach to improve the quality of care of adult participants with chronic diseases or at high risk of developing medication-related problems (e.g. polypharmacy).

Activities targeting patients included the assessment of medication management through medication management reviews (including HMRs and comprehensive reviews that did not fulfil all HMR program criteria that were designated as non-HMRs), medication adherence and appropriateness, medication-related problems, improving participants' medication knowledge and giving preventive health advice. Pharmacists at each ACCHS undertook an audit of medication appropriateness and an assessment of underutilisation, for a sample of participants at the rate of 30 participants per one full time equivalent (FTE) pro rata. Pharmacists also delivered participants with education and preventive health activities.

Activities targeting healthcare providers and systems included conducting education sessions, responding to medication-related queries, reviewing prescribing and mentoring new prescribers, participating in case conferences, undertaking drug utilisation reviews, and liaising with community pharmacies and other stakeholders to ensure continuity of care and transitional care that supported participants discharged from hospital. The Logic Model for the Evaluation outlines the roles and the expected outputs and outcomes from each role (see Appendix B).

In the initial months of the project, the integrated pharmacists focussed on establishing and building relationships, integrating into the primary health care team, and recruiting participants. During this time, pharmacists also conducted medication management reviews and baseline assessments of medication appropriateness and adherence. The remainder of the intervention period focused on participant follow-up and practice-based activities. Pharmacists received support from ACCHSs and staff, in particular Aboriginal

Health Workers. They had access to clinical information systems and consulting rooms within the clinic, and their role was promoted to clients of the ACCHS. [20]

A full description of the intervention, recruitment and induction for pharmacists and ACCHSs, and participant consent processes are described elsewhere.[21] The evaluation of patient-related assessments including medication appropriate index audits, [22] assessments of medication underutilisation,[23] medication reviews, [24] and self-reported patient adherence[25] have been reported elsewhere.

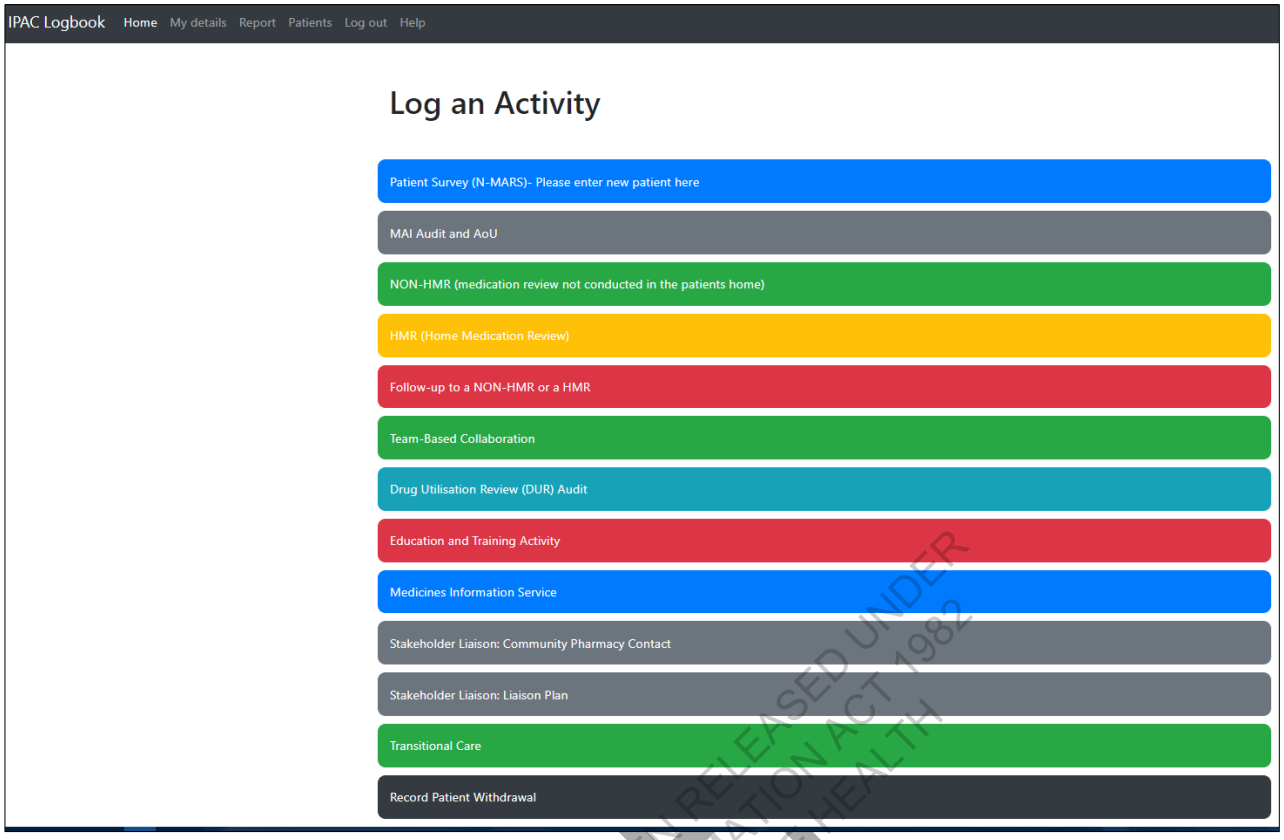
IPAC Pharmacist training

The PSA recruited 26 registered pharmacists to work within the participating ACCHSs. Pharmacists were employed at a minimum of 0.2 full -time equivalent (FTE) up to full time (1.0 FTE) and participated in an induction program that included cultural safety training prior to commencing in the ACCHSs. The majority of pharmacists participated in a two-day program in a centralised location covering the project objectives, cultural safety, the ten core roles, teamwork processes, and data recording requirements for the evaluation.[26] The program was supplemented by online learning modules. Pharmacists who commenced later in the project participated in individualised programs addressing the same topics. Ongoing support was provided for the pharmacists by the PSA Project Coordinators throughout the intervention period.[27]

Pharmacist Logbook

The integrated pharmacists recorded data on all ten core roles in a bespoke electronic pharmacist logbook. The logbook was a password protected, electronic database, accessible from any internet-connected device. It was designed specifically for the project and had dual functionality for data entry and reporting. Each core role had its own 'questionnaire' in the logbook to record all required data for that specific activity. An additional questionnaire recorded details of participants withdrawn from the study. Figure 1 depicts the logbook home page which simply provides the menu of questionnaires for each core role.The logbook design was optimised to make data collection and entry useful and efficient. The use of 'select-from' lists and multiple choice questions was maximised were possible and free text fields only used where necessary. As part of certain core role questionnaires, pharmacists were able to upload a PDF document to support their activity entry.

Figure 1. Pharmacist logbook home page.



Logbook system administration was managed by a JCU administrator and data custodian. Security was paramount and all users of the logbook had to be approved by the administrator, who could manage the creation and deactivation of accounts. Pharmacists were only able to access the system when the PSA had advised JCU of their commencement and details. Individual accounts were set up and pharmacists set their own password to ensure security and integrity of the system. Using a permissions-based hierarchy meant that each pharmacist could only see their own data, whereas administrators were able to run overall data reports and view the activity of each pharmacist.

The JCU administrator, with the permission and support of the logbook software developer, created a guidebook with step by step instructions and screenshots for pharmacists to help them navigate the system. Pharmacists were expected to enter data on their activity by the end of each IPAC project working day.

Raw data was downloaded from the logbook into Microsoft Excel. Descriptive data analysis was undertaken using pivot tables. A simple content analysis and counting responses categorized into themes was conducted for free text questions. To facilitate the monitoring of pharmacist activity, the JCU Team analysed high level quantitative logbook data and provided monthly reports to the project operational team on the pharmacists' levels of activity for each of the 10 core roles, including selected project targets, during the implementation phase and for the duration of the project.

GRHANITE™ data

In order to supplement information on pharmacists' team-based care activities from the logbook, certain MBS claims data extracted from health services clinical information systems was also examined. The MBS items relevant to team-based care that were examined included: 715 (Aboriginal and Torres Strait Islander health assessment); 721 (chronic disease care plan); combined 721, 723 and 732 (chronic disease care plan, team care arrangements (TCA), and review of a care plan or TCA) respectively; combined 735, 739, 743 (organizing and coordinating a case conference); combined 747, 750, 758 (participation in a case conference; and 10987, 10997 (follow-up service to item 715 and 721 that includes a medication adherence check undertaken by a practice nurse or an Aboriginal and Torres Strait Islander health practitioner). MBS items were combined as indicated due to relatively low numbers of claims for these services based on national claims data.[28]

Deidentified MBS utilization indices were extracted from CISs using an electronic tool called GRHANITE™ that required remote installation and regular extraction from IPAC sites for the term of the project.[29] GRHANITE extracted data and copied it to a JCU databank employing internationally recognised point-to-point encryption (P2PE) mechanisms to protect data in transit. MBS claims data was extracted from the JCU SQL Server database using the Navicat 15 for SQL Server (PremiumSoft) database management tool, whilst HMR, non-HMR and MRP data was extracted from the pharmacist logbook as Microsoft Excel files, and subsequently analysed using a number of statistical tools including the SPSS Statistics Premium version 24 (IBM) statistical package, Stata/MP 13.0 (StataCorp LP), and Microsoft Office 2016 (Microsoft). Nominal variables are presented as absolute and relative frequencies. Depending on their distribution, continuous variables are presented as mean and standard deviation (SD) or median and inter-quartile range (IQR), as indicated accordingly. The event rates of MBS item claims were calculated for pre and post intervention as the number of participants with claims (or the number of claims) per 100 person-years of observation. The study design of IPAC involved cluster sampling using ACCHSs as the primary sampling units. As a consequence, statistical analyses were cluster-adjusted for the design effect of ACCHSs. P-values for comparisons between baseline and end of the study for changes in nominal variables (paired data) were determined using conditional logistic regression analyses that were cluster-adjusted for ACCHSs. P-values for changes in numerical variables for participants (paired data) were derived from the cluster-adjusted confidence interval (ACCHS cluster) of the differences as this is equivalent to a paired t-test. Statistical significance was assumed at the conventional 5% level.

The number of MBS claims in the 12 months prior to participant enrolment was defined as 'baseline', whilst the number of claims from enrolment until the end of the study (31st October 2019) was defined as the intervention period or follow-up period.

Core roles targeting healthcare providers and health service systems

Team-Based Collaboration

The pharmacists were integrated within the ACCHS model of care as a member of the PHC team to improve the chronic disease management of participants. Integration meant that pharmacists had identified positions and core roles, shared access to clinical information systems, provided continuous clinical care to participants, received administrative and other supports from primary health care staff, and adhered to the governance, cultural, and clinical protocols within ACCHSs as part of their shared vision. Pharmacists' recorded details of their involvement in team-based care activities in an electronic logbook, such as the type of team member or stakeholder were involved in the collaborative activity, the duration of the activity and whether or not it involved an IPAC consented participant.

Medicines Information Service

Integrated pharmacists' provided medicines-related information to clinicians and other staff within the ACCHSs including responding to Pharmaceutical Benefits Scheme (PBS) queries, information requests regarding dose titration, interactions, new and emerging drugs, drugs in stock and ad-hoc medicine queries. Data recorded in the logbook included the recipient of the information, how the request was received, the type of information provided and the clinical reference, and the time taken to complete the service. Evidence of an outcome was recorded in situations where the pharmacist was aware that the GP or other clinician had made a change to the participants therapy based upon their advice or recommendations.

Education and Training

Medication-related education sessions were provided by the integrated pharmacists for both participants and healthcare providers. The pharmacists also participated in preventive health promotion and community events. Details recorded in the logbook included the type of activity, the format in which it was provided, duration and examples of materials or resources which could be uploaded. During their training, pharmacists were encouraged to consider the health literacy of recipients, use culturally appropriate resources and co-design training with other staff members to ensure relevance.

Stakeholder Liaison Plans

A written stakeholder liaison plan aimed to support the development of relationships and networks between the ACCHS and community pharmacies, and other relevant service providers (such as local hospitals or aged care facilities) in order to facilitate communication and collaboration. It was anticipated that enhancement of communication processes with stakeholders would continue to have benefit and relevance to the ACCHSs even after completion of the project. Pharmacists were expected to develop one written plan for communication between their ACCHS and each local community pharmacy/ies, and any other relevant stakeholders. Data collected in the logbook included the identification of staff involved in the co-design of

the plan, the key stakeholders, whether the plan had approval of the ACCHS CEO and the time take to develop the plan. A template was provided for the plan and when completed was uploaded into the logbook (see Appendix C). Pharmacists were also able to note or upload documentation providing evidence of any outcomes.

Contacts with Community Pharmacy

In addition to the development of the stakeholder liaison plans, integrated pharmacists recorded details of interactions with community pharmacy in the logbook including the reason for contact, whether contact was initiated by the IPAC or community pharmacist, and the method of contact used.

Transitional Care

The transitional care core role aimed to optimize medication management for participants across the continuum of care, by relaying relevant information and improving the communication of discharge summaries for medicines reconciliation. Integrated pharmacists reported details of each occasion of transitional care in which they participated including the agency they engaged with, the reason and mode of contact, and the duration of the activity.

Drug Utilisation Reviews

Integrated pharmacists also completed one or more drug utilisation reviews (DUR) at their respective ACCHSs. The World Health Organisation defines a drug utilisation review (or drug utilisation evaluation) as 'a system of ongoing, systematic, criteria-based evaluation of drug use that will help ensure that medicines are used appropriately'.[30] DURs are a comprehensive and cyclical process of review, evaluation, and intervention that play a key role in influencing and improving prescribing, and the quality use of medicines. Pharmacist training on DURs required reviews to be based on a priority issue nominated by the ACCHS. Best practice evidence or guidelines were to be used to support the DUR and a template was provided to pharmacists to assist the reporting process (Appendix D). Pharmacists uploaded the DUR report into the logbook, in addition to providing details about the initiator of the review, duration, and measures used to assess progress with this quality assurance activity within the ACCHS.

Ethics approval

Ethics approval for the project was received from four ethics committees in the three jurisdictions including St Vincent's Hospital Melbourne (SVHM) Human Research Ethics Committee (HREC), Victoria (HREC/17/SVHM/280), James Cook University HREC (mutual recognition of SVHM HREC, approval HREC/H7348), Menzies School of Health Research (HREC/2018-3072) and the Central Australian HREC (HREC/CA-18-3085).

Results

Activity data was recorded in the pharmacist logbook for all ten core roles from the commencement of the first pharmacist in their respective ACCHS on 2nd August 2018 to the data close-off date of 31st October 2019. Activities were conducted by the integrated pharmacists who worked at the aggregated rate of 12.3 FTE, across 18 ACCHSs for the duration of the intervention.[31]

Pharmacists in the IPAC project recruited a total of 1,733 patients of which 1,456 had pre and post data and were included for analysis. Patient-related activity conducted by the pharmacists included a total of 789 through MAI audits and AoUs and 2,759 patient surveys (N-MARS) including baseline and end-point assessments (Table 1). A total of 639 HMRs, 757 non-HMRs, and 1,548 follow-up assessments to either a HMR or non-HMR were conducted with participants. Some participants received more than one medication management review and/or follow-up assessment. Analysis of these patient-related assessments and activities are reported elsewhere.[32] [33] [34] [35]

With regard to activities that targeted healthcare providers and primary healthcare service systems, medicines information was provided to staff on 1,715 occasions, 358 education sessions were delivered to staff and participants, and 26 drug utilisation reviews and 47 stakeholder liaison plans were completed. During the project period, a total of 3,233 contacts with community pharmacists were recorded, along with 1,901 occasions of transitional care and 3,165 team-based collaboration activities (Table 1).

Table 1: Overview of pharmacist activity recorded in the logbook between 02/08/2018 and 31/10/2019.

Pharmacist Core Role	Number of activities
Self-reported medication adherence survey (N-MARS) *	2,759
Medication Appropriateness Index (MAI) Audits / Assessment of Underutilisation *	789
Home Medicines Reviews (HMRs) *	639
Non-HMRs *	757
Follow-up to a HMR or Non-HMR *	1,548
Team Based Collaboration (1,082 related to IPAC participants)	3,165
Medicines Information	1,715
Education & Training	358
Drug Utilisation Reviews	26
Stakeholder Liaison Plans	47
Stakeholder Liaison – Community Pharmacy Contact	3,233
Transitional Care	1,901

Source: Logbook
* See separate reports for further details.
N-MARS = NACCHO Medication Adherence Readiness Scale; HMR = Home medicines review

Team-Based Collaboration

Integrated pharmacists participated in a total of 3,165 team-based collaboration activities (Table 2). General practitioners (GPs) were involved in 63.6% (n=2,013) of these activities together with pharmacists. Registered nurses were involved in 44.4% (n=1,406) of these activities, Aboriginal Health Workers in 33.9% (n=1,072) and 20.5% (n=649) involved other pharmacists. 'Others' involved in team-based activities were most commonly staff such as wellbeing workers, diabetes educators, care coordinators, clinic managers and administration staff.

The total time taken for all 3,165 team-based collaboration activities was 115,500 minutes or 1,925 hours. The median duration of each team-based activity was reported to be 30 minutes (range 15 minutes to 180 minutes).

Table 2: The number of integrated pharmacists' team-based activities, and the types of staff or external agencies involved.

Team members role	Number of team-based activities that involved this staff member (n=3,165) * N (%)
General Practitioners	2,013 (63.6%)
Registered Nurses	1,406 (44.4%)
Aboriginal Health Worker	1,072 (33.9%)
Other pharmacists	649 (20.5%)
Others***	398 (12.6%)
Allied Health Staff	566 (17.9%)
Community Agencies**	213 (6.7%)
Community Member	205 (6.5%)
Specialists	130 (4.1%)
Chief Executive Officers	114 (3.6%)

Source: Logbook

* Activities involved multiple team members, and individual activities by role exceeds the total number of activities reported.

** Examples of community agencies included hospital admissions risk program, Mission Australia, disability services, community housing, probation officers etc.

*** 'Other' participants included other health services staff such as well-being workers, diabetes educators, care coordinators, clinic managers and administrative staff.

Of the 3,165 team-based collaboration activities, 34.2% (n=1,082) involved IPAC consented participants. Some participants were recipients of multiple team-based collaborative activities. The remainder of the team-based collaborative activities recorded in the logbook did not pertain to specific IPAC participants (65.8%, n=2,083). The purpose of each team-based collaboration was not recorded, however feedback received from the PSA coordinators suggests that these activities may have included:

- Participation in discussions with clinicians and multidisciplinary case conferences, irrespective of whether the service was claimed/claimable by GPs under the Medicare Benefits Schedule (MBS);
- Working with ACCHS staff (e.g. clinic manager) to improve the pharmacist integration in the clinic;

- Assistance with clinical governance activities, e.g. medicine-related policies, programs and procedures, drug imprest management;
- Assistance with medicines-related responses to, and management of, localised events of high public health significance, e.g. outbreaks of acute post-streptococcal glomerulonephritis;
- Participation in team meetings e.g. the 'morning huddle', and staff meetings;
- Support for, and participation in, preventive health and chronic disease activities e.g. National Stroke Week, Diabetes Day;
- Support for activities to improve cardiovascular risk assessment (e.g. recording smoking status in patient records); and
- Participation in ACCHS-coordinated patient group meetings such as Men's Group meetings, diabetes 'yarning' groups, Elders' group gatherings.[36]

The number of participants with the MBS item claims relevant to team-based care, and the total number of claims for these items, are shown in *Supplementary Tables A-L*. Despite pharmacists recording a large number of team-based activities in the logbook, no statistically significant change in health service utilization was observed with any of the team-based care relevant MBS item numbers when event rates were examined per 100 person-years and cluster adjusted.

This suggests that MBS claims for these activities remain outside the control of the pharmacists. Initiating an MBS claim is a health service responsibility and is a legal action that is dependent on the relevant staff member such as practice nurses or general practitioners who have authority to make these MBS claims. Moreover, MBS rules stipulate the frequency of repeat services so that for example, MBS item 715 can only be claimed once in a 9 month period, so if participants already had a 715 MBS item claimed at baseline (this applied to 61% of participants), a subsequent claim may be clinically unnecessary or the claim may be ineligible. These reasons are likely to explain why health service claims for team-based care relevant MBS items did not change for participants during the intervention period.

Medicines Information Service

Medicines information was provided by the integrated pharmacists on 1,715 occasions (Table 3). Some pharmacists recorded activities relating to the provision of information exclusively to community members (n=94) but this was excluded from the analysis as the medicines information role was intended to target healthcare providers. On some occasions there were multiple recipients of information. The majority of medicines information services were provided to GPs (66.1%, n=1,133), followed by just under a third of services that involved registered nurses (30.3%, n=520). The median duration of time for provision of a medicines information service was 15 minutes (n=1,290). Duration ranged from 5 minutes to 180 minutes.

Table 3: The type of health service staff receiving medicines-related information from integrated pharmacists.

Staff member supported*	Number of services (n=1,715) N (%)
GPs	1,133 (66.1%)
Registered Nurses	520 (30.3%)
Aboriginal Health Workers	215 (12.5%)
Others**	96 (5.7%)
Community members (with another staff member)	73 (9.7%)
Specialists	14 (0.8%)
Chief Executive Officers	8 (0.5%)
Tobacco Control Officers	5 (0.3%)

Source: Logbook
* May have been multiple recipients of the one service.
** Other recipients included hospital and community pharmacists, nursing staff, diabetes educators and other allied health staff, dental staff, care coordinator, students, and administration staff, etc.

Medicines information was provided by integrated pharmacists to health service staff on a range of topics (Table 4). Of the specified topics listed, the most common was '*treatment options for a specific condition'* for 26.1% (n=447) of all medicines information services provided. Other common reasons for providing medicines-related information was to inform health services staff of drug availability on the PBS (13.4%, n=230), and dose titration advice (10.9%, n=187).

'O*ther'* types of information provided to staff members made up 29.0% (n=498) of medicines information services. Just over a third of these involved queries about specific medicines. The remainder addressed queries on medication reviews for non-IPAC patients; adverse effects; non-clinical aspects of medicines such as disposal, storage, dispensing, claiming; access to medications and pricing details; options or advice for participants; documentation requiring update; accessing programs and resources; legislation; and vaccines.

Integrated pharmacists reported whether or not they were aware if there was any evidence of an outcome (changes made in patient management) based upon their advice or recommendations. Pharmacists were able to report that an outcome was achieved following the provision of information relating to 'PBS prescribing restrictions' on 37.1% of occasions (36/97). Outcomes were also evident for 35.6% of queries relating to 'medicines access' (67/188), 33.5% of 'drug availability of the PBS' (77/230) and 33.1% in relation to 'dose titration' (60/167).

Table 4: Type of information about medicines provided to staff by integrated pharmacists by the number of occasions this advice was provided.

Type of information provided *	Number of occasions that advice was provided to all staff (n=1,715) N (%)	Evidence of an outcome N (%)
Other **	498 (29.0%)	143 (28.7%)
Treatment options for a specific condition	447 (26.1%)	126 (28.2%)
Drug availability on the PBS	230 (13.4%)	77 (33.5%)
Medicines access	188 (11.0%)	67 (35.6%)
Dose titration	187 (10.9%)	60 (32.1%)
Drug interactions	131 (7.6%)	30 (22.9%)
PBS prescribing restrictions	97 (5.7%)	36 (37.1%)
New and emerging drugs	70 (4.1%)	13 (18.6%)
Pricing	65 (3.8%)	20 (30.8%)
Pregnancy/breastfeeding considerations	33 (1.9%)	5 (15.2%)
Point of care testing	17 (1.0%)	1 (5.9%)

Source: Logbook

* More than one type of information may have been provided on an occasion.

** 'Other' types of information provided involved queries regarded specific medicines; medication reviews for non-IPAC patients; adverse effects; non-clinical aspects of medicines such as disposal, storage, dispensing, claiming; access to medications and pricing details; options or advice for patients; documentation requiring updates; accessing programs and resources; legislation queries; and vaccines.

Education and Training

Integrated pharmacists provided education and training on 358 separate occasions (Table 5). The median time taken by pharmacists for the delivery of all education and training activities was 45 minutes.

In addition to the provision of written information and workshops, pharmacists also reported being involved in 'other' education and training activities such as giving information to participants verbally to support them with their medications and device techniques, informal education to staff on procedures, advice on specific medicines, IPAC project briefings, and participation in community health promotion activities and cultural events. Pharmacists indicated multiple types of education were delivered on 22 occasions (6.1%).

Table 5: Type of education and training provided to staff and patients within IPAC sites by the number of occasions.

Type of education and training provided by pharmacists	Number of occasions (n=358) N (%)	Median time/activity (range)
Written information:		
for patients	77 (21.5%)	30 mins (15 mins – 180 mins)
for staff	42 (11.7%)	30 mins (15 mins – 120 mins)
Workshops:		
pharmacist conducted	84 (23.5%)	45 mins (15 mins – 180 mins)
pharmacist participated	55 (15.4%)	60 mins (30 mins – 180 mins)
Other *	122 (32.1%)	45 mins (15 mins – 180 mins)

Source: Logbook

* Other activities included giving information to patients verbally to support them with their medications and device techniques; informal education to staff on procedures, specific medicines; induction about the IPAC project; and participation in community health promotion activities and cultural events.

Written information for patients

Written information was provided to participants on 77 occasions (Table 6). Patients may have received more than one type of information during an occasion. The median time pharmacists spent preparing information for patients was 30 minutes, ranging from 15 minutes to 180 minutes. Patients were most commonly provided with information on *'how to take their medicine'* (74.0%, n=57) and *'why it is important to take the medicine'* (31.2%, n=24).

Table 6: Type of written information provided to patients within IPAC services about medicines, by the number of occasions.

Type of written information provided to patients	Number of occasions (n=77) N (%)
How to take the medicine	57 (74.0%)
Why it is important to take the medicine	24 (31.2%)
Adverse effects of medicines	20 (26.0%)
Other *	18 (23.4%)
Storage of medicines	7 (9.1%)

Source: Logbook

* Other types of written information provided to patients included details about their medications, advice on diet and lifestyle, information on specific diseases (e.g. diabetes, kidney disease, eczema); and how to use devices such as blood sugar monitors and dose administration aids.

Written information for staff

Written information was provided to staff, by pharmacists on a total of 42 occasions (Table 7). Information was most commonly provided to GPs and AHWs, both comprising 59.5% of occasions. The median time pharmacists spent preparing information for staff was 30 minutes, ranging from 15 minutes to 120 minutes.

'Others' to whom information was provided included clinic managers, allied health, administration staff and students. The topic of the information provided to staff was not collected.

Table 7: Type of staff receiving written information about medicines.

Type of staff receiving written information about medicines	Number of occasions staff received written information (n=42) N (%)
General Practitioners	25 (59.5%)
Aboriginal Health Workers	25 (59.5%)
Registered nurses	16 (38.1%)
Other *	10 (23.8%)
Specialists	3 (7.1%)
Chief Executive Officers	2 (4.8%)
Tobacco control officers	1 (2.4%)

Source: Logbook

* Others to whom information was provided included clinic managers, allied health, administration staff and students.

Workshops conducted by the integrated pharmacist

The type of health services staff attending the 84 workshops conducted by the integrated pharmacist are shown in Table 8. Registered nurses attended 57 of the 84 workshops (67.9%) conducted by integrated pharmacists. The next most prevalent attendees were Aboriginal Health Workers (64.3%, n=54) and GPs (50.0%, n=42). There were a total of 600 attendees in these workshops including members of the Aboriginal and Torres Strait Islander community. Multiple staff members may have participated in each workshop. The median duration of workshops conducted by the integrated pharmacist was 45 minutes, ranging from 15 minutes to 180 minutes.

Table 8: Type of staff participating in workshops <u>conducted</u> by the integrated pharmacists, by the number of workshops.

Participants Roles	Number of workshops attended (n=84) N (%)	Number of participants involved (n=600) N (%)
Registered Nurses	57 (67.9%)	168 (28.0%)
Aboriginal Health Workers	54 (64.3%)	156 (26.0%)
General Practitioners	42 (50.0%)	132 (22.0%)
Others *(details not collected)*	19 (22.6%)	63 (10.5%)
Community members	9 (10.7)	67 (11.2%)
Pharmacists (other)	8 (9.5%)	9 (1.5%)
Tobacco Control Officers	2 (2.4%)	2 (0.3%)
Specialists	1 (1.2%)	2 (0.3%)
CEOs	1 (1.2%)	1 (0.2%)

Source: Logbook

Workshop topics were broad ranging and were categorized into the following topic areas: diseases and related medications; use of devices and techniques for administration; quality and safety with medications; systems such as cold chain processes; accessing 'GoShare' (online consumer education resources) and managing script requests; lifestyle advice and support groups; and information about the IPAC project. The majority of sessions on diseases and related medications focused on diabetes, cardiac conditions, and chronic pain management. Sessions on use of devices and techniques covered asthma inhalers, use of dose administration aids, and insulin injection techniques.

Workshops in which the integrated pharmacist participated

Integrated pharmacists attended 55 workshops along with other health services staff. The roles of attendees who participated is shown are shown in Table 9. The median duration of workshops in which the integrated pharmacist participated was 60 minutes, ranging from 30 minutes to 180 minutes. Registered nurses were represented at most of the workshops (67.3%, n=37). A total of 583 staff were involved in these workshops. Registered nurses, AHWs, GPs, allied health and other staff also attended these workshop. Details on the roles of 'other' participants were not collected. However, some integrated pharmacists reported other participants were from external agencies and they were not aware of their roles (personal communication).

Table 9: Type of staff participating in workshops also attended by integrated pharmacists, by the number of workshops.

Participants Roles	Number of workshops attended (n=55) N (%)	Number of participants involved (n=583) N (%)
Registered Nurses	37 (67.3%)	114 (19.6%)
GPs	35 (63.6%)	88 (15.1%)
AHWs	35 (63.6%)	121 (20.8%)
Others *	22 (40.0%)	203 (34.8%)
Allied health	16 (29.1%)	34 (5.8%)
CEOs	6 (10.9%)	6 (1.0%)
Pharmacists (other)	4 (7.3%)	13 (2.2%)
Tobacco Control Officers	2 (3.6%)	2 (0.3%)
Specialists	2 (3.6%)	2 (0.3%)

Source: Logbook

* Others attendees roles were not collected.

The topics of the workshops in which the integrated pharmacist participated with other staff generally related to: professional development on a broad range of clinical topics; training on information systems (e.g. GoShare, Communicare and Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander People [QUMAX]); other projects and programs (e.g. NDIS, Sistaquit, bowel screening); or were for local cultural training.

Stakeholder Liaison Plans

The integrated pharmacists completed 47 stakeholder liaison plans during the project period. Of these plans, 22 (46.8%) were completed for one ACCHS in an urban area that dealt with several stakeholders. Two ACCHSs did not complete such plans: one ACCHS opted to exclude this core role as it was not a priority for them as identified by the NACCHO project coordinator during development of the pharmacist work plan for this ACCHS; and the pharmacist at the other service commenced a plan but did not complete it prior to resigning from the project role approximately half way through their contract due to unforeseen changes in workforce capacity at the community pharmacy where the pharmacist also worked.

Of all plans completed, 95.7% were co-designed with other health services staff (n=45) (Table 10). Multiple staff members were involved in the co-design. *'Other'* staff members were reported most commonly as being involved in the design of plans (68.9%, n=31) and were identified as the clinic or practice manager, or senior medical administration staff. GPs were also involved in over half of the plans (55.6%, n=25). The reason given for the two remaining plans not being co-designed was that it was '*not a priority'* for staff.

Table 10: ACCHS staff involved in co-design of stakeholder liaison plans.

ACCHS staff involved in co-design of stakeholder liaison plans	**Total number of plans (n=47) N (%)**
Yes	45 (95.7%)
No	2 (4.3%)
Role of staff involved in the design of plans: *	**Number of plans co-designed (n=45) N (%)**
Other **	31/45 (68.9%)
General Practitioners	25/45 (55.6%)
Aboriginal Health Workers	21/45 (46.7%)
Registered Nurses	20/45 (44.4%)
Pharmacists Other	9/45 (20.0%)
Chief Executive Officers	3/45 (6.7%)
Allied Health Staff	1/45 (2.2%)
Specialists	0
Tobacco Control Officers	0

Source: Logbook

*Multiple staff may have been involved in the plans.

** Other staff engaged in the co-design of plans include clinic manager, practice manager, senior medical administrative staff, etc.

The majority of plans were implemented collaboratively with staff from community pharmacies (80.9%, n=38), followed by hospitals (17.0%, n=8, Table 11). Other stakeholders with whom plans were implemented, were staff from two dialysis units and a rehabilitation unit.

Table 11: Stakeholders involved in implementation of liaison plans.

Stakeholders *	Total number of plans (n=47) N (%)
Community pharmacy	38 (80.9%)
Hospitals/s	8 (17.0%)
Other **	3 (6.4%)
Other General Practice services	0
Tertiary [healthcare providers]	0
Aged care facilities (private or other, such as run by ACCHS)	0

Source: Logbook
*Multiple stakeholders may have been involved in the plans.
** 'Other' stakeholders included staff from two dialysis units and a rehabilitation unit

An analysis of the plans uploaded into the logbook was undertaken. Five pharmacists did not use the template provided or did not answer all components in the template. On 42 plans, pharmacists documented the type of medication related services provided by stakeholders to ACCHSs. Pharmacists identified 64.3% of medication-related services were from dispensing pharmacists (n=27, Table 12). 'Other' such services were provided by 21 stakeholders (50.0%) including provision of dose administration aids (DAAs), Opioid Replacement Therapy (ORT), a Return Unwanted Medicines (RUM) type pharmacy, or dialysis services, whilst 20 stakeholders were involved in QUMAX arrangements with the service (47.6%).

All but one of the service providers preferred contact by email (97.6%, n=41), however the majority were also open to contact by phone (90.5%, n=38). Fax was an acceptable method of contact for 38.1% (n=16) of providers and 33.3% (n=14) were receptive to face to face contact.

Table 12: The type of medication related services provided by stakeholders to ACCHSs, and the preferred method of contact.

Type of medication related services provided to ACCHSs by stakeholders	Total responses (n=42) n (%)
Dispensing pharmacist	27 (64.3%)
Other *	21 (50.0%)
QUMAX program arrangements	20 (47.6%)
Local hospital	8 (19.0%)
S100 provider	7 (16.7%)
S100 support provider	4 (9.5%)
HMR provider	1 (2.4%)
Tertiary referral centre	1 (2.4%)
Preferred method of contact	**Total responses (n=42) n (%)**
Email	41 (97.6%)
Phone	38 (90.5%)
Fax	16 (38.1%)
Face to face	14 (33.3%)
Letter	1 (2.4%)
IT Helpdesk Ticketing System	1 (2.4%)

Source: Logbook
HMR= Home Medicines Review
IT= Information Technology
QUMAX= Quality Use of Medicines Maximised for Aboriginal Community Controlled Health Services.
S100= Section 100 of the National Health Act (1953) for the supply of medicines for remote area Aboriginal health services.
* Other responses were the agency that provided DAAs (blister packs, MPS), Opioid Replacement Therapy, a Return Unwanted Medicines (RUM) pharmacy or provided dialysis services.

Table 13 outlines the time it took for integrated pharmacists to develop the stakeholder liaison plans, with the median time being up to 5 hours. Duration ranged from approximately 1 hour (60 minutes) to 20 hours (1,200 minutes).

Table 13: Time taken to develop the stakeholder liaison plans.

Duration	Number of plans (n=47) N (%)
0-5 hours	25 (53.2%)
6-10 hours	21 (44.7%)
11-15 hours	0 (0.0%)
16-20 hours	1 (2.1%)

Source: Logbook

Improvement areas to support better stakeholder liaison

The plans (n=47) were analysed to identify the suggested improvements in liaison or workflow between the stakeholder and the ACCHS. Two-thirds of the plans noted improvements were needed for procedures to supply DAAs and for ordering medications for the health service imprest stock. Just over half of plans identified the need for a designated contact person within the service to respond to queries. This is because

stakeholders in the past had reported difficulties contacting doctors within the ACCHSs. Other suggested areas for improvement were better communication about funding schemes (Closing the Gap [CTG] and QUMAX); clearer communication about medication changes; faster communication after patient discharge from hospital; and improvements in the quality use of medicines.

Strategies and actions to support better stakeholder liaison

Over three-quarters of plans noted that a communication strategy had been implemented to address these issues. The strategies supported visits or meetings between stakeholders and other means of regular communication. The identification of a designated contact within the ACCHS to respond to queries was identified in just over half of the plans, and the development or update of resources such as contact lists and medical records was an action identified by pharmacists in just under half of the plans. Other strategies identified included ensuring relevant people were included on communication lists (for example for discharge summaries); and the establishment or updating of templates (for example, to guide communication regarding changes in blister packs), or agreements.

Evidence of an outcome

Integrated pharmacists felt their actions had led to an improvement in workflow for ACCHS staff and communication and collaboration with stakeholders as documented on just over three-quarters of the plans (36/47). While for the majority, no written evidence to support these claims was provided, pharmacists cited examples of improvements such as better engagement between the clinic and community pharmacy, fewer errors with medication supply, ordering of medications for imprest stocks was more efficient, queries were addressed in a timely manner, and issues were resolved quickly.

Verbal feedback noted from ACCHS staff was positive:

> *"Having the IPAC pharmacist in the clinic regularly has enhanced communication and services from [community pharmacy] to [ACCHS]".*

> *"Having the IPAC pharmacist onsite has been extremely beneficial for staff and patient's medication queries and for being the first point of contact with hospitals, other pharmacists and agencies outside the clinic."*

> *"Outcomes especially for patients with chronic conditions have been greatly enhanced with better medicines management and a better working relationship between [ACCHS] and [community pharmacy]."*

The integrated pharmacists noted GPs appreciated them facilitating access to information and resources. Moreover, ACCHS staff expressed uncertainty about how medication related support would be managed once the IPAC project had ceased.

Thirty-four of the 47 stakeholder liaison documents noted that feedback had been received from stakeholders. Approximately half of the received feedback indicated there was better engagement between the stakeholder and the ACCHS, and that the flow of information regarding processes and medications had improved. Queries were also answered. Many community pharmacists reported that communication with ACCHSs had improved significantly with the integrated pharmacist as their main point of contact. Some stakeholders (n=7) reported improvement in communication about medications and support for patients resulting in improved medication adherence:

> *"Communication improved safety and patients' adherence; the role of the [IPAC] pharmacist can only continue to improve patients' outcomes."*

Five stakeholders also commented that collaboration had resulted in improved quality use of medicines. One stakeholder commented that while the situation had improved greatly and they were satisfied, they still had some concerns regarding whether doctors were actually seeing patients for repeat prescriptions:

> *"[I'm] happy with improvements to processes that onsite [IPAC] pharmacists have facilitated, [but] still concerned about the somewhat lack of accountability regarding patients attending appointments with doctors for scripts, but [things have] greatly improved."*

Stakeholder Liaison (Contact with Community Pharmacy)

During the project, the integrated pharmacists recorded 3,233 contacts with community pharmacy (Table 14). It was noted that one service in an urban location reported 31.4% (n=1,015) of all the occasions of contact with local community pharmacies. Approximately 69.6% of community pharmacy contacts (n=2,249) were initiated by the integrated pharmacist.

Table 14: Liaison with community pharmacy and the instigator of the contact.

Instigator of contact with community pharmacy	Number of activities (n= 3,233) N (%)
Integrated Pharmacist	2,249 (69.6%)
Community pharmacist	984 (30.4%)

Source: Logbook

The primary reason for contact between the community pharmacy and the integrated pharmacist was for *'dose administration aid preparation and supply'* (n=1,544, 47.8%). This was followed by *'dispensing of medications'* (n=724, 22.4%) as shown in Table 15.

'Other' reasons for contact were stated for 12.7% (n=410) of occasions of contact. Free text responses were categorised and counted as shown in Table 16. The most common 'other' reason for contact between the integrated pharmacist and community pharmacy was *'medication reconciliation, queries, changes to packs, or to correct DAA errors' (n=150).*

Table 15: Reasons for contact between the integrated pharmacist and the community pharmacist.

Reason*	**Number of activities (n= 3,233) N (%)**
Dose-administration aid preparation and supply	1,544 (47.8%)
Dispensing of medicines	724 (22.4%)
Other **	410 (12.7%)
Participation in Home medicines reviews	266 (8.2%)
Assistance with script collection	252 (7.8%)
For delivery of medicines to the clinic	237 (7.3%)
Onsite medicines stock control	163 (5.0%)
Discuss discharge medications	140 (4.3%)
Request to source a particular medication	137 (4.2%)
Response to queries about medication related information	127 (3.9%)
For home delivery of medicines to patients	85 (2.6%)
Pricing advice	78 (2.4%)
Notify CTG script eligibility	39 (1.2%)
Patient referral for Home medicines review	18 (0.6%)
To give educational sessions to staff within the clinic	3 (0.1%)

Source: Logbook
CTG = close the gap.
** Multiple reasons may have been recorded for each stakeholder liaison contact.*
*** Other reasons – see Table 16.*

Table 16: 'Other' reasons for contact between the integrated pharmacist and the community pharmacist.

Other reasons for contact	Number of 'other' reasons (n=409) N (%)
Medication reconciliation, queries, changes to packs, correct DAA errors	150/409 (36.7%)
Financial queries including QUMAX, 6CPA claims	51/409 (12.5%)
Information on DAA collection by patients and owing scripts *	47/409 (11.5%)
Patient-related issues e.g. lost scripts, advise deceased, access resources	41/409 (10.0%)
General queries about medications e.g. Disposal, storage, dispensing history	37/409 (9.0%)
Access to medication and stock supplies	27/409 (6.6%)
IPAC project related queries	13/409 (3.2%)
Miscellaneous	12/409 (2.9%)
Admin or communication procedures	12/409 (2.9%)
Education or accessing resources e.g. Sample DAAs	11/409 (2.7%)
Information on other programs (NDSS, ACCHS programs)	5/409 (1.2%)
Updating documentation re allergies, adverse effects	3/409 (0.7%)

Source: Logbook
6CPA= 6th Community Pharmacy Agreement
ACCHS= Aboriginal community controlled health service
DAA= dose administration aid
NDSS= National Diabetes Services Scheme
QUMAX= Quality Use of Medicines Maximised for Aboriginal Community Controlled Health Services.
* Owing scripts are where medications are dispensed to the patient before the pharmacy has received the actual prescription.[37]

Transitional Care

The total number of transitional care activities that integrated pharmacists participated in was 1,901 (Table 17). The median duration of this activity was 15 minutes, ranging from 15 minutes to 180 minutes. The majority of these activities involved liaison with community pharmacy (42.3%, n=804) or liaison with hospital staff (38.6%, n=733). This was followed by contact with staff from tertiary referral centres (9.4%, n=178). 'Other' agencies that integrated pharmacists liaised with included external HMR providers, community agencies, other ACCHSs or programs, nurse navigators (hospital-based coordinators of care for complex patients[38]) and other health care providers such as specialist clinicians or services.

Table 17: Agencies engaged by the integrated pharmacists to support the transitional care of patients during IPAC study period.

Type of agency	Number of transitional care activities (n=1,901) N (%)
Community Pharmacy	804 (42.3%)
Hospital	733 (38.6%)
Tertiary referral centre (e.g. renal unit)	178 (9.4%)
Other*	115 (6.0%)
External general practice	40 (2.1%)
Aged care facility	31 (1.6%)

Source: Logbook
* 'Other' agencies included external HMR providers, community agencies, other ACCHSs or programs, nurse navigators and other health care providers such as specialists or services, etc.

Integrated pharmacists supported the transitional care for patients by engaging with the aforementioned agencies in order to facilitate a range of medication-related outcomes (Table 18). The most common reason for which integrated pharmacists contacted these agencies was for *'medicines reconciliation'*. This accounted for approximately a third of all interactions across the various agencies. '*Dose-administration aid preparation and supply'* was the next most common reason given to support the transitional care of patients and comprised 30.7% (n=487) of all transitional care contacts with community pharmacy. The need to discuss the patients discharge medications was the next most common reason for transitional care activity necessitating liaison with hospital staff (28.1%, n=317).

Table 18: Reasons for the integrated pharmacists contacting agencies for the transitional care of patients.

Reasons for contact *	Type of agency contacted and number of transitional care activities (n=1,901)				
	Hospitals n=1,127 N (%)	External general practice n=63 N (%)	Tertiary referral centre (e.g. renal unit) n=340 N (%)	Aged care facility n=52 N (%)	Community Pharmacy n=1,584 n (%)
Medicines reconciliation	385 (34.2%)	17 (27.0%)	128 (37.6%)	19 (36.5%)	528(33.3%)
Dose-administration aid preparation and supply	110 (9.8%)	9 (14.3%)	57 (16.8%)	12 (23.1%)	487 (30.7%)
Dispensing of medicines	84 (7.5%)	5 (7.9%)	28 (8.2%)	4 (7.7%)	196 (12.4%)
Assistance with script collection	48 (4.3%)	1 (1.6%)	31 (9.1%)	2 (3.8%)	114 (7.2%)
Other**	74 (6.6%)	2 (3.2%)	21 (6.2%)	5 (9.6%)	62 (3.9%)
Participation in Home medicines reviews	11 (1.0%)	9 (14.3%)	9 (2.6%)	3 (5.8%)	59 (3.7%)
Home delivery of medicines to patients	6 (0.5%)	2 (3.2%)	0 (0.0%)	0 (0.0%)	50 (3.2%)
Discuss discharge medications	317 (28.1%)	5 (7.9%)	38 (11.2%)	4 (7.7%)	45(2.8%)
Delivery of medicines to the clinic	11 (1.0%)	0 (0.0%)	4 (1.2%)	1 (1.9%)	11 (0.7%)
Response to queries re medication related info	31 (2.8%)	6 (9.5%)	9 (2.6%)	1 (1.9%)	8 (0.5%)
Medication pricing advice	3 (0.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	7 (0.4%)
Onsite medicines stock control	1 (1.0%)	0 (0.0%)	0 (0.0%)	1 (1.9%)	5 (0.3%)
Request to source a particular medication	9 (0.8%)	0 (0.0%)	3 (0.9%)	0 (0.0%)	5 (0.3%)
Notify CTG script eligibility	9 (0.8%)	1 (1.6%)	1 (0.3%)	0 (0.0%)	4 (0.3%)
Participation in team care arrangements	7 (0.6%)	0 (0.0%)	7 (2.1%)	0 (0.0%)	3 (0.2%)
Patient referral for Home Medicines Review	13 (1.2%)	1 (1.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Educational sessions to staff within the clinic	3 (0.3%)	5 (7.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Participation in care plan development	5 (0.4%)	0 (0.0%)	1 (0.3%)	0 (0.0%)	0 (%)
Participation in case conferences	0 (0.0%)	0 (0.0%)	1 (0.3%)	0 (0.0%)	0 (%)
Participation in clinic accreditation activity	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (%)
Participation in meetings	0 (0.0%)	0 (0.0%)	2 (0.6%)	0 (0.0%)	0 (%)

Source: Logbook
CTG = Close the gap.
*Multiple reasons per agency can be selected.
** 'Other' reasons given by pharmacists include liaising to confirm a patient's next appointment date; explaining the IPAC project; to prioritise a review of the patient; to encourage a specialist review; to confirm pathology results in relation to non-adherence; to organise home visits; to obtain a DAA etc.

Drug Utilisation Reviews

Twenty-six DURs were conducted by the integrated pharmacists, who initiated 57.7% (n=15) of the review topics (Table 19). Topics for the remaining reviews were initiated by GPs (30.8%, n=8) or a clinic manager (3.8%, n=1). On two occasions the topic was selected by multiple members of the clinical team (7.7%).

Table 19: Initiator of the topic of the drug utilisation review.

Review initiator	Number of plans (n=26) N (%)
Integrated Pharmacist	15 (57.7%)
Doctor	8 (30.8%)
Multiple members of the clinical team	2 (7.7%)
Other (clinic manager)	1 (3.8%)
Nurse	(0.0%)
Aboriginal Health Worker	(0.0%)
Community Pharmacist	(0.0%)

Source: Logbook

The length of time it took for the integrated pharmacists to complete the DUR varied (Table 20). Just under a third of reviews reportedly took 21 hours or over to complete (30.8%, n=8), and just under a quarter took between 6 and 10 hours (23.1%, n=6). The median time to conduct a review was 11 to 15 hours, ranging from approximately 1 hour (60 minutes) to over 21 hours (1,260 minutes).

Table 20: Time taken to conduct the drug utilisation review.

Time taken	Number of plans (n=26) N (%)
0-5 hours	3 (11.5%)
6-10 hours	6 (23.1%)
11-15 hours	4 (15.4%)
16-20 hours	5 (19.2%)
21+ hours	8 (30.8%)

Source: Logbook

DUR Topics and Outcomes

Topics for the DUR were predominantly chosen by the integrated pharmacists after considering relevant medicines-related issues at their respective ACCHSs. Input to topics was also provided by doctors and other clinicians at some sites. Examples of topics chosen for DURs included:

- Evaluation of angiotensin converting enzyme (ACEI) or angiotensin receptor blocking (ARB) therapy and statin use in high-risk patients with chronic kidney disease (CKD)
- Thyroid stimulating hormone (TSH) and thyroxine replacement therapy prescribing

- First line antibiotic use for skin infections based on local protocols
- Azithromycin use for the management of clients with bronchiectasis
- Benzodiazepines and opioids prescribed concomitantly
- Vitamin D prescribing and subsidy guidelines
- Estimated glomerular filtration rate (eGFR) versus metformin - is the dose appropriate?
- Pregabalin usage
- Patients on proton pump inhibitors (PPI) for more than one year

Following completion of the DUR, the integrated pharmacists recorded changes made at their respective ACCHSs as a result of their findings, the education they provided to staff and the recommendations made to improve quality use of medicines. Of the 26 DUR plans uploaded to the pharmacists' electronic logbook, 21 reflected a change while 5 indicated that the DUR was either ongoing or the outcome unknown due to the time remaining in the project. Some examples of outcomes were:

- The appointment of a co-coordinator targeting early intervention of high-risk patients with CKD
- Recalls added to client files to systematically review the thyroxine dose
- Revision of a skin infection clinical protocol
- Increased review of metformin dosage in patients with CKD
- New policy for the subsidy of colecalciferol including indications for testing of vitamin D status
- Reduction in the dose and number of pregabalin scripts written overall
- General Practitioners deprescribing PPIs where they were no longer indicated.

Some pharmacists conducted DURs within a short timeframe, with recommendations made but outcomes were unknown due to insufficient time remaining in the project. On some occasions 'handover' instructions were given to ACCHS staff to encourage follow-up over time beyond the completion of the project and the integrated pharmacists' tenure.

Ratio of Patient and Practice Activity

Pharmacists recorded a total of 541,545 minutes or approximately 9,026 hours spent delivering activities over the 15 month implementation phase of the project (Table 21). The ratio of pharmacist time spent delivering activities to patients versus practice-based activity was 62.5% to 37.5% respectively. Times were recorded in the logbook for the majority of the core roles. However, data on the time it took the pharmacists to conduct the patient survey (N-MARS) and stakeholder liaison with community pharmacies was estimated by the PSA project coordinators with imputation of the total time that was taken. Several limitations affecting this calculation are discussed.

Table 21: Frequency of IPAC pharmacist core activities and time taken to complete them.

Category	Activity	Total number of activities	Median time per activity (mins) (range)	Total time taken (mins)	Percent of all time
Patient-related	Patient survey (includes unpaired data) *	2,759	30 (range unknown)	82,770	
	Home medicines review (HMR)	639	105 (30-180 mins)	67,095	
	Non-HMR	757	75 (15-180 mins)	56,775	
	Follow-up to a HMR or non-HMR	1,548	30 (<15-180 mins)	46,440	
	MAI and AoU (includes unpaired data)	789	60 (15-180 mins)	47,340	
	Education and Training #	124	45 (15-180 mins)	5,580	
	Team-based collaboration #	1,082	30 (15-180 mins)	32,460	
	Sub-total	***7,698***		***338,460***	**62.5%**
Practice-related	Transitional care activity	1,901	15 (15-180 mins)	28,515	
	Education and Training #	234	45 (15-180 mins)	10,530	
	Team-based collaboration #	2,083	30 (15-180 mins)	62,490	
	Medicines Information Service	1,715	15 (15-180 mins)	25,725	
	Stakeholder liaison (community pharmacy) **	3,233	15 (range unknown)	48,495	
	Stakeholder Liaison Plan ##	47	150 (60-1,200 mins)	7,050	
	Drug utilisation reviews ##	26	780 (60-1,260 mins)	20,280	
	Sub-total	***9,239***		***203,085***	**37.5%**
Total		16,937		541,545	

Source: Logbook

HMR=Home medicines review; MAI=Medication appropriateness index; AoU=Assessment of Underutilisation

* Time taken for conduct of the patient survey was not recorded. Estimated by the PSA at 30 minutes duration.

** Time taken for liaison with community pharmacies was not recorded. Estimated by the PSA at 15 minutes duration.

Education and training and team-based collaborations were allocated by the reported target audiences. Approx. a third of education activities were patient-related through provision of written information and 'other' activities e.g. verbal support, assistance with devices such as asthma puffers, DAAs, insulin techniques. Team-based collaborations relating to IPAC patients were included as patient-related activity.

Middle value of median categories was used in calculations e.g. median time for stakeholder liaison plans was 0-5 hours - 2.5 hours was used. Median time for DURs was 11-15 hours - 13 hours was used.

Discussion

The IPAC project documented the comprehensive and large volume of activities undertaken by integrated pharmacists within ACCHS primary health care settings that contributed to improved prescribing quality,[39 40] improved health service utilisation,[41] and positive patient outcomes.[42] This report summarises some of the core roles and quantifies and describes activities within these roles that comprised the intervention evaluated in the project. Whilst there was individual variation within and between services in the delivery of these core roles, this report represents the aggregated summary of all such activity across 18 ACCHSs. These activities supported adult Aboriginal and Torres Strait Islander participants with chronic disease as well as health service staff in ACCHSs. The evaluation of integrated pharmacists' activity regarding medication management and prescribing quality reviews, medication adherence assessments, preventive health activity, and health service utilisation in the IPAC project is presented elsewhere.[43 44 45]

Communication and collaboration with health service staff and external stakeholders was an important function for integrated pharmacists. The types and extent of activity undertaken in the IPAC project provides evidence that supports other studies, where the integration of pharmacists within primary health care teams, enabled greater communication, collaboration and relationship building among healthcare providers, and internal and external stakeholders.[46 47 48 49] Another study found communication between GPs and pharmacists increased over time, and resulted in more collaboration and trust, with pharmacists clarifying their role and becoming more integrated into the team.[50] The integrated pharmacists provided clinicians and other health service staff with a medicines information service and education and training; supported the transitional care of patients; and participated in team-based collaborations with internal staff and external stakeholders. They also provided education and support for patients. The integrated pharmacists developed relationships, which strengthened over time and enabled collaborations to support the management of patients with chronic diseases in the IPAC project, as evidenced in other studies.[51 52]

Integrated pharmacists provided significant continuous support to health services staff throughout the project as evidenced through 3,165 occasions of team-based collaboration. Pharmacists collaborated with a range of healthcare providers, community agencies, patients and members of the community to deliver enhanced medication-related services. Pharmacists were often integrated into team-based collaborations such as case conferences for individual patients. Case conferencing is an effective way for a patient with chronic disease to have their multidisciplinary needs met and involves a medical practitioner and at least two other health or community care providers to meet and discuss the care of the patient. The Medicare Benefits Schedule (MBS) supports case conferences and the schedule fee is 100% rebatable.[53] Approximately one-third of the team-based collaborations reported by integrated pharmacists were patient-related and this activity included case conferencing. Pharmacists were however unable to influence the number of MBS

claims for case conferencing or other team-based collaborative activity within ACCHSs over a 12-month period for a number of possible reasons. MBS claims need to be generated by health staff other than integrated pharmacists as pharmacists are ineligible to make these claims. The MBS rules also limit the number of claims that can be made within the 12-month window of observation for the IPAC study. So, even though pharmacists reported a large number of team-based activities, MBS claims remained outside the control of pharmacists.

Qualitative evaluation of the IPAC project revealed that team-based collaborations resulted in benefits for health service staff by having access to a medicines expert who could input into patient care through formal case conferencing, or informal meetings and conversations that did not generate an MBS rebate.[54] Informal opportunistic communication has been found by others to be the most effective method of discussing patient care as it can be timelier.[55] Others have also reported that pharmacists working in these multi-disciplinary teams can share comprehensive drug information about medicines, ensure their safe and efficient use, promote adherence, and identify medication-related problems.[56]

Most of the team-based collaborations reported by integrated pharmacists did not involve patients directly. Integrated pharmacists also participated in a range of formal and informal health service staff meetings, working groups on clinical governance activities, community health promotion events, patient support groups and other activities in response to local health issues. Being involved in a range of service-related activities enabled the IPAC pharmacist to develop relationships and integrate into the team and the health service.[57]

Integrated pharmacists also supported ACCHS staff by directly providing information on medications. GPs in particular, received information on treatment options for specific conditions, drug availability on the PBS, and had their queries about specific medicines answered. Pharmacists reported that their advice influenced prescribing and that clinicians had made changes to patient therapy based on their recommendations. The provision of advice to GPs on PBS prescribing restrictions, medicines access and treatment options for specific conditions was thought to be especially helpful. In a separate IPAC analysis, clinical staff reported it was valuable having access to the integrated pharmacist who was a medicines expert and was able to provide ad hoc advice on medicines-related topics provided through 'corridor conversations' in addition to more formally through medication management reviews.[58]

Medication-related education was also provided by integrated pharmacists through face-face workshops with healthcare staff. Pharmacists also developed written resources for health services staff, patients and community members with topics shaped by the needs of service staff and patients. Workshop topics related to diseases (such as for diabetes, cardiac conditions, and chronic pain management) and medication-use

(such as how to use devices like asthma inhalers, dose administration aids, and insulin injection techniques). Health systems improvement topics were also chosen such as the quality use of medications and systems to maintain the cold chain, use of IT, as well as information about the IPAC project. In a separate qualitative evaluation, health services staff reported increased levels of knowledge on clinical conditions and medication options as having arisen specifically from integrated pharmacists input into their clinical team meetings and by providing them with education sessions.[59]

Patients value information tailored to their specific conditions.[60] It was not surprising that the most common topic for the written information provided to patients by integrated pharmacists was 'how to take the medicine'. Verbal explanation of information provided to patients was also important as was the opportunity to demonstrate and teach patients how to use their devices effectively. Patients participating in the qualitative evaluation of the project reported being more adherent to taking their medicines as a result of having a better understanding of their conditions, including what their medicines were for, how they worked, and why they needed to take them, which was explained to them by the integrated pharmacist.[61] GPs also reported that having a pharmacist as part of the health services team saved them time as the pharmacists were able to provide education to patients around their conditions and how their medications worked.[62] The participation of pharmacists in education and training workshops with other health service staff, and in health promotion and community events may have helped to integrate the pharmacist in the PHC team and enhance cultural safety. It also may have helped to build trust and relationships with patients and the community, as noted in the qualitative evaluation of the IPAC project.[63]

Collaboration between medical clinics and community pharmacy can be enhanced through better communication and work towards common shared goals. Such discussions offer staff the opportunity to understand how each other's organisations' operate, to establish rapport, and appreciate their respective expertise.[64] Stakeholder liaison plans were utilised by IPAC pharmacists to encourage such collaboration, support communication and further develop relationships between the ACCHS and community pharmacies, and other local healthcare providers with whom the service worked. Enhanced collaboration aimed to improve information transfer and optimise the patient journey.

These written stakeholder liaison plans were co-designed most commonly with clinic or practice managers, senior medical administration staff and GPs. The majority of plans developed by the integrated pharmacists targeted community pharmacy, with others created for improving collaboration with staff from local hospitals or providers of dialysis and rehabilitation services. Community pharmacists already provided a range of services to the ACCHSs and their patients including dispensing of medicines, provision of DAAs, and participation in QUMAX arrangements. The plans therefore aimed to enhance existing collaborations between the stakeholder and the ACCHS. They aimed to improve communication, avoid unnecessary

duplication of services, and to take a structured approach to identifying issues as well as explore strategies to improve them.

Most of the plans involved dispensing pharmacists at the community pharmacies, and recommended improvements to procedures for supplying DAAs, and ordering medications and supplies for the ACCHS imprest stock. The need for a contact person within the service who was responsive to queries was noted in just over half of plans. Strategies to support regular ongoing communication were subsequently implemented, and contact-persons within the ACCHS were identified to better respond to queries (such as from community pharmacists).

Integrated pharmacists noted examples of improvements after implementation of these plans such as better engagement between the clinic and community pharmacy, fewer errors with medication supply, more efficient ordering of imprest stock medications, queries addressed in a timelier manner, and issues resolved more quickly. Feedback specifically on the implementation of the plan from stakeholders and ACCHS staff was positive and working relationships with stakeholders were further strengthened through the process. ACCHS staff felt communication and services from the other services providers had been enhanced, the pharmacist was the key contact and responded to queries about medicines, and outcomes for patients with chronic conditions had improved. Staff from the stakeholder organisations, particularly community pharmacists, agreed that communication had improved through having the integrated pharmacist as their main point of contact. Some stakeholders reported that better collaboration had resulted in enhanced medication reviews, improved quality use of medicines and more support for patients leading to better medication adherence.

In addition to the liaison plans, integrated pharmacists interacted with community pharmacists on a daily basis. There were more occasions of service logged for an interaction between the integrated pharmacists and community pharmacy than any other IPAC activity. Over two-thirds of the 3,233 logged contacts with community pharmacy were initiated by the integrated pharmacist. Nearly three-quarters of contacts related to communication on the preparation and supply of DAAs and medication dispensing. Community pharmacists also assisted with queries regarding a range of medicines-related topics including reconciliation, owing scripts, stock supplies, financial assistance and they received referrals from the integrated pharmacists and GP for Home Medicines Reviews. In the qualitative evaluation of the IPAC project, community pharmacists reported that IPAC pharmacists had helped with resolving medication-related problems for ACCHS clients, and had strengthened their relationship with the ACCHS. Community pharmacists also reported that the integrated pharmacist had facilitated communication between them and the GPs within the ACCHS.[65] Similar findings with general practice pharmacists have also been reported.[66] Improved

relationships between the clinic and the community pharmacy facilitate a better understanding between the organisations and subsequent patient outcomes.[67]

The enhanced engagement between the ACCHS and community pharmacy was also evident with logged activity pertaining to transitional care. The most common agency engaged by integrated pharmacists for the transitional care support of patients was community pharmacy. Other health care providers, external to the health service, such as hospitals and renal units were also engaged in the ongoing care of patients across the care continuum. Combined community pharmacy and hospital contacts relating to transitional care made up 80% of the 1,901 transitional care activities logged by pharmacists. Medicines reconciliation was the main reason for such contact, explaining over a third of the interactions with staff from community pharmacy, hospitals, tertiary referral centres and aged care facilities. Just under a third of contacts with community pharmacy were in relation to DAA preparation and supply, and a quarter of contacts with hospital staff were in relation to discharge medications. This level of communication between the health service, hospitals and community pharmacy provides further evidence that effective collaboration between stakeholders is vital for optimal continuity of care for patients. Patient care is known to be adversely affected by the lack of communication and information transfer following discharge from hospital.[68] An overseas study demonstrated that collaboration between hospitals and community pharmacists and coordination of discharge information was crucial to the continuity of care for patients.[69] Medication discrepancies are common across transition of care.[70] Medicines reconciliation is an important step towards improving patient safety at transitions of care particularly for Aboriginal and Torres Strait Islander people and those with complex medication regimens.[71] A lack of communication between stakeholders was an issue identified by the integrated pharmacists in the qualitative evaluation of the IPAC project. The integrated pharmacists commonly served as a liaison between the health service and surrounding healthcare providers, including hospitals and their clinical units, and community pharmacists[72] and were well-placed to improve transitions of care and medicines reconciliation for participants.

During the IPAC Project, integrated pharmacists also conducted DURs to optimise prescribing and increase the standard of care in ACCHSs. Over half of the reviews undertaken through the project were initiated by the integrated pharmacist. Reviews were a quality improvement activity [73] and their completion resulted in prescribers making changes in the ways they used medicines. The selected topics varied across participating ACCHSs according to local priorities and context, which was evidenced by significant differences in the total time taken to conduct this activity. Numerous examples of positive outcomes to prescribing quality were reported such as deprescribing of PPIs, reduced prescriptions for pregabalin, as well as systems changes such as to practice protocols and staff deployment.

The completion of DURs is time consuming and can be complex. In another report, integrated pharmacists outlined the factors which affected the outcome of the DUR at their individual health services. Turnover of key ACCHS staff at some sites led to a delay in identification of a medicines-related DUR topic of relevance, while in other sites conflicting priorities and preferences of the health service for pharmacist activities meant that the DUR was started quite late in the project with inadequate time to meaningfully assess effectiveness.[74] Project-related workload and unfamiliarity with reporting functions in the clinical information systems within the ACCHS were identified by some pharmacists as barriers to optimal completion of DURs. Medication shortages in some sites meant pharmacists were unable to accurately assess the impact of best practice recommendations made during the DUR cycle.[75]

A core requirement from the funding body was that integrated pharmacists spend 75% of their time directed towards patient-level activities (defined as medication management reviews and assessments of adherence and appropriateness).[76] Patient-level activities in this project comprised 62.5% of activities recorded including medication reviews and assessments, as well as direct service delivery to patients through education and preventive health care, and team-based collaborations identified as being patient-related (as defined in the Logic Model for Evaluation, Appendix B). This approximates the expected division of pharmacist roles, especially given that significant underreporting of actual patient-related activity occurred. For example, patient education and team-based collaboration activities (such as case conferences) although categorised for the purpose of the evaluation as practice-based activities, were critical to direct patient care as well as to the practice. Furthermore, transitional care occasions and a proportion of contacts with community pharmacy were also expected to have been related to the care of individual patients. However, the categorisation of this activity as purely practice-based also underestimated the proportion of time that pharmacists spent delivering patient-based care. In addition, time taken for patient-based activities may have been underestimated as the time able to be recorded in the logbook for these activities was limited to 180 minutes. In all, the activities undertaken by integrated pharmacists during the IPAC project closely approximated the division of core roles that were expected of them at the start of the project.

The IPAC pharmacists also focused considerably more activity on patient-based rather than practice -based activity when compared to reports of integrated pharmacists activity from other studies. A study involving a single pharmacist in a general practice setting, found pharmacist activity focused on completing medication reviews which comprised 47% of their time, whilst other patient contacts contributed an additional 1% of time.[77] Another small Australian study tracked activity of three general practice pharmacists and found patient-related activities comprised an average of 30% of the pharmacists' time (19% medication management reviews and 11% patient education and counselling). Quality of practice activities made up 37% of pharmacist time (audits, medicines information, staff education), whilst administration work made up around 34% (including 10% for evaluation) of time.[78] Whilst for the IPAC project, administration and

evaluation time was not recorded and factored into pharmacist activity, feedback from pharmacists during site visits conducted by the PSA project coordinators indicated that data entry took between 1-3 hours per day. Other activities undertaken that were not recorded included time spent with non-consented patients, and non-productive time, for example, for inter-clinic travel, coordinating clinic staff such as AHWs to accompany on HMRs, arranging a staff car for visits, and waiting for patients scheduled for appointments but do not attend.[79] It also took some time at the commencement of the project for the pharmacists to settle in and ensure staff understood their role. Feedback from pharmacists throughout the qualitative evaluation provided further evidence of these challenges. It is important to note that whilst the project protocol defined 10 core roles for pharmacists which formed the foundation for the project and the evaluation, in line with community-based participatory research principles, each participating ACCHS also had the flexibility to utilise the services of the pharmacist according to service and client priorities at the local level.

Evidence collected in the qualitative evaluation of the IPAC project from GPs, other health services staff, community pharmacists, and the integrated pharmacists themselves, elaborated on the beneficial outcomes from improved stakeholder liaison, transitional care, and DURs.[80] IPAC pharmacists identified that their integration into the PHC team was facilitated by a clear definition of their core roles. Participating in a broad range of clinical and non-clinical team activities, education and training, collaborating with stakeholders for transitional care and the development and implementation of stakeholder liaison plans, helped the pharmacists to build and maintain relationships and integrate in the primary health care team and the service. ACCHS staff felt communication and services from other stakeholders had been enhanced by integrating a pharmacist into the ACCHS. The integrated pharmacist often acted as the key contact and assisted the ACCHS to respond to queries about medicines. Having the pharmacist role embedded in the primary health care team and ACCHS more broadly had numerous benefits for staff and patients and impacted positively on the holistic services provided by ACCHS, which resulted in benefits for patients with chronic conditions directly and indirectly. Staff from the stakeholder organisations, particularly community pharmacists, agreed that communication had improved through having the integrated pharmacist as their main point of contact. Some stakeholders reported that better collaboration had resulted in enhanced medication reviews, improved quality use of medicines and more support for patients leading to better medication adherence.

Separate analyses support these assessments. Integrated pharmacist activities most likely explain the improvements in the quality of prescribing,[81] [82] increased patient access to medication management reviews and improved health service utilisation,[83] improved medication adherence and self-assessed health status of patients,[84] and clinical endpoint improvements[85] as shown for the IPAC study. Improvements in prescribing quality significantly prevented potential prescribing omissions (PPOs) to high-value pharmacotherapies,[86] and improved the appropriateness of medication prescribing.[87] There was also a substantial increase in

access to medication management reviews (HMR and non-HMR), and follow-up to these reviews for Aboriginal and Torres Strait Islander adults with chronic disease.[88]

The core roles implemented in the IPAC project could be included in the position description for a future expansion of integrated pharmacists working in Aboriginal primary health care settings. Similar to the recent Australian studies undertaken predominantly in mainstream settings,[89,90,91] the services provided by integrated pharmacists within ACCHSs were highly valued by health service staff, external stakeholders and patients. The IPAC project provided evidence that the implementation of similar non-dispensing pharmacy services were well received and valuable for Aboriginal peoples and Torres Strait Islanders attending ACCHSs in urban, regional and remote settings.[92] This evidence supports the generalisability of implementation of the pharmacist core roles more broadly.

Limitations

The activities recorded in the logbook are a conservative measure of the actual activities undertaken by pharmacists. A few pharmacists reported that data entry was time-consuming and they had not entered data on every activity they had undertaken.[93] Some pharmacists also reported initially there was a lack of clarity about where or how to enter certain information in the logbook for activities which did not clearly fit into one of the ten defined core roles. This may have led to some inconsistencies as to which 'questionnaire' each pharmacist selected to enter their data. This may explain why there are numerous free-text responses for some questions.

The time recorded by the pharmacists for undertaking some activities may have been underestimated as defined response options available in the logbook were capped at 180 minutes for the majority of roles. In particular the time spent on HMRs and non-HMRs recorded by pharmacists in the logbook, is likely to under-represent the total time taken for all aspects of the medication reviews, such as coordinating another member of staff (generally an Aboriginal Health Worker or Practitioner) to accompany them on the home visit, arranging ACCHS transport, locating patients in community, communicating with patients to schedule the home visit, accounting for cancellations or 'no shows'. The logbook did not capture pharmacist time spent on administration, non-clinical duties or data entry required for evaluation purposes.

Limitations to data entry may have also underestimated pharmacist reports of positive outcomes as logbook entries could not be edited once submitted. For example, some data on the outcomes of medication reviews, such as whether the prescriber accepted or declined recommendations made by the pharmacist, could not be recorded. Pharmacists were also not able to delete their own entries made in error, however pharmacists were able to advise the JCU Administrators where errors occurred and these were excluded from analysis.

Each pharmacist was established with an individual logbook account to ensure security of the system and confidentiality of patient data. However, at up to three ACCHSs where two pharmacists provided services for the IPAC project, challenges were experienced in monitoring services provided by the pharmacists to 'shared' patients, and identifying which patients needed follow-up. Alternative processes were put in place by these pharmacists, generally using excel spreadsheets, to track their combined interactions with patients.[94]

Conclusion

The integrated pharmacist role within ACCHSs as part of the IPAC project was comprehensive, with a large range of services delivered to health service staff, external stakeholders, patients and the community. Core practice-based roles within these primary health settings included team-based collaboration, transitional care, the development and implementation of stakeholder liaison plans, and communication and contact with community pharmacy. Pharmacists provided a medicines-related information service, education and advice, and contributed to chronic disease care through case conferences, care planning, and other team-based activity.

Integrated pharmacists were found to have interacted with community pharmacists on a daily basis with more occasions logged for such interactions than any other IPAC activity. The most common agency engaged by integrated pharmacists for supporting the transitional care of patients was also community pharmacy for the purpose of reconciling medication lists. Integrated pharmacists were well-placed to improve medication safety at patient transitions of care. Stakeholder liaison plans were predominantly co-designed with clinic managers or senior staff and targeted local community pharmacies. These plans guided improvements to communication and knowledge transfer to optimise the patient journey. Relationships between stakeholders and the health service were reinforced and community pharmacists, in particular, agreed that communication had improved particularly through having the integrated pharmacist as their main point of contact. Some stakeholders reported that better collaboration had enhanced medication reviews, improved the quality use of medicines, and supported patients to improve their adherence to medications. Pharmacists conducted drug utilisation reviews which facilitated improvements in prescribing quality on a range of topics that were a priority for their respective health service.

The integrated pharmacists developed relationships with health service staff through team-based collaborations, which strengthened over time and facilitated their integration into the team and health service. Pharmacists participated in multidisciplinary case conferencing and provided input into care plans and the management of patients with chronic diseases. The provision of medicines information through medication reviews and informal conversations was valuable for clinical staff and increased their knowledge levels on clinical conditions and medication options. Education sessions and written medicines information provided opportunities to upskill and enhance the knowledge of Aboriginal Health Workers. Integrated pharmacists also supported patients through education most frequently on how to take their medicines. Verbal explanation of information provided to patients was important, as was the opportunity to demonstrate and teach patients how to use their devices effectively.

Qualitative evaluation of the IPAC project facilitated feedback from GPs, other health services staff, community pharmacists, and the integrated pharmacists themselves and provides context around these roles and their the impact.[95] Health services staff identified that the pharmacists built and maintained relationships and integrated with the primary health care team and more broadly within ACCHSs. Education sessions and medicines information provided by the pharmacist was found valuable and knowledge levels of staff had increased as a result. ACCHS staff felt communication and services from external stakeholders had been enhanced by integrating a pharmacist into the ACCHS, such as relationships with community pharmacists. Patients reported being more adherent to taking their medicines as a result of having a better understanding of their conditions, including what their medicines were for, how they worked, and why they needed to take them, which was explained to them by the integrated pharmacist.

Approximately two-thirds of activities recorded by the integrated pharmacists directly impacted patients. However, the majority of other activities had benefits more broadly and were anticipated to benefit patients indirectly. Practice-based activities are likely to have contributed to improvements in prescribing quality,[96] [97] increased patient access to medication management reviews and improved health service utilisation,[98] improved medication adherence and self-assessed health status of patients,[99] and clinical endpoint improvements[100] as shown in other reports for the IPAC study.

The core roles implemented by pharmacists in the IPAC project and the resulting benefits were highly valued by health service staff, external stakeholders and patients. The IPAC project provided evidence that the implementation of similar non-dispensing pharmacy services is generalizable to other Aboriginal Community Controlled Health Services in all settings. Future integrated pharmacist roles could include the practice-based activities described in this report.

Supplementary Tables

Table A. Total number of participants with MBS item 715 (Aboriginal and Torres Strait Islander health assessment) rebate claims.

	Baseline	Intervention period	p-value*
Number of participants with a completed item:			
None	564 /1456 (38.7%)	807 /1456 (55.4%)	<0.001
One	825 /1456 (56.7%)	572 /1456 (39.3%)	
Two	66 /1456 (4.5%)	76 /1456 (5.2%)	
More than two	1 /1456 (0.1%)	1 /1456 (0.1%)	
Total number of participants with at least one completed item	892 /1456 (61.3%)	649 /1456 (44.6%)	<0.001
Total person-days of observation**	531440	413723	<0.001
Number of participants with at least one completed item per 100 person-years [95% CI]*	61.3 [52.0-70.6]	57.3 [44.5-69.7]	0.590
Rate ratio of participants with at least one completed item per 100 person-years	1	0.93	

*P-value, cluster adjusted p-value for ACCHS. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table B. Total number of MBS item 715 (Aboriginal and Torres Strait Islander health assessment) rebate claims.

	Baseline	Intervention period	p-value*
Total number of completed items	960	727	
Number of completed item claims per patient	0.66	0.50	0.021
Total person-days of observation**	531 440	413 723	<0.001
Total number of completed items per 100 person-years [95% CI]*	65.9 [55.5-76.4]	64.1 [45.5-82.6]	0.833
Rate ratio of completed items per 100 person-years	1	0.97	

* P-value, cluster adjusted p-value for ACCHS and patients. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table C. Total number of participants with MBS item 721 (chronic disease care plan) rebate claims.

	Baseline	Intervention period	p-value*
Number of participants with a completed item:			
None	663 /1456 (45.5%)	969 /1456 (66.6%)	<0.001
One	768 /1456 (52.8%)	445 /1456 (30.6%)	
Two	24 /1456 (1.7%)	40 /1456 (2.75%)	
More than two	1 /1456 (0.1%)	2 /1456 (0.1%)	
Total number of participants with at least one completed item	793 /1456 (54.4%)	487 /1456 (33.5%)	<0.001
Total person-days of observation**	531440	413723	<0.001
Number of participants with at least one completed item per 100 person-years [95% CI]*	54.5 [43.3-65.6]	43.0 [30.8--55.0]	0.103
Rate ratio of participants with at least one completed item per 100 person-years	1	0.79	

*P-value, cluster adjusted p-value for ACCHS. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table D. Total number of MBS item 721 (chronic disease care plan) rebate claims.

	Baseline	Intervention period	p-value*
Total number of completed items	819	531	
Number of completed item claims per patient	0.56	0.36	0.005
Total person-days of observation**	531 440	413 723	<0.001
Total number of completed items per 100 person-years [95% CI]*	56.3 [44.5-68.0]	46.9 [31.4-62.0]	0.270
Rate ratio of completed items per 100 person-years	1	0.83	

* P-value, cluster adjusted p-value for ACCHS and patients. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table E. Total number of participants with MBS items (any of) 721,723, and 732 (chronic disease care plan, team-care arrangements (TCA) and review of a care plan or TCA) rebate claims.

	Baseline	Intervention period	p-value*
Number of participants with a completed item:			
None	463 /1456 (31.8%)	683 /1456 (46.9%)	<0.001
One	122 /1456 (8.4%)	215 /1456 (14.8%)	
Two	414 /1456 (28.4%)	285 /1456 (19.6%)	
More than two	457 /1456 (31.4%)	273 /1456 (18.8%)	
Total number of participants with at least one completed item	993 /1456 (68.2%)	773 /1456 (53.1%)	<0.001
Total person-days of observation**	531440	413723	<0.001
Number of participants with at least one completed item per 100 person-years [95% CI]*	68.2 [56.2-80.2]	68.2 [48.7-87.4]	>0.999
Rate ratio of participants with at least one completed item per 100 person-years	1	1	

*P-value, cluster adjusted p-value for ACCHS. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table F. Total number of MBS items (any of) 721, 723, and 732 (chronic disease care plan, team-care arrangements (TCA) and review of a care plan or TCA) rebate claims.

	Baseline	Intervention period	p-value*
Total number of completed items	2557	1800	
Number of completed item claims per patient	1.76	1.24	0.008
Total person-days of observation**	531 440	413 723	<0.001
Total number of completed items per 100 person-years [95% CI]*	175.6 [136.6-214.7]	158.8 [102.9.-214.1]	0.607
Rate ratio of completed items per 100 person-years	1	0.90	

* P-value, cluster adjusted p-value for ACCHS and patients. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table G. Total number of participants with MBS items (any of) 735, 739, and 743 (case conference-organizing and coordinating) rebate claims.

	Baseline	Intervention period	p-value*
Number of participants with a completed item:			
None	1415 /1456 (97.2%)	1391/1456 (95.5%)	
One	40 /1456 (2.8%)	57 /1456 (3.9%)	0.148
Two	0 /1456 (0%)	7 /1456 (0.5%)	
More than two	1 /1456 (0.1%)	1 /1456 (0.1%)	
Total number of participants with at least one completed item	41 /1456 (2.8%)	65 /1456 (4.5%)	0.154
Total person-days of observation**	531440	413723	<0.001
Number of participants with at least one completed item per 100 person-years [95% CI]*	2.8 [1.1-4.5]	5.7 [1.9-9.5]	0.123
Rate ratio of participants with at least one completed item per 100 person-years	1	2.03	

*P-value, cluster adjusted p-value for ACCHS. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table H. Total number of MBS items (any of) 735, 739, and 743 (case conference- organizing and coordinating) rebate claims.

	Baseline	Intervention period	p-value*
Total number of completed items	43	74	
Number of completed item claims per patient	0.03	0.05	0.148
Total person-days of observation**	531 440	413 723	<0.001
Total number of completed items per 100 person-years [95% CI]*	3.0 [1.2-4.7]	6.5 [2.0-11.1]	0.188
Rate ratio of completed items per 100 person-years	1	2.21	

* P-value, cluster adjusted p-value for ACCHS and patients. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table I. Total number of participants with MBS items (any of) 747, 750, and 758 (case conference-participation) rebate claims.

	Baseline	Intervention period	p-value*
Number of participants with a completed item:			
None	1455 /1456 (99.9%)	1453 /1456 (99.8%)	
One	1 /1456 (0.1%)	3 /1456 (0.2%)	na
Two	0 /1456 (0%)	0 /1456 (0%)	
More than two	0 /1456 (0%)	0 /1456 (0%)	
Total number of participants with at least one completed item	1 /1456 (0.07%)	3 /1456 (0.21%)	na
Total person-days of observation**	531440	413723	<0.001
Number of participants with at least one completed item per 100 person-years [95% CI]*	0.1 [0-0.2]	0.3 [0-0.6]	na
Rate ratio of participants with at least one completed item per 100 person-years	1	3.9	

*P-value, cluster adjusted p-value for ACCHS. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table J. Total number of MBS items (any of) 747, 750, and 758 (case conference- participation) rebate claims.

	Baseline	Intervention period	p-value*
Total number of completed items	1	3	
Number of completed item claims per patient	0.0007	0.0021	na
Total person-days of observation**	531 440	413 723	<0.001
Total number of completed items per 100 person-years [95% CI]*	0.07 [0-0.22]	0.26 [0-0.64]	na
Rate ratio of completed items per 100 person-years	1	3.85	

* P-value, cluster adjusted p-value for ACCHS and patients. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table K. Total number of participants with MBS items (any of) 10987 and 10997 (follow-up service to item 715 and 721 that includes a medication adherence check undertaken by a practice nurse or an Aboriginal and Torres Strait Islander health practitioner) rebate claims.

	Baseline	Intervention period	p-value*
Number of participants with a completed item:			
None	470 /1456 (32.3%)	625 /1456 (42.9%)	
One	248 /1456 (17.0%)	288 /1456 (19.8%)	0.148
Two	200 /1456 (13.7%)	167 /1456 (11.5%)	
More than two	538 /1456 (37.0%)	376 /1456 (25.8%)	
Total number of participants with at least one completed item	986 /1456 (67.7%)	831 /1456 (57.1%)	**0.020**
Total person-days of observation**	531440	413723	<0.001
Number of participants with at least one completed item per 100 person-years [95% CI]*	67.7 [58.1-77.4]	73.3 [60.3-86.1]	0.475
Rate ratio of participants with at least one completed item per 100 person-years	1	1.08	

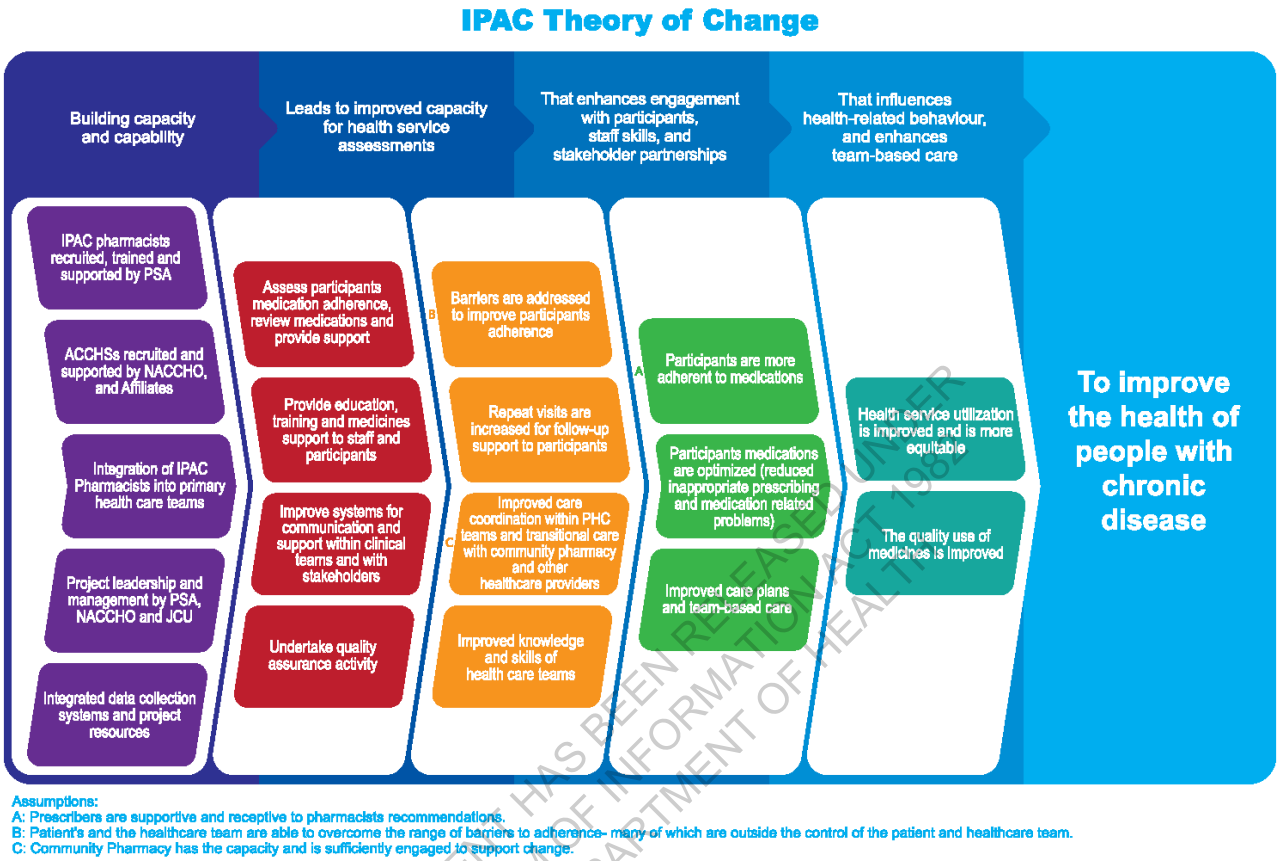
*P-value, cluster adjusted p-value for ACCHS. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table L. Total number of MBS items (any of) 10987 and 10997 (follow-up service to item 715 and 721 that includes a medication adherence check undertaken by a practice nurse or an Aboriginal and Torres Strait Islander health practitioner) rebate claims.

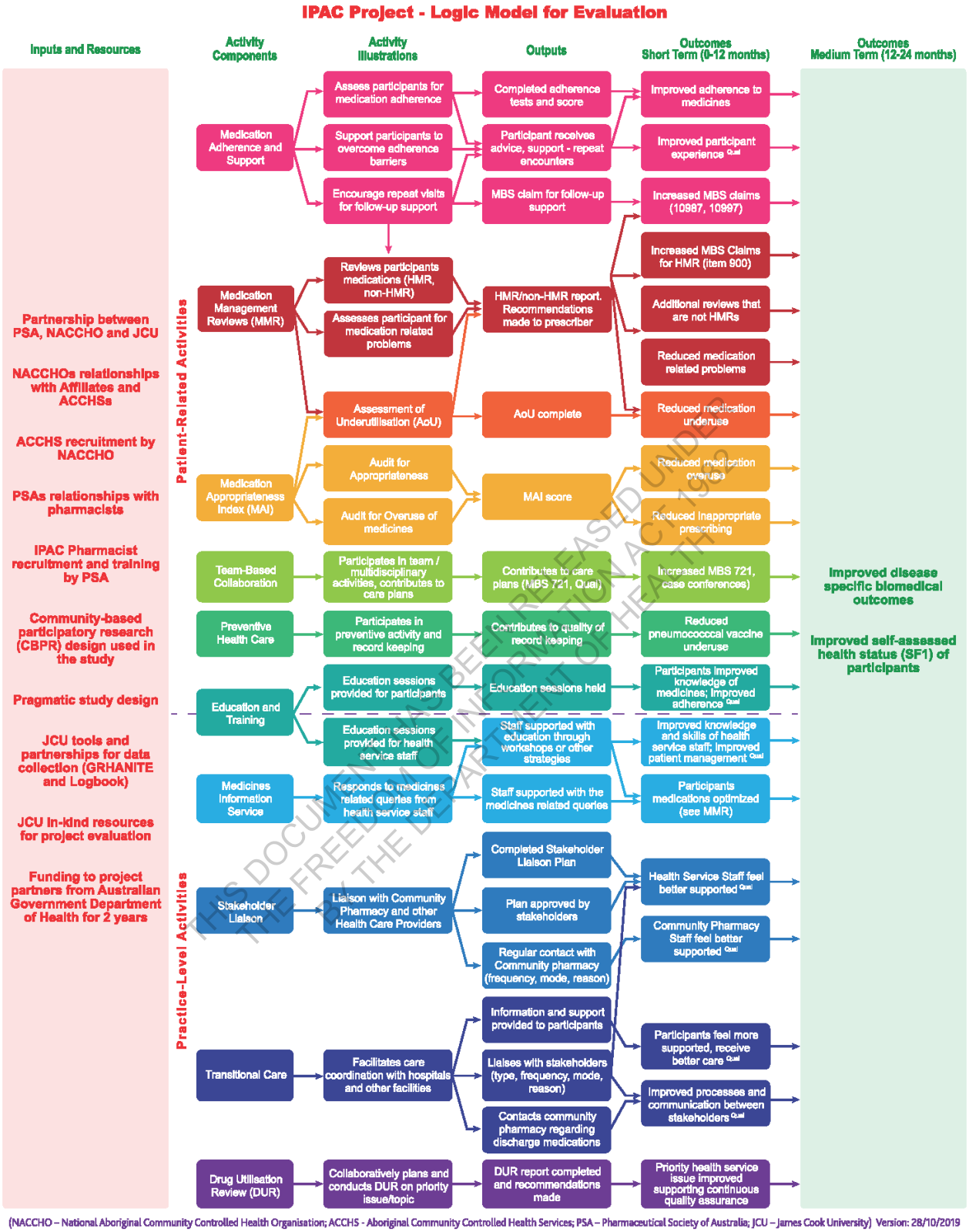
	Baseline	Intervention period	p-value*
Total number of completed items	4203	2910	
Number of completed item claims per patient	2.9	2.0	**0.035**
Total person-days of observation**	531440	413723	<0.001
Total number of completed items per 100 person-years [95% CI]*	288.7 [188.4-389.0]	256.7 [174.2-338.3]	0.602
Rate ratio of completed items per 100 person-years	1	0.89	

* P-value, cluster adjusted p-value for ACCHS and patients. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Appendix A: IPAC Project Theory of Change



Appendix B: The IPAC Project Logic Model for the Evaluation.



Appendix C: Stakeholder Liaison Plan Template.

IPAC Project - MEDICINES STAKEHOLDER LIAISON PLAN

Complete a plan for each stakeholder

Name of Stakeholder / Service Provider	
Name of primary Stakeholder contact person (include phone number)	
Type of service provider	• Community pharmacy provider _____ • Hospital _____ • Other GP service provider _____ • Tertiary referral centre _____ • Aged Care Facility _____ • Pathology provider _____ • Other (please specify):
Nature of involvement in providing medication related services to the ACCHS	• S100 provider _____ • S100 support provider _____ • QUMAX arrangement _____ • Dispensing pharmacist _____ • HMR provider _____ • Tertiary referral centre _____ • Local hospital _____ • Other (please specify):
Preferred method(s) of engagement	• Phone _____ • Email _____ • Face-to-face _____ • Other (please specify)
Outline any suggested areas for improvement in workflow/liaison	

1

Evidence of Outcome

Actions undertaken to improve workflow/liaison	
Evidence that actions have led to improvement in workflow/liaison	
Feedback from Stakeholder / Service Provider	
Feedback from ACCHS	

Date of plan finalisation: _____ / _____ / _____

Signature of Stakeholder representative: _____

Appendix D: Drug Utilisation Review Template.

IPAC Project Drug Utilisation Review Report

Date of DUR _____

DUR Title (description)	
Source of best-practice evidence used to support DUR	
Criteria for DUR	
Method of data collection & evaluation	
Results	
Actions or recommendations (Proposed changes to standard of care)	
Staff members involved in making changes to care (include role)	
Outcome of actions	

Additional notes:

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IPAC

Methodology for a model extending an integrated pharmacist program into all Aboriginal Community Controlled Health Services in Australia

May 2020

Pharmaceutical Society of Australia

NACCHO

JAMES COOK UNIVERSITY AUSTRALIA

Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project.

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The authors wish to acknowledge the Australian Government as the funding body supporting the implementation of the IPAC Project, under the Sixth Community Pharmacy Agreement (6CPA), with funding allocated for a Pharmacy Trial Program (PTP). The PTP will trial new and expanded community pharmacy programs which seek to improve clinical outcomes for consumers and/or extend the role of pharmacists in the delivery of primary healthcare services through community pharmacy. All PTP trials will be evaluated by an independent health technology assessment (HTA) body.

The authors also acknowledge members of the IPAC Evaluation Team, the Affiliates of the National Aboriginal Community Controlled Organisation, the participating ACCHSs, IPAC pharmacists, and the IPAC Steering Committee members.

Introduction

The IPAC Project has delivered significant benefits to the 18 participating Aboriginal Community Controlled Health Services (ACCHSs). It is proposed that this model be extended to all ACCHSs across Australia. The IPAC Project had a clear definition of ACCHS pre-requisites (inclusion criteria) based primarily on the *research* requirements through the Pharmacy Trial Program (PTP). The ACCHS inclusion criteria were not primarily related to the implementation of a national program.[1] A fundamental premise of the project was that the IPAC intervention would be generalisable to all ACCHSs. Additionally, the PTP Principle "Applicability and Context" requires projects to consider national implementation. The difference between mainstream and government-run AHSs compared to ACCHSs is well documented,[2] and the IPAC Project did not investigate the intervention in an AHS or mainstream environment. For these reasons, the model outlined below has been costed for all 140 ACCHSs across Australia. The program cost per annum presented here is comparable with other federally funded Aboriginal and Torres Strait Islander medicines initiatives and may help to close the gap in Aboriginal and Torres Strait Islander underutilization of nation-wide Australian pharmaceutical measures, such as the PBS and other Community Pharmacy Agreement related programs. Further rationale and assumptions used for this modelling are described below.

Pharmacists' Salary

Due to the study design and nature of the PTP, costs were allocated only for the salary of the pharmacist plus on costs, for the IPAC Project. Using the IPAC Project methodology for allocation of pharmacist FTE and salary, together with AIHW statistics related to attendance of clients at Aboriginal Primary Health Services,[3] a funding model for pharmacist salary has been proposed. The approach, as in IPAC, was to allocate a baseline 0.2FTE to each ACCHS then a further allocation of pharmacist FTE according to ACCHSs' client numbers. Only a block funding model was costed for this report but analysis of IPAC data could be used to negotiate alternate methods.

The Workforce Incentive Payment (WIP) Practice Stream is a federal program that provides an annual payment of up to $125,000 plus a remote loading to general practices and ACCHSs to employ nurses, AHPs, AHWs allied health professionals and, since February 2020, non-dispensing pharmacists.[4] This maximum annual incentive payment is available to clinics with a Standard Whole Patient Equivalent (SWPE) number over 5000, and may be used to support a combination of eligible allied health professionals for a minimum average of 63 hours and 20 minutes per week. As such, the annual incentive amount available for any individual service provider working 1.0 FTE is capped at $75,000, supplemented by MBS income for provision of additional billable services.

A survey of IPAC ACCHSs suggests that the majority of ACCHSs already use the maximum funds available for nurses, AHPs or AHWs. Therefore, these ACCHSs cannot access WIP funds for pharmacists without displacing other clinical staff and thus is not a viable option for funding an integrated pharmacist. Furthermore, non-dispensing pharmacists remain unable to claim MBS item fees for chronic disease management (CDM) services provided in a primary care setting, and therefore cannot supplement the maximum incentive payment available under the WIP.

While the WIP model caps the payment at $125,000 per practice/ACCHS, this has not been done in the proposed integrated pharmacist model where large ACCHSs would be eligible for more than the maximum allocation. The IPAC model allocated more than 1 FTE pharmacist to 2 large urban practices with high patient numbers, and the results reflect a proportionate increase in numbers of services delivered.

While a mixed model encompassing baseline funding plus a fee-for-service methodology may be considered for future program rollout, block funding is likely to be more appropriate to enable integrated pharmacists to most effectively meet the unique needs of Aboriginal and Torres Strait Islander peoples. A block funding approach aligns with other Commonwealth funding approaches for ACCHSs (such as the Indigenous Australians' Health Programme); accommodates patient non-attendance at scheduled clinic appointments that occurred in some ACCHSs during the IPAC Project; and allows for the significant variation in preference for pharmacist services (including clinical governance, education and training, and patient-directed care) observed across ACCHSs in the IPAC Project.

Size of the patient population being serviced by the ACCHS is also a factor. Wakerman et al[5] found that per capita health care costs increase with decreasing population, independent of remoteness. For this reason, the IPAC model and this proposed model provides a baseline 0.2FTE for all ACCHSs, regardless of their size, before allowing for the estimated population. This means that the per capita cost for smaller ACCHSs is higher than for larger ACCHOs. It also ensures that there is a minimum commitment of time for pharmacists in very small services (who may otherwise be allocated less than 0.2FTE) to allow regular contact, maximise integration into the ACCHS and to build rapport with staff.

Infrastructure support such as office facilities, computer access, transport, travel and accommodation for remote sites as well as salaries for people assisting the pharmacist were provided in-kind by the IPAC hosting ACCHS and could not be consistently costed. Thus, it is not included in this model but, for program sustainability, may need to be considered in future policy discussions.

Remoteness is another factor to be considered with studies demonstrating that health costs increase with remoteness. Rural loadings per WIP – Practice Stream have been used in this model (Table 1).

Table 1: Workforce Incentive Payment Practice Stream rural loadings used in this model.

Modified Monash Method Category	% loading
MMM1	0%
MMM2	0%
MMM3	20%
MMM4	30%
MMM5	30%
MMM6	50%
MMM7	50%

Table 2 outlines the proposed model for pharmacist salary using the IPAC methodology and WIP rural loadings.

Table 2. Proposed model for pharmacist salary using IPAC methodology and ACCHS remoteness.

	Total clients attending Aboriginal Primary Health Services *	Regular clients accessing ACCHSs, assuming constant proportion 85%	Total number of Aboriginal Primary Health Services	Approx number of ACCHSs in each region[1]	Baseline 0.2 FTE per ACCHS	Proportional pharmacist FTE[2]	Baseline FTE plus proportional pharmacist FTE	Proposed % salary loading[3]	Pharmacist Salary[4]
Major Cities	97,473	82,657	23	16	3.2	10.0	13.2	0	$1,645,586.26
Inner Regional	95,733	81,182	40	29	5.6	9.8	15.4	0	$1,923,351.18
Outer Regional	117,294	99,465	45	32	6.4	12.0	18.4	20	$2,758,649.40
Remote	82,259	69,756	26	18	3.6	8.4	12.0	30	$1,951,520.82
Very Remote	90,314	76,586	64	45	9.2	9.2	18.4	50	$3,456,154.43
Total	**483,073**	**409,646**	**198**	**140**	**28**	**49.4**	**77.4**		**$11,735,262.09**

Assumptions:

1. The AIHW report combines ACCHS and state/territory funded primary Health Services. Therefore the number of ACCHSs in each region was not directly available, however, these data illustrate approximate values effectively. Figures in the table were based on the ratio of total ACCHSs to total Aboriginal Primary Health Services from AIHW report for each category. However, this may skew costs as health services in remote areas may be more often operated under state/territory governance.[3]
2. The proportional pharmacist FTE was based on 1FTE pharmacist per 8295 client population as per IPAC Project methodology. This is irrespective of age or chronic disease. It is unclear how this relates to the WIP formula of FTE per 5000 SWPE.
3. The salary loading for remoteness is based on WIP guidelines which uses the MMM category of remoteness (7 layers). The AIHW report used for estimated populations uses the ASGC-RA system (5 layers). Associations between classes are not straight forward. Therefore, assignment to class for this calculation may not be precise and is conservative, as some remote locations may be classified at a lower RA level.
4. The total national cost quoted above is a proposed maximum figure which assumes that all ACCHSs would wish to participate in the IPAC program and can access a suitable pharmacist/s.

Training and support for integrated pharmacists

Pharmacists integrated within ACCHSs work with complex patients, often with multiple chronic diseases, necessitating an understanding of social determinants of health and the public health challenges related to Aboriginal and Torres Strait Islander peoples. Training therefore needs to prepare pharmacists to work within ACCHS settings to deliver a diverse range of professional services within their scope of practice in a culturally-responsive manner.

While the comprehensive induction training program developed for use in the IPAC Project included some elements specific to the project, a large proportion of its content could be considered for incorporation into a future training program for pharmacists upon broader rollout of integrated pharmacist services to ACCHSs across Australia. Such a training program could be modelled on PSA's existing *General Practice Pharmacist Foundation Training c*ourse,[6] a multi-module online course intended to prepare pharmacists to work in a general practice setting; this concept could then be tailored to the ACCHS context.

Beyond training, the provision of ongoing support, along with the creation of a community of practice for pharmacists working with Aboriginal and Torres Strait Islander peoples, would enable sharing of sector knowledge and expertise with the aim of increased uptake, up-skilling and retention of pharmacists working in the ACCHS sector. Support for integrated pharmacists may be provided by various means as demonstrated in the IPAC Project, and should be multi-modal to take into account accessibility, ease of utilisation and responsiveness.

Recommendations for such a model are included in PSA's *IPAC Project Support for Pharmacists Report*[7] which references the following methods: phone and email support, online resources repository, facilitated teleconferences, discussion forum, social media and mentor support. An estimate of the cost of training and support for integrated pharmacists is included in Table 3.

Table 3. Proposed cost per annum of training and support for integrated pharmacists.

	Year 1	Year 2	Year 3	Year 4	Year 5
Creation of online training course	$530,000				
Facilitation of mentor, clinical and other support to pharmacists working (or intending to work) in the ACCHS sector	$529,000	$529,000	$529,000	$396,750	$396,750
Creation and maintenance of a community of practice for integrated practice pharmacists in the ACCHS sector	$62,000	$62,000	$62,000	$62,000	$62,000
Ongoing support for the PSA/NACCHO ACCHO Pharmacist Leadership Group	$30,000	$30,000	$30,000	$30,000	$30,000
Total Program Expenses	**$1,151,000**	**$621,000**	**$621,000**	**$488,750**	**$488,750**

Program Support for ACCHSs

The novelty of employing an integrated pharmacist to many health services has had a considerable implementation burden on ACCHSs and pharmacists alike. This is evidenced by the gradual uptake of intervention activities within the IPAC Project and through findings in the Project's qualitative evaluation. Substantive and considered program support for pharmacists and ACCHSs' staff is needed as service providers develop workplans, understand roles and adapt to new healthcare activities and workflow. There is a risk that integrating pharmacists into ACCHSs without adequate support may limit uptake and effectiveness of an integrated pharmacist program.

Tested support methods for medicines-related programs within ACCHSs already exist. The Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander peoples (QUMAX) program has run effectively within a clearly defined set of program rules and support measures for over 10 years. Several reviews in this period have validated the program's effectiveness[8] [9] [10](8-10). The QUMAX program ACCHS support involves 1 FTE dedicated support staff member (including associated management and overheads costs) and provisions for 1 annual workshop and for occasional ACCHS site visits by support staff. We therefore propose an implementation of a support package that combines metrics and methods from the QUMAX program with those used in the IPAC project establishment and implementation phases, to ensure an ACCHS integrated pharmacist program is implemented as effectively and efficiently as possible.

The following proposed budget represents an estimate of the costs of a similar program to the QUMAX and the IPAC support programs, with support from NACCHO for health services. This provides for an average of 2 FTE project officers per year over the course of 5 years to support implementation of the program.

The role of the support program will include:

- Work with ACCHS, pharmacists and the funding body to implement and revise/improve the Program
- Oversee and support annual workplans developed by ACCHSs, consistent with the model used for QUMAX and s100 support allowance. The workplan would be consistent with the ideals of the program and the funding algorithm developed by the fund holder
- Provide support to ACCHSs and integrated pharmacists in optimisation of outcomes for clients via the Program
- Inform and develop Program materials and/or resources for pharmacists, consumers and participating ACCHSs as required
- Jointly develop the annual national meeting of ACCHSs and pharmacists
- Enable and advise on data collection and monitoring of program delivery

The package below is to be delivered over a 5-year period. The timing of funding for this program is skewed towards the earlier stages due to the novelty of this program and thus the need for active support and promotion early in the programs' implementation. Uptake for some ACCHSs may be delayed without investment in early implementation and communication as ACCHS identify the program and are enrolled, and then pharmacists are recruited over time. These methods could be incorporated into the salary, on-costs, IT and project publications and resources budget items shown in Table 4.

Table 4. Proposed costs per annum of program support to ACCHSs.

	Average per year	Year 1	Year 2	Year 3	Year 4	Year 5
Project officers FTE	(2.0 FTE)	(2.5 FTE)	(2.5 FTE)	(2.0 FTE)	(1.5 FTE)	(1.5 FTE)
Salary – project officers	250,000	312,500	312,500	250,000	187,500	187,500
Salary on costs (25% of salary) + IT, management fee	80,000	100,000	100,000	80,000	60,000	60,000
Travel (project officers + meeting travel)	50,000	75,000	75,000	50,000	25,000	25,000
Annual Meeting Expenses (i.e. annual workshop)	60,000	60,000	60,000	60,000	60,000	60,000
Project Publications & Resources	50,000	100,000	75,000	50,000	25,000	0
Total Program Expenses	**$490,000**	**$647,500**	**$622,500**	**$490,000**	**$357,500**	**$332,500**

Program Monitoring and Evaluation

In order to provide a comprehensive costing of proposed program implementation, a component of program evaluation has been incorporated into the report. It is understood that the framework for evaluation would be determined by the funding body and its existing mechanism.

While evaluation of the proposed service will not need to be as extensive as that undertaken in the IPAC Project, ongoing monitoring and assessment is essential to ensure that the program is meeting its stated objectives, identify any issues affecting implementation, and address these in a timely manner.

Components of monitoring and evaluation of the proposed service may include:

- Work with partners to identify key activity measures and design an evaluation framework;
- Develop data collection tools guided by the evaluation framework;
- Coordinate surveys and qualitative activities as required;

- Coordinate data management including collection, transfer and extraction, and storage;
- Manage all data processing including preparation of datasets for analysis;
- Provide biostatistical support including all statistical analysis and preparation of output reports;
- Provide data custodian services including data integrity monitoring, security, quality assurance;
- Prepare and deliver data reports for team members and project partners as required.

The provision of regular output reports based on pharmacist activity data would provide stakeholders with evidence that activities are being completed, help to target support within services where needed, provide data to support health promotion, and assist the community pharmacy sector to support collaborative activity.

It is proposed that pharmacist activity data be collected through an electronic pharmacist logbook, similar to the tool used in the IPAC project. The logbook used in the trial could adapted and tailored to report on key pharmacist activity measures (such as medication reviews, follow-up assessments, contact with community pharmacy, etc), as agreed to by the business rules for the program. The services of an IT consultant would be required to tailor the logbook and facilitate access to the tool for all pharmacists and other relevant stakeholders.

Other evaluation strategies including surveys and qualitative activities undertaken at key points in time, as guided by the framework developed, could be used to facilitate formal feedback from stakeholders and support ongoing quality improvement of the program. Surveys could be implemented online and interviews with ACCHS staff, pharmacists and stakeholders conducted by Zoom/teleconference at one or two points in time over the proposed 5-year duration.

As James Cook University (JCU) College of Medicine and Dentistry led the evaluation of the IPAC Project, it would be well placed to collaborate with the Australian Department of Health, NACCHO, the PSA and other stakeholders to design an evaluation framework and implement resulting activities for broader program rollout.

Table 5 outlines the proposed budget required to fulfil this role.

Table 5. Proposed costs per annum of monitoring and evaluation of the proposed Service.

Expenses	Year 1	Years 2 - 5 (per annum)
1.5 FTE Project Officer/Biostatistician (including on-costs)	$210,000	$210,000
Overheads (35% of salaries)	$73,500	$73,500
1 month (160 hours) logbook adaptation, development and setup ($110/hour ex GST x 160 hours)	$17,600	
Logbook hosting ($60/month ex GST)	$720	$720
1 day per month (8 hours) logbook ongoing maintenance ($110/hour ex GST x 8 hrs/month)	$10,560	$10,560
Total (ex GST)	**$312,380**	**$294,780**

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Pharmaceutical Society of Australia

June 2020

Pharmacy Trial Program Tranche 2

Integrating Pharmacists within ACCHSs to Improve Chronic Disease Management (IPAC) Project

Thematic Analysis of Feedback received by the PSA Coordinators

PSA Committed to better health

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THIS REPORT WAS WRITTEN BY
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- James Cook University (JCU) College of Medicine and Dentistry; A/Prof Sophia Couzos, Dr Deb Smith, Dr Erik Biros.
- Steering Committee; Independent Chair s47F , Dr Dawn Casey (NACCHO), Ms Deb Bowden (PSA), A/Prof Sophia Couzos (JCU), s47F (Pharmacy Guild of Australia), s47F (Independent pharmacist), Emeritus Professor Lloyd Sansom (Department of Health)

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The authors wish to acknowledge the Australian Government as the funding body supporting the implementation of the IPAC Project, under the Sixth Community Pharmacy Agreement (6CPA), with funding allocated for a Pharmacy Trial Program (PTP). The PTP will trial new and expanded community pharmacy programs which seek to improve clinical outcomes for consumers and/or extend the role of pharmacists in the delivery of primary healthcare services through community pharmacy. All PTP trials will be evaluated by an independent health technology assessment (HTA) body.

The financial assistance provided by the Australian Government must not be taken as endorsement of the contents of this report. The trials are undertaken by independent researchers and therefore the views, hypotheses and subsequent findings of the research are not necessarily those of the Australian Government Department of Health.

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Background

Pharmacists integrated within Aboriginal Community Controlled Health Services (ACCHSs) often work with complex patients who may have multiple chronic diseases and specific socio-cultural priorities and challenges. This necessitates an understanding of both complex chronic disease management and of the social determinants of health and the public health challenges related to Aboriginal and Torres Strait Islander peoples.

The IPAC Project explored if integrating a registered pharmacist as part of the primary health care team within ACCHSs (the intervention) led to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples with chronic diseases, when compared with prior (usual) care. [1] As such, pharmacists participating in the Integrating Pharmacists within ACCHSs to improve Chronic Disease Management (IPAC) Project were required to work across diverse settings in a culturally-responsive manner to deliver the required core services and to capture relevant data for evaluation.

All study measures related to *'quality of care'* outcomes (the project objective), and included indices to assess change in the quality of prescribing, the quality of medicines support through indicators of health service utilisation, and ultimately the effect of these improvements on biometric indices as a measure of health outcome; these are reported elsewhere.[2-4] Also fundamental to the relationship between study measures and the project objective was the quality of the patient, service and stakeholder experience related to the impact of integrated pharmacists at their respective ACCHSs.

As the project partner responsible for qualitative analysis, James Cook University (JCU) College of Medicine and Dentistry evaluated perceptions from health service staff and patients on having an IPAC pharmacist integrated within ACCHS. The analysis also explored perceptions regarding the effectiveness of the intervention through an in-depth assessment of implementation in an urban, regional and remote setting.[5]

Throughout the implementation phase of the project, PSA Coordinators received substantial feedback from patients, clinicians and health service staff supporting the value of pharmacists integrated within ACCHS. The participating integrated pharmacists also provided feedback related to the enablers and challenges they experienced during the project, examples of the tools and resources they developed for use in the project, and case studies demonstrating their impact on patients' health outcomes. This report aims to document a series of comments and feedback received by patients, ACCHS staff and pharmacists and synthesises themes related to this feedback.

Feedback received by PSA Coordinators

Feedback from patients

Throughout the implementation phase of the project, testimonials from patients attending participating ACCHSs were received by integrated pharmacists and health service representatives, and forwarded to PSA Coordinators. This feedback acknowledged the positive health impact and value to patients of integrated pharmacist services and, importantly, identified that the integrated pharmacists were working in a culturally responsive and safe manner.

In one testimonial, a patient stated:

> *"[IPAC pharmacist] said that we are a team. Me, [IPAC pharmacist], the doctor, nurses, everyone involved in helping ensure my diabetes doesn't get out of control- and I am the team leader but we are a TEAM. THAT changed my life. It was the start of a happier, healthier life for me". (Appendix A. Testimonial 1)*

Some consistent themes evident in the testimonials received from patients included the integrated pharmacists' ability to;

- Increase patient engagement with members of the health care team
- Instil a sense of self-empowerment in patients, enabling them to play a more active role in decision-making about their medication management
- Improve patients' understanding of the role of medicines, including reasons for changes made to therapy
- Adjust patients' medication regimens to better suit their lifestyle, making adherence easier
- Streamline medications and offer invaluable advice on dietary requirements
- Provide clinical consistency at sites which are reliant upon locum doctors
- Provide a valuable medicines-related contribution to holistic patient care when working as part of the multidisciplinary team at the ACCHS
- Communicate with patients in a way that made them feel comfortable talking about their health and their circumstances, enabling effective sharing of information

These patient testimonials (de-identified) are included at Appendix A.

Feedback from clinicians and other ACCHS staff

Testimonials supporting the value of integrated pharmacists within participating ACCHSs were also received by PSA Coordinators from clinicians working within the ACCHSs as well as from external clinicians involved in the care of their patients. This feedback was offered either at the time of site visits by PSA Coordinators or via email throughout the implementation phase.

Clinicians included numerous Medical Officers, a visiting Consultant Physician and an Aboriginal Health Worker, in addition to external pharmacists and a Credentialed Diabetes Educator working in public hospital servicing patients common to the ACCHS. Further testimonials were provided by a practice manager and site manager at participating ACCHSs.

In one testimonial, a Medical Officer stated;

> *"I think it would be an absolute dream for each practice to have a clinical pharmacist, especially where there is a high priority of Indigenous patients" (Appendix B. Testimonial 9)*

In another testimonial, a Medical Officer described a notable case in which the integrated pharmacist had a significant impact on patient's health outcome;

> *"A young woman in her 20's with an intellectual impairment and multiple endocrine disorders (thyroid, parathyroid, calcium metabolism) requiring complex medication dosing with side effects.*
>
> *[IPAC Pharmacist] visited the family several times and made contact with the disability support agency and the pharmacy who supplied her Webster packed medication.*
>
> *She ensured that the medication dosing regimen allowed for potential medication interactions (calcium, thyroxine etc); and worked out that the best way to support the client in taking her medications was to have them administered by the disability support agency who saw the client 3 times a week.*
>
> *She undertook significant communication with the client and her family, the disability support agency and the dispensing pharmacy, to help make this happen.*
>
> *I have just had this patient's blood results in (after all of [IPAC Pharmacist] hard work), and can report that after having had calcium serum levels which were putting her at risk of cardiac arrhythmias for months, a PTH 10 times above the upper limit of normal, and TSH consistent with symptomatic hypothyroidism, this patient has today returned with a normal suite of blood results for the first time in 12 months. This is just one case where having [IPAC Pharmacist] input from "on the ground/in the home", and her significant contribution to solving this problem, has resulted in a great outcome for this patient.*
>
> *Pharmacists working with GPs in this fashion can make an amazing difference to patient outcomes. I sincerely hope that funding for this kind of team work will continue." (Appendix B. Testimonial 15)*

Some consistent themes evident in the testimonials received from clinicians and ACCHS staff indicated that pharmacists integrated within the ACCHS;

- Educate and empower the community with improved understanding and confidence with their medications which in turn improves adherence
- Improve safety for patients around medication management, compliance, and avoidance of medication errors
- Increase GP understanding of the scope of practice of non-dispensing pharmacists
- Utilise their medicines information and research skills to assist GPs with decision making, particularly important in a population group with a high burden of chronic disease with many patients taking multiple medications
- Increasing quality of patient care, improve accuracy of records and reduce GP stress and time pressures

- Actively participate in case conferences, providing advice and suggestions as well as logistical support in providing treatment to patients in the community
- Play an important role in following-up and recalling patients who are at risk or require monitoring or review
- Provide tailored upskilling for staff including Aboriginal Health Workers and other staff on how to use medications
- Liaise between the GP and the community pharmacist / hospital / specialists / allied health, providing information and advice on medication and flagging issues that may not have been considered otherwise in a busy practice with high patient volume and complex patient needs, and high GP turnover
- Improve pathways of communication between GPs and community pharmacies, especially in regard to discharge medications
- Support the development of new tools for reviewing medication lists and checklists to update community pharmacy regarding changes in dose administration aids
- Provide guidance on matters such as medicine-related procedures, imprest management, and revision of emergency trolley contents

The clinician and staff testimonials (de-identified) received by PSA Coordinators are included in Appendix B.

Feedback from participating integrated pharmacists

Throughout the implementation phase, communication between the integrated pharmacists and PSA Coordinators was achieved by means of an extensive multi-modal program of support, as described in the *IPAC Project Support for Pharmacists Report*[6]

While day to day feedback from participating pharmacists was considered by PSA Coordinators in the routine operation of the project, formal feedback was sought in a workshop setting at the end of the implementation phase to supplement the qualitative evaluation[5] undertaken by James Cook University (JCU) College of Medicine and Dentistry.

The decision was made by PSA Coordinators to bring the pharmacists together in such a workshop environment, in lieu of second site visits, to enable dynamic group discussion and sharing of experiences. All participating integrated pharmacists were invited by the PSA Coordinators to attend the workshop in Darwin. Of the twenty pharmacists currently participating in the project at the end of the implementation phase, eighteen attended the workshop, with two pharmacists unavailable due to personal or annual leave arrangements.

The aim of the workshop was to explore the numerous enablers and challenges experienced by the integrated pharmacists throughout the implementation phase of the project. Pharmacists were also asked to individually identify enablers beyond induction training which assisted with their successful preparation and integration into the ACCHS setting.

These enablers were grouped into themes for further exploration and discussion. Themes were found to be consistent with those identified in the *IPAC Project - Qualitative Evaluation Report*.[5]

PSA Coordinators prepared a detailed report for the Steering Committee following the workshop, which can be found at Appendix C.

Templates, tools and resources created by integrated pharmacists

Throughout the implementation phase, many of the integrated pharmacists developed resources and templates to enhance patient care and medication adherence, as well as tools to assist with processes within their respective ACCHSs.

A number of pharmacists commented that the medication lists generated by the clinical information systems in their respective ACCHSs were not 'user friendly', prompting them to create culturally appropriate medication list templates (Appendices D1 – D3) of varying complexity which could be customised to meet the needs of individual patients.

In assisted-living circumstances where patients' medicines were managed by care staff, some pharmacists developed protocols (Appendix D4) to assist staff with safe handling and administration of medicines.

Some pharmacists recognised the need to create infographic resources to assist with medication use by patients with varying levels of health literacy. One example is shown at Appendix D5.

In addition to using the promotional posters and brochures developed by the project partners specifically for the IPAC Project, some pharmacists worked with health service staff to create their own ACCHS-specific flyer (see example at Appendix D6) to promote their availability and encourage patients to make an appointment for a pharmacist consultation.

In recognition of the challenges associated with contacting patients who may not have a reliable phone service, a number of pharmacists developed a letter template (see example at Appendix D7) inviting patients to come in to the ACCHS to see the pharmacist.

At a number of sites, pharmacists found that although referrals for Home Medicines Reviews (HMRs) were being generated there was no existing process in place to ensure receipt of the HMR reports, follow up and completion of Medication Management Plans by GPs and subsequent claiming for the associated MBS Item 900 payments.

One pharmacist developed a 'sharable spreadsheet' (Appendix D8) to capture all relevant steps involved in the HMR process and liaised with the MBS Officer at the ACCHS to co-create a process to be followed whereby multiple staff could update the spreadsheet according to their role. The pharmacist reported that this process increased the rate of progression from HMR referral to Item 900 claiming at the ACCHS.

At another site the integrated pharmacists liaised with their ACCHS clinical information system support manager to add a template (Appendix D9 into the clinical information system to streamline input by both pharmacists and GPs when creating HMR reports and associated Medication Management Plans (MMP).

Case studies and pharmacist reflections

Throughout the implementation phase, a number of integrated pharmacists provided PSA Coordinators with case studies or reflections on how they felt they contributed to patient health outcomes. These case studies highlight the complexity of health issues experienced by their Aboriginal patients, along with the need for multidisciplinary input to optimise patient health care.

Examples are included at Appendix E.

Discussion

The feedback received by PSA Coordinators from patients, ACCHS staff and external stakeholders involved in the medicines cycle of care for ACCHS patients was positive, and consistent with findings reported in the project's Qualitative Evaluation Report.[5]

Common themes emerged across the feedback provided to PSA Coordinators throughout the implementation phase, and included the acceptability, cultural safety and effectiveness of the pharmacist intervention.

Acceptability: Pharmacists, patients and staff alike reported that the integrated pharmacists became valued members of the primary healthcare team, collaborating with other clinicians to provide medicines-specific input into multidisciplinary patient care.

Cultural safety: Feedback indicated that the pharmacists communicated with patients in a culturally safe and respectful way to improve their understanding of the role of medicines, provide support with medication adherence, and empower them to become more involved in decision-making related to management of their chronic conditions.

Effectiveness: The perceived effectiveness of the pharmacist intervention was evident from patient, staff and pharmacist testimonials and case studies which told the stories of improved patient health outcomes and a strong desire for continuation of integrated pharmacist services to optimise patient care beyond the end of the project.

The number of non-dispensing pharmacists integrated within ACCHSs remains low, as pharmacists are not currently funded consistently or reliably to work within primary health care settings in the public health sector in Australia. This highlights the need for a broader program enabling uptake of integrated pharmacists into all ACCHSs across Australia to enable patients, staff and stakeholders to recognise the scope of practice of pharmacists and benefit from their input into patient-directed and health service-directed activities.

Throughout the IPAC Project, integrated pharmacists used their unique skills to create templates and culturally appropriate resources to enhance patient care and aid medication adherence, as well as tools to assist with processes within their respective ACCHSs. It is anticipated that with broader program rollout, integrated pharmacists would continue to provide this valuable service to the ACCHSs sector.

Conclusion

The substantial and consistently positive feedback received by PSA Coordinators from patients, clinicians and health service staff throughout the project indicated that participating integrated pharmacists fulfilled their role in a way that was acceptable, culturally safe and effective for ACCHSs and their communities. Furthermore this feedback indicated a clear desire for continuity of integrated pharmacist services within ACCHSs beyond the conclusion of the project, supporting the validity of broader program rollout to all ACCHS across Australia.

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Appendices

Appendix A. IPAC Project Testimonials from Patients

Testimonial 1:

In 2003 I was diagnosed with type 2 diabetes. I was given a high dose of Metformin however it made me sick. Eventually I just stopped taking it. I also stopped going to the doctor. A few years later I was seeing another doctor. That doctor prescribed something else. That medication didn't seem to do anything for me. I was put on insulin in 2008 when I was pregnant with my third daughter. I started having hypos which didn't seem to worry the doctor I was seeing and that concerned me.

I have had type 2 diabetes for 16 years. Most of that time I have not controlled the diabetes. I have tried. I have seen several doctors, nurses, dieticians and educators. I have been on several different medications. I know ultimately it is up to ME to look after myself; to take my medications, live a healthy lifestyle, see doctors, have checkups. But I am not a doctor, nurse, dietitian or pharmacist. It is not up to ME to scour the internet and research medical journals to find the information that should be provided to me by those who do have their medical degrees. All options should be provided and discussed.

I gave up so many times because I felt judged, not listened to, not given the information I needed. I felt that I am the patient without the medical expertise and I would be told this is what I'll take, when I'll take it and how much I'll take. And if that didn't work then obviously I was doing something wrong.

I gave up. I couldn't do it anymore. Ii couldn't go through the mental anguish any longer. So I stopped trying.

About November 2018, after more than two years of not seeing a doctor or taking any medication. I started to have problems with my legs and feet. I decided to see a doctor but put it off for a while and at the end of January 2019 I made an appointment to see a doctor at [site].

While I was waiting to see the doctor, a very friendly lady approached me with a big smile. She introduced herself as [IPAC pharmacist] and she told me she was the pharmacist. She explained to me what she does and asked me about my history and what medications I am taking or have taken in the past. She also offered to come in with me to see the doctor so that we could discuss what was available and what we could start off with. I gladly accepted her offer.

Part of our (myself, [IPAC pharmacist] and the doctors) discussions included what tablets/insulin was available, benefits/side effects of each and what they do, what can be taken together and what can't. I have never been given the information the [IPAC pharmacist] gave me that day. And she continues to give me information about different medication that are available to me.

That morning I was involved in the decision of what I would be given. I was asked my opinion.[IPAC pharmacist] said that we are a team.

Me, [IPAC pharmacist], the doctor, nurses, everyone involved in helping ensure my diabetes doesn't get out of control- and I am the team leader but we are a TEAM. THAT changed my life. It was the start of a happier, healthier life for me.

On the 30th January 2019 my hbA1c was 12.3%. Six weeks later it was 7.5%, at my three month checkup it was 5.1%.

I have had my eyes checked, my flu shot, 715 health check, seen a podiatrist, dietician and a psychologist, had a pap smear, breast check. I am exercising, am more active, I've lost weight. All because [IPAC pharmacist] cared enough to approach me that first day. All because she cares enough to check on how things are going and make sure I have ALL the information I should have.

I have witnessed firsthand what [IPAC pharmacist] does. I have seen her with other patients. The service and care she provides is just as important and just as valuable as the doctors, nurses, dieticians and anyone else who provides care for diabetics.

I have an awesome team and thanks to [IPAC pharmacist] I feel that I am a part of that team.

Testimonial 2:

To whom it may concern.

Last week after meeting with the Doctor/Pharmacist regarding our medications, my husband and I both agree that the consultation process was excellent.

Later we were told that this was only a one-off project. We believe that this consultation process should be considered as an ongoing service to further enhance our community care plan/

We know that the community will greatly appreciate it.

Thank you

Two Satisfied Elders

Testimonial 3:

To whom this may concern.

My name is [IPAC participant] and am a community member of [ACCHS location]. I have been attending [site] or a long time.

Since having a pharmacist working at [site] I have had someone to explain and talk to about my medications that I haven't been able to do with the chemist shop. I understand what my medications are for and know I can come down at any time and speak to the pharmacist.

When I come to [site] I see different doctors each time and sometimes I think my medicines are changed too much.

Having a pharmacist helps me to understand these changes and I feel that someone is helping to look after my health and medicines.

A pharmacist is important for [ACCHS location] and the older people. We go to the hospital and doctors for our medicines. The pharmacist is important to make sure the medicines are all okay for us to take.

I would like to know that there is a pharmacist at [site] in the future as I have really benefited from seeing her.

Yours sincerely

[IPAC participant]

Testimonial 4:

To whom this may concern,

I, [IPAC participant] being a community member of [ACCHS location] and a client of [site] since it began [as original site name] consented to the IPAC project in October 2018. Since having a pharmacist on board my medications are now up to date and suit my lifestyle. Before this, I was missing some doses of my medicines. Now that my medicines are sorted, I feel that my health will only improve. Even though this is something simple, before the pharmacist started, no one else looked at how to help with my medicines.

I believe that the pharmacist at [site] helps other patients in the community manage their chronic diseases and how to manage medicines. A pharmacist gives consistency at [site] which uses locum doctors.

Also, [IPAC pharmacist] at [site] has a nice personality and is easy to communicate with. I am comfortable talking to her about my health.

Yours sincerely

[IPAC participant]

Testimonial 5:

To whomever it may concern

My name is [IPAC participant] of [participant address] and have been attending the [site] in [ACCHS location] since being diagnosed with unusually high blood pressure at their outreach in [ACCHS location].

Since then, after manipulating various tablets and finding the appropriate medication for my medical condition has improved/stabilized dramatically according to the requirements of my living standards.

The staff there are courteous, always with a smile and are very efficient in their duties as are the transporters (I don't drive).

My blood pressure has adjusted to the require comfortability for my living and the physical and mental stress has decreased in accordance with the treatment given to me.

The visiting podiatrist has shown me how to walk so as to relieve the stress in my feet, calves and ankles from which I have suffered pain for a number of years.

The dietician there has taught me how to eat appropriately in accordance with my inactivity (I'm an invalid pensioner). Not only have I lost the paunch belly acquired from a previous life style, but I also sleep better.

On my last appointment the flu injection was administered for the first time ever and the pharmacist convinced me to give up smoking. I am trying hard to do so.

I give commendation fully to this clinics and all the staff permanent and visiting. Thank you all

From [IPAC Participant]

Testimonial 6:

Dear Sirs,

My wife and I are members of the [location] Aboriginal Cooperative and attend the [site] there.

We first met [IPAC pharmacist] when she started working at [site] one day a week as a pharmacist late in 2018. In the short space of time [IPAC pharmacist] was working with us, she was able to streamline my wife's medications and offer invaluable advice on dietary requirements. As a result of this my wife who is diabetic has been able to halve her doses of insulin, her blood sugar readings have stabilized and we both have lost over a stone in weight with hopefully more weight loss to come thanks to her knowledge and amazing ability to pass this information on in a friendly, easy manner and atmosphere.

It is a pity that more people at the centre did not avail themselves of the opportunity to work with [IPAC pharmacist], it would certainly have been to their benefit.

We wish her well and will miss her and her ability to pass on her knowledge to aid our better living and health efforts.

Yours sincerely

[IPAC participants]

Appendix B. IPAC Project Testimonials from Clinicians and ACCHS Staff

Testimonial 7:

Letter of commendation:

I am writing this letter in gratitude and acknowledgement of our clinical pharmacist [IPAC pharmacist] whom I have known since starting my rotation in [site] in January this year.

Upon starting, it sounded alright to have such a person on the team but I wasn't particularly blown away; after all most of us doctors probably more encounter them because of errors, not signing scripts, unavailability of stock and other such inconveniences. While working here though, I have been completely blown away by her knowledge and work and dedication.

She is easily able to recollect and sift out previous barriers of patients' treatment and other issues, for example, one day I had a patient who presented for wound dressing and I was shocked by his deranged blood sugar levels. Contrary to what patient reported, [IPAC pharmacist] was able to tell me that he had actually lied about HITH staff planning to give him his regular insulin later in the day because

1- She personally knew that they organize their visits much earlier in the day and
2- She was aware of patients previous history of non-compliance and previous malingering as to not make a fuss of situations

[IPAC pharmacist] displays the heart of a teacher and is genuine advocate for better health practices.

She demonstrates insight in being able to pinpoint common neglects or deficiencies even before they have begun.

I believe strongly that her presence for the clinic is a great asset.

[General Practitioner]

Testimonial 8:

Hi (PSA Coordinator),

I just wanted to drop you an email to let you know that [IPAC Pharmacist] was incredibly helpful today in assisting with a deceased patient. She was able to research the literature to help me discuss a case with the Coroner's office which ultimately was instrumental in deciding to report the death to the Coroner.

Kind regards,

[General Practitioner]

Testimonial 9:

Hi (PSA Coordinator),

I hope this email finds you well.

My name is [General Practitioner] and I am a new GP to Australia (from NZ) and to [site]. I've been working with [IPAC pharmacist] and have been amazed by her rapport with our patients who are mostly Aboriginal. [IPAC pharmacist] is a real asset to our general practice and as an expert Advanced Clinical Pharmacist I have found her to be a very competent and a brilliant addition to the general practice team. Her expertise is used daily and I have learned much from her even though I've only been at the practice for such a short time. She conducts morning training sessions varying from anti-spasmodics to insulin. Her sessions are very enlightening. What's more notable is that [IPAC pharmacist] patients respect her and have made marked improvements in their diabetes and hypertension as a direct result of her work.

I have worked in New Zealand with a clinical pharmacist at a practice in Wellington whose knowledge was invaluable. I think it would be an absolute dream for each practice to have a clinical pharmacist, especially where there is a high priority of Indigenous patients. Please feel free to use what I've emailed you in any way that would increase services like [IPAC pharmacist] in other practices.

Kind regards

[General Practitioner]

Testimonial 10:

Hi (PSA Coordinator),

I would just like to place feedback on what a positive difference having [IPAC pharmacist] working here in the clinic.

As a locum, I feel this service has improved safety for patients around medication management, compliance, and avoidance of medication errors. I feel quite supported, in my clinical work, with this team holistic approach.

[IPAC pharmacist] is an awesome resource with tricky pharmacological queries, and medication interaction, particularly in an AMS service with so much chronic disease, where patients are on multiple medications, with much potential for interactions.

In addition, [IPAC pharmacist] has been able to spend time with the patients fully explaining their medication, and reasons for this, and this improves compliance, and clients do seem more interested in the reasons they are taking medications. It saves the doctor so much time too.

I really hope this service will continue in the future, and I will really miss having [IPAC pharmacist] here at my next locum job!

Kind Regards, [General Practitioner]

Testimonial 11:

Hi [site manager]

I meant to e-mail after my last locum in [site], but have only got round to it now.

I firstly wanted to thank you for the opportunity of working at [site] - I always enjoyed my time in [site].

I don't have any further locums booked in with you, but will liaise with the (site) team once I know what my plans are for 2020.

I just wanted to flag my deep concern at the possibility of not having an onsite pharmacist in the future.

When I started at [site] there was no pharmacist, and I can attest to the huge positive impact having a pharmacist made to increasing the quality of patient care, improved accuracy of records, reduced GP stress and time pressures.

I would seriously consider not returning to [site] if there is no on-site pharmacist, in the same way that I would hesitate to work there without a practice nurse.

The patients at [site] are complex from a medical point of view, and the system you're working in is extremely complex, with the poor communication between hospital and other services. In the same way that the nurses play a vital role in co-ordinating care, the pharmacist plays a vital role in managing medication between all the players in the system to ensure patient safety and optimum outcomes.

The care co-ordination aspect of the GP job would not be possible without the nurses and health workers AND pharmacist.

I re-iterate:

The benefit of working with an in-practice pharmacist have been significant and far reaching.

The clinical pharmacist contributes in numerous ways, for example, by resolving medication issues, liaising between the GP and the community pharmacist / hospital / specialists / allied health, providing information and advice on medication, and flagging issues that may not have been considered otherwise in a busy practice with high patient volume and complex patient needs, and high GP turnover.

Having an on-site pharmacist is, without a doubt time saving for the GP and results in improved patient safety and satisfaction.

As a GP, I felt supported and more able to focus on the clinical reasoning and decision making that is required, knowing that the whole team, including the pharmacist, support and assist in facilitating the implementation of proposed management plans for patients.

The in-practice pharmacist actively participates in case conferences, providing advice and suggestions, as well as logistical support in providing treatment to patients in the community, playing an important role in following-up and recalling patients who are at risk or require monitoring or review. The pharmacist assists in providing continuity of care and clinical handover, resulting in improved patient safety. I feel that this is essential, especially considering the number of doctors who are managing your patients.

The pharmacist is an important part of the clinical team, and has come to play a vital role in the local practice. Not having an in-practice pharmacist at [site] will negatively affect patient care.

I understand that funding may be playing a part, and will gladly advocate for additional funding in any forum.

Please let me know how I can assist to retain a vital member of the clinical team at [site].

Yours sincerely,

[General Practitioner]

Testimonial 12:

To Whom It May Concern,

[IPAC pharmacist] has been an integral part of our Aboriginal Medical Service at [site], commencing approximately 12 months ago as part of the IPAC Project.

Since her arrival to [site] she has worked diligently and tirelessly to integrate her knowledge & skill set into the day to day running of our clinics. Requiring her flexibility in providing support to clinics based in [local regions]. (IPAC pharmacist) has been an important part of our clinical team. She has made herself available & approachable to all our staff. A real professional with a passion for her work & caring for the community. Working to continually improve her own understanding of our unique environment & ever mindful of the cultural appropriateness of her approach towards Aboriginal & Torres Strait Islander patients.

[IPAC pharmacist] has provided a great insight & expertise in regards to any pharmacy related issues within the clinic. At several levels [IPAC pharmacist] advice has been a contributor to improving our level of care, from advice around updating & maintenance of our Emergency Trolley & required drugs at clinic level, to non HMR reviews, support & education of both staff & patients. To advocating for our patients with our clinic, & external providers like hospitals, nursing homes & community pharmacies.

In the short time [IPAC pharmacist] has been a part of the [site] team she has also supported in the development of new tools for updating Medication lists and check lists to update Webster packs for the community pharmacy. Always such willingness to help, educate & empower the community & staff with improved understanding and confidence with their medications. Personally, (IPAC pharmacist) has provided such high quality reviews, that improvements are always identified in her detailed clinic medication reviews. Really striving for a high level of excellence in all the work she has produced in her time at [site].

[IPAC pharmacist] is a beautiful intelligent soul, with a real talent & willingness to connect & engage with people at all levels. I've yet to source any negative feedback from even the most complex & difficult of patients in our community. Often, patients have declined a home visit review in preference to attend the clinic to discuss with [IPAC pharmacist]. This is a mark of the community's respect & confidence in both her knowledge, competence & kindness.

A team player, dedicated to improved health for all people. She strives for innovation in how to optimize her skills within our GP setting, with a positive attitude towards any issues.

Please feel free to contact me should you like to discuss or expand on my recommendation.
Best Wishes,

[General Practitioner]

Testimonial 13:

Hi (PSA Coordinator),

We have been very fortunate to have had Pharmacists [IPAC Pharmacists] conducting the IPAC trial at [site]. Aside from the trial itself, the presence of two Pharmacists at our practice has had enormous benefits for both GPs and clients.

They became very involved in day-to-day medication issues for all clients, irrespective of the trial.

[IPAC Pharmacists] were available at most times in the clinic to give advice to GPs and Clients on medications, interactions, etc.

If not in the clinic, then one or other was always available by phone.

They were of considerable help in developing better coordination between Hospital and Community pharmacies, clients and GPs.

Hospital and Community pharmacists would often contact them in the first instance rather than the GPs and would include them in email and other correspondence with the GP.

There are now improved pathways of communication between GPs and the Pharmacies, especially in regard to discharge medications.

Their presence encouraged GPs to increase the number of requests for Home Medication Reviews and resulting Medication Management Plans.

Client follow up for HMRs was diligent and communication with GPs was prompt with constant reminders.

By constantly keeping an eye on the clinic's electronic waiting list, they were good at catching up with clients who were in the clinic for other services.

Their education to clients in primary health care was exceptional.

With the completion of the IPAC trial, the services and help that [IPAC Pharmacists] offered will be sorely missed.

I am aware of the possibility of [site] being able to fund a small portion of Pharmacist FTE to allow an ongoing Pharmacist service.

This will be greatly appreciated.

I cannot emphasise enough the benefit of an on-site pharmacy service has made to [site] and to my mode of practice.

Yours sincerely

[General Practitioner]

Testimonial 14:

Hi (PSA Coordinator),

Our pharmacists have done so many things for us I will try to group them into separate sections.

Staff medications support

[IPAC Pharmacist] has completely re written our use of medicines procedure, a mammoth task that I, and senior nurse, and [IPAC Pharmacist] undertook -and [IPAC Pharmacist] did the lion's share of it. [IPAC Pharmacist] attended 2 sessions with our doctors reshaping our medicines list and after agreement and discussion has also provided us with a pdf of all of the medicines available in the clinics colour coded as to where to find them (doctors bag, emergency trolley, imprest, QH STI medicines replacement program) which I use on a weekly basis and we will use as the basis for individual clinic imprest lists. She has developed and shared eye drop charts for patients with pictures of the medicines – if your sight is poor you can't follow written instructions!! Also diabetic insulin regimens for people who might otherwise be unsafe with a sliding scale- but now have an easy to follow visual chart.

She has flagged with us some issues about our ordering system saving us from medication shortages and over-ordering. She has provided tailored upskilling on how to use medications which were very well attended.

[IPAC Pharmacist] has provided staff with upskilling by asking health workers what they wanted to know about. This simple effective check meant that her sessions have been very well attended with lots of vigorous discussion! She also signed the health service up for GoShare and provided info sessions in its use. Both pharmacists have worked on the multistep process of HMR referral, pharmacist report and medical response so it is streamlined and electronic, easy to find in our medical record, and (IPAC pharmacist) worked with our Communicare officers to make them clinical record templates. We have now shared these templates with other AMSs.

Community support

[IPAC Pharmacist] has gone on local radio to talk up what pharmacists can do to help people. [IPAC Pharmacist] is known as "the Medicine Woman" in the [local area] patient diabetes self-care group and is the preferred health staff speaker for them.

Both have gone above and beyond in their efforts to make HMRS a positive experience for patients and [IPAC Pharmacist] recently shared with me a 12 month review of someone's HMR where it was very obvious that progress had been made in understanding and adherence in the interim 12 months. We have several board members who have had HMRs done who are very enthusiastic supporters of the pharmacists as a result.

Patient story

[IPAC Pharmacist] saw a pregnant woman who was a very infrequent attender to all types of health services, who had been started on insulin and who was clearly not coping with what she was supposed to do despite being seen at the [local area] diabetes Centre and being given lots of instructions by specialists and diabetes educators. [IPAC Pharmacist] visited her at home for me several times and picked up and dealt with a typo (a very important accidental added zero on the end of a dose!!) on one of my scripts, thus saving the patient, myself and the service from a potentially very bad outcome and adverse event.

Cheers, [Practice Manager]

Testimonial 15:

Dear (PSA Coordinator),

I would like to provide feedback about the IPAC trial, and in particular about working with pharmacist [IPAC Pharmacist] at the (suburb) clinic of [site].

[IPAC Pharmacist] has been so helpful, friendly and continuously gone out of her way to assist with some of my more difficult to manage chronic disease patients. The feedback from patients, who are often reluctant to have "strangers" visit them at home, has been that [IPAC Pharmacist] has been great to work with, culturally appropriate, and a welcome visitor. When [IPAC Pharmacist] does a HMR for me, she not only provides medication review/advice, but also the often-missing information about clients' social and emotional wellbeing which so significantly affects their ability to adhere to medication regimes. With her assistance we have improved many patients' diabetic control, blood pressure management and worked up other medical conditions (like constipation, or gynaecological disorders) which patients have revealed to [IPAC Pharmacist] during her review, and she has passed on to me.

One case in particular:

A young woman in her 20's with an intellectual impairment and multiple endocrine disorders (thyroid, parathyroid, calcium metabolism) requiring complex medication dosing with side effects.

[IPAC Pharmacist] visited the family several times and made contact with the disability support agency and the pharmacy who supplied her Webster packed medication.

She ensured that the medication dosing regimen allowed for potential medication interactions (calcium, thyroxine etc); and worked out that the best way to support the client in taking her medications was to have them administered by the disability support agency who saw the client 3 times a week. She undertook significant communication with the client and her family, the disability support agency and the dispensing pharmacy, to help make this happen.

I have just had this patient's blood results in (after all of [IPAC Pharmacist] hard work), and can report that after having had calcium serum levels which were putting her at risk of cardiac arrhythmias for months, a PTH 10 times above the upper limit of normal, and TSH consistent with symptomatic hypothyroidism, this patient has today returned with a normal suite of blood results for the first time in 12 months. This is just one case where having [IPAC Pharmacist] input from "on the ground/in the home", and her significant contribution to solving this problem, has resulted in a great outcome for this patient.

Pharmacists working with GPs in this fashion can make an amazing difference to patient outcomes. I sincerely hope that funding for this kind of team work will continue.

Kind regards,

[General Practitioner]

Testimonial 16:

Hi (PSA Coordinator)

I have been informed that the IPAC trial at [site] is drawing to a close.

I would like to offer my support for the project. It has been invaluable to have a team of pharmacists available to handover clinical information regarding cardiac patients here in [local area].

We have a very high number of patients who are from remote areas outside of [local area] and many of them require a period of outpatient treatment/follow-up prior to being fit for transfer back to their home community. They do not have a local GP and many of them go to [site] as a default option because it is equipped to provide culturally safe healthcare. The ability to handover information to [IPAC Pharmacists] has been wonderful as I feel much more confident that information regarding these patients will be appropriately followed up.

I hope that this model of care is continued and expanded to other areas and patient groups. Although My Health Record is assisting with transfer of information between acute and primary healthcare it is invaluable to have a team of motivated and professional pharmacists able to ensure that a patient's medication information and suggestions for ongoing review and adjustment are appropriately reviewed and actioned. Although we would like to 'fully optimise' medications prior to discharge this is often not possible and in many cases is not appropriate, so we rely on our primary healthcare colleagues to optimise the quality use of medications for our patients.

Please do not hesitate to contact me if you would like any further information.

Regards, [External Hospital Pharmacist]

Testimonial 17:

Hi (PSA Coordinator),

I wanted to provide some feedback on the IPAC trial conducted at (ACCHS) with regards to (IPAC pharmacists):

Over the last 12 months (IPAC pharmacists) have greatly improved the coordination of care for patients who are being managed in both a specialist and primary care setting. A large proportion of patients in the (town) Hospital Renal Unit (Dialysis and Renal Clinics) identify as being of Aboriginal or Torres Strait Islander background (approx. 75%). There are many barriers affecting the provision of medications to this patient group including financial (access to Closing the Gap prescriptions, pharmacies that do not charge a Webster packing fee), access to transport, access to dose administration aids to facilitate compliance, poor health literacy and social support. Many of these barriers ultimately affect medication adherence which in turn leads to poorer outcomes and higher rates of hospitalisation for this patient group. Furthermore, changes that are made to medications in the specialist setting are not always communicated in a timely fashion (or at all) to GPs or the primary care provider.

As a pharmacist based in the outpatient setting working in the renal unit I have worked closely with (IPAC pharmacists) to improve the communication between the renal unit and the (ACCHS). They have assisted greatly in providing a service and access to medications for patients who have had to relocate from a remote area to commence haemodialysis and are completely lost in an urban environment. They have assisted with ensuring patients who have been discharged from (town) Hospital have their medications updated and that patients have access to closing the gap prescriptions so they are not financially impacted (hospital prescriptions and prescriptions from the public renal specialist clinics cannot be processed as CTG scripts which makes it extremely difficult to get medications changed in community pharmacies without the extra step of patients seeing their GP to rewrite the same prescription or having to pay for the medication). They have helped a dialysis patient who had a large pharmacy bill due to Webster packing fees get access to QUMAX funding to waive the Webster fee which in turn led to improved compliance and improved control of her blood pressure, reducing the number of hospitalisations due to hypertensive crisis. The improved compliance with this patient has also meant she is now on the transplant waiting list.

(IPAC pharmacists) have assisted me greatly in identifying barriers to medication adherence through their home visits and better understanding of the patient's social circumstances. We have worked together to improve a patient's compliance post-parathyroidectomy to ensure she was able to collect her updated Webster packs each week following her weekly calcium monitoring by coordinating a day in the week that best suits the patient.

Prior to the IPAC trial there was always a level of uncertainty from my end as to whether the information communicated to the patient and GP would be acted upon and concern of the many barriers (particularly the CTG prescription barrier) limiting access to medications. In many instances patients would run out of medications or did not make appointments to see their GP and as a result the hospital would supply emergency medications to try and get them through.

This was not ideal due to the burden on hospital resources and also the financial impact on the patient (some patients receiving invoices of greater than $100 due to inability to process hospital scripts as CTG).

When (IPAC pharmacists) started their service I found them to be reliable, efficient and always willing to assist. The communication between our services improved and ultimately has led to better outcomes for an extremely complex patient group.

I sincerely hope that their role can continue and that similar models are rolled out to other health services that have a large indigenous patient group.

If you wish for any further information, please don't hesitate to contact me.

Kind regards,

(Renal Dialysis Pharmacist)

Testimonial 18:

Hi (PSA Coordinator),

I am the Visiting Consultant Physician at (ACCHS).

This to report back that the IPAC trial has been a resounding success.

With pharmacists on-site, available and community-involved this way, there has been an impressive positive effect on (ACCHS)'s ability to deliver high-quality health services.

Their impact is manifest right across the organisation.

My only hope, for the sake of our patients, is that this can be continued.

Best wishes

(Visiting Consultant Physician)

Testimonial 19:

Hi (PSA Coordinator),

Just letting you know that I am sorry the trial is coming to an end. I have found that my clients are finding it easier with their medications after seeing both (IPAC pharmacist) and (IPAC pharmacist). At first my client's didn't want to talk to them but I told them that both (IPAC pharmacist) and (IPAC pharmacist) were qualified and would be able to tell them all about their medications.

Clients would then tell me they have a better understanding of what they are taking, if there medications were changed and if it was making a difference. Some were happy to report to me the amount of medications they were taking was less and that they were happy about it.

This service is an integral part of client's health journey. (ACCHS has a high number of indigenous clients that benefits form this type of service.

I am positive the trial was successful because I see the client's that have taken part in the trial.

Follow up to the trial; do we get funding to employ pharmacists to our staff and Medicare taking responsibility to adding pharmacists to the EPC referral Medicare billing.

Cheers (Generalist Health Worker)

Testimonial 20:

Hi (PSA Coordinator),

Just some feedback about your trial.

I thought it was great for the clients. Home visits and clear explanations of each medications where useful.

I had a few clients involved, (patient 1), (patient 2) and (patient 3).

I feel medications overwhelm most of my clients, they are on far too many and they find it very confusing.

Any input to clarify medications should be completed after any medication changes.

Keep up the good work

(System Navigator NN RN RM CDE, hospital health service)

Testimonial 21:

Good afternoon,

I am providing input on the IPAC trial at our [site].

It is so sad to see that the trial is ending at the end of October.

Having [IPAC Pharmacist] working from our clinic at [site] with our clinical team has been a very rewarding experience for our clients.

Our clients have provided great feedback, which I document below, and they now call [IPAC Pharmacist] the "Medicine Doctor".

(1) [Site] Diabetes Yarning Group :

[IPAC Pharmacist] has provided information to the group every month when we meet, which is easily understood. She explains what the medication does and how is effects our health. Without her clearly explaining to us all how medicines work, we would of still left our medications under the bed as we did not fully understand how they work.

Now we ring [IPAC Pharmacist] every time we have a question on medicines – she has been very helpful and we are now confident and understand the importance of taking our medications daily.

[IPAC Pharmacist] also comes to my house to check when I am unsure on my webster pack. I welcome her every time to my house as she teaches me many things on my medicines.

We should have the "Medicine Doctor" at all community gatherings when we talk about diabetes and any other chronic disease problem as it helps us to understand how it works in our body and gives us confidence to self-manage our health better.

(2) Clinical Team and participation at weekly clinical meetings:

[IPAC Pharmacist] has been a valuable member of our clinic team, she shares her knowledge well and explains to others on medications work.

[IPAC Pharmacist] has been a keen participant of our weekly clinical team meetings giving us updates on the IPAC trial and medications.

We have made so much progress in this area with our clients, we can see the improvement in clients' compliance with their medications, our clients are more confident. They feel at ease with [IPAC Pharmacist], they have built a very solid relationship, trust and respect.

The IPAC trial has given our clients and staff tremendous confidence on medication management.

Regards,

[Site Manager]

Appendix C. IPAC Project Workshop Report – Darwin November 2019

IPAC PROJECT WORKSHOP – DARWIN 5TH NOVEMBER 2019

Facilitated and reported on by PSA IPAC Project Coordinators

Summary

Aim
To explore the numerous enablers & challenges experienced by the IPAC Project pharmacists throughout the intervention phase of the project. This decision was made to bring the pharmacists together in a workshop environment in lieu of second site visits by PSA's IPAC Project Coordinators at the end of the project, to enable stimulation of group discussion and sharing of experiences.

Outcomes:

ENABLERS: Pharmacists were asked to individually identify enablers to the establishment & successful implementation of their role at their respective Aboriginal Community Controlled Health Services (ACCHSs); they were then tasked with grouping these into themes for further exploration & discussion.
Broadly, these themes included:

- Availability of local cultural induction
- Support from clinic leaders at the ACCHS
- Inclusion in all-staff meetings at the ACCHS
- Provision of a ACCHS shirt/uniform
- Availability of a cultural escort
- Attendance at patient group meetings & community events
- Frequent contact with community pharmacy & external stakeholders
- Pre-existing local knowledge
- Good understanding of local services
- Proximity of pharmacist consulting room to GP consulting room
- IT support with clinical software at the local ACCHS level
- Integrated pharmacist model
- Positive 'project culture' created by PSA, JCU & NACCHO Operational Team
- Consistent availability of peer/collegiate support
- Option of an Aboriginal Health Service pharmacist mentor
- Personal attributes

CHALLENGES: Pharmacists were asked to identify specific barriers which impeded or delayed their ability to effectively conduct their IPAC Project role; they were then asked to group these into themes for further discussion. Broadly, these themes included:

- Lack of a local project champion at some sites
- 'Newness' of the integrated pharmacist role
- ACCHS preferences regarding how patients are directed to the pharmacist
- Pressure to seek patient consent & commence capture data early in the project
- Activity requested by the ACCHS which didn't 'fit' a core IPAC role
- Limited availability of a consulting room
- Pharmacist consulting room location far away from GPs
- Low FTE role in some project sites

- IT challenges
- Clinic closures
- Language barrier in remote locations
- Change in governance structure & management
- Stability of GP workforce
- Clinic staff turnover
- Project duration
- Access to remote sites
- Data capture

Conclusion:

The IPAC Project workshop was very well attended with project pharmacists, the Pharmacy Guild of Australia's Steering Committee representative and all members of the Operational Team united in the same room. This created an exceptionally positive atmosphere for collaborative team discussion and facilitated the sharing of experiences by pharmacists who had otherwise conducted their project activity in isolation from each other. A strong sense of teamwork and support between the pharmacists was noted throughout the day.

During the workshop attendees discussed, identified and explored the key themes associated with the successes and challenges they experienced while delivering the project at their respective ACCHSs. This built upon the observations made by the Operational Team during earlier site visits and communication with pharmacists, and will ultimately serve to further inform and enhance the project's final report.

Comprehensive Notes from Workshop:

Welcome & Introduction
Pharmacists were asked to introduce themselves & to share a brief example of a clinical situation during the IPAC Project in which they felt they made had a positive impact upon a patient's health & wellbeing. Such examples included:

- An elder opening up for the first time about his history of mental health problems & wanting to know more about the role of his medicines in keeping him 'well'
- A patient with uncontrolled diabetes, HbA1c of 12%, suboptimal adherence to insulin regimen as she disliked administering daily injections, talked with the pharmacist who recommended to GP to consider switch to weekly exenatide injection, patient happy with this, progressively lost weight & became more mobile, HbA1c reduced to 8%, Endocrinologist very happy with progress!
- 40yo patient in outreach clinic, ongoing heavy alcohol & IV drug use, prescribed multiple opioids, benzodiazepines and sodium valproate for last seizure 10 years ago, patient stated no-one had ever explained medicines before, engaged well with pharmacist who recommended slow weaning of medicines, patient less sedated over time and became an active participant in his own healthcare and decision-making
- After conducting several education sessions Aboriginal Health Workers on the topic of diabetes, the pharmacist then overheard the AHWs passing on this information to patients and staff alike!
- Pharmacist asked by health service to participate in Diabetes Yarning Group to answer any questions from members, attended several sessions then a participant from the group presented to the clinic to see the pharmacist, grinning, asking for glucometer to be checked as it was now reading 6 for the first time ever
- Patient with history of parathyroidectomy, poor adherence to medicines but no one had ever asked why, pharmacist did a home visit and asked the patient about barriers to adherence, discovered that the carer was only able to collect Webster packs several days after (frequent) medication changes leaving days without access to correct medicines. New home delivery process negotiated by the pharmacist with the community pharmacy preparing the packs, adherence vastly improved, TFTs and parathyroid markers now within reference range for the first time since parathyroidectomy,
  GP very happy!
- Patient in her 50's, disconnected with healthcare system following her husband's death mid-flight, poorly controlled diabetes, lots of 'Did Not Attend' episodes recorded at clinic, reluctantly agreed to see the pharmacist who explained all medicines and recommended Trulicity, several follow-up episodes arranged with pharmacist, patient gradually lost weight and developed trust in clinicians
- Patient living in remote clinic, spoke local language with very little English, history of diabetes with poor medication adherence (metformin, gliclazide and more) resulting in clinic stopping supply of her sachet packs, seen by pharmacist who asked how the patient felt after taking medicines, patient stated diarrhoea + dizzy/'wiped out'. Pharmacist recommended slow recommencement of low-dose medicines, tolerated well by patient, medicines adherence & diabetes control greatly improved
- Pharmacist worked closely with Aboriginal Health Worker and patient to explain dose titration of heart failure medication to a patient, AHW able to then explain role of medicines to patient in a way the patient understood, patient was ultimately able to identify all current medicines and on one occasion contacted community pharmacy after discovering up a Webster pack error which could be quickly rectified
- Patient with complex medical history and many ADRs documented differently across healthcare settings hence patient suspicious of all medications, stopped bisoprolol of his own accord as a result of confusion with ADR from similar sounding drug. Over a few follow up visits the pharmacist was able to collate all ADR lists from various sources into a single list & explain this to the patient, trust & rapport developed over time, adherence noticeably improved

- Patient waiting to see the pharmacist but left upon realising there was also an intern in the consulting room. Pharmacist took the time to visit the patient at home, which enabled engagement and resulted in a long consultation & good outcomes
- Male patient recently released from jail, cyclical pattern of good medication adherence in jail followed by poor adherence upon release & subsequent decline in health. Pharmacist was able to work alongside Aboriginal Health Worker to engage patient in his medication regime when back in community, resulting in increased attendance at clinic & better health, hopefully breaking the cycle
- Pharmacist visited patient in community for HMR, found patient to be significantly unwell so escorted her back to clinic for GP attendance and case conference, medication regimen adjusted with pharmacist input. Pharmacist conducted follow up visit 3 months later & found patient to be feeling much better & now a strong advocate encouraging other community members to see the pharmacist!
- Pharmacist reported improved communication with all GPs in the local area & increased uptake of clinical recommendations as a result of many discussions occurring while integrated at the Aboriginal Community Controlled Health Service
- Elderly patient seen by pharmacist together with an Aboriginal Health Worker for HMR, patient's demeanor was 'closed off' & suspicious. The pharmacist then spoke with the patient a number of times while attending Stolen Generation gatherings, after which the patient was willing to come to the clinic to see the pharmacist for follow up on a number of occasions. The patient became more involved in her own healthcare and at future gatherings announced that everyone else should see the pharmacist too!
- Pharmacist attending Women's Group meetings reported development of trust over time, with a number of community members subsequently approaching her to ask for information about their medicines or to explain changes to their Webster packs
- Pharmacist reported that by working collaboratively with the local community pharmacy they developed a system of identifying patients who had NOT collected their Webster packs (previously they could only report those who HAD collected their packs), then annotating this in Communicare at the health service as a clinical item ('non-adherent') to prompt a conversation when the patient next attended the clinic. This process ultimately improved Webster pack collection by 10-15%, with presumed improvements in patient health related to better medicines adherence

ENABLERS

Pharmacists were asked to identify individual enablers to the establishment & successful implementation of their role at their respective ACCHS; they were then tasked with grouping these into themes for further exploration & discussion.
These themes included…

- **Availability of local cultural induction**

During IPAC Project training conducted by the PSA, all pharmacists either participated in a half-day general cultural awareness workshop titled 'Pharmacists working with Aboriginal and Torres Strait Islander people' or were offered the opportunity to undertake the RACGP's online 'Cultural awareness and safety training' online modules. Pharmacists were also encouraged to undertake local cultural training at their respective Aboriginal Community Controlled Health Service if available.

For sites where local cultural induction was available, pharmacists attending the induction reported that this assisted their understanding of the history & priorities of the community in which they would be working. In some locations the induction program gave the pharmacist the opportunity to meet and talk with local Elders who could further explain the connection between members of the community & their ACCHS.

- **Support from clinic leaders at the ACCHS**

Pharmacists consistently reported that having the support of a 'champion' who understood the IPAC project & the pharmacist's role at their ACCHS, whether they be a GP, Aboriginal Health Worker, nurse, Social & Emotional Wellbeing worker, reception or administration staff greatly assisted with their integration into the health service.

In particular the champion was able to help the pharmacist with obtaining informed patient consent to participate in the project, developing referral pathways, understanding the needs of the ACCHS, & directing the flow of patients to see the pharmacist.

- **Inclusion in all-staff meetings at the ACCHS**

Pharmacists who were invited to attend staff gatherings such as all-staff meetings, the 'morning huddle', or clinical team meetings reported that this helped increase staff awareness of the pharmacist & their project role at the health service, thereby assisting with integration. Conversely this attendance also enabled the pharmacist to better understand the various roles of other staff within the health service & to liaise with the team to see where the pharmacist best fitted into the flow of the clinic's daily activities.

- **Provision of a ACCHS shirt/uniform**

Pharmacists who were offered a uniform or shirt bearing the health service logo reported feeling that this conveyed to patients the message of acceptance & trust by the ACCHS & assisted with more timely integration into the clinic team. In some circumstances where a health service staff uniform was not available, some pharmacists wore a shirt bearing the logo of their local community pharmacy to aid association between their presence at the health service & their profession.

- **Availability of a cultural escort**

For reasons of personal and cultural safety the IPAC Project protocol directed that pharmacists could only conduct patient visits at locations other than the health service if a cultural guide was available to accompany them. This escort could be any representative from the health service, such as an Aboriginal Health Worker or transport driver. In sites where there was ready availability of this support, the pharmacist was able to respond to the needs of the patient in terms of preferred location for service delivery (eg. Home Medicines Reviews, follow up, medication adherence assessment & support).
Importantly the cultural escort was often able to share insight & information about the patient's likely whereabouts &/or events taking place in the community which may influence the patient's personal priorities & health choices.
The ability to get out into community was seen as very valuable to ensure patient follow up, especially in circumstances where the patient was not inclined or able to attend the clinic to see the pharmacist there.

- **Attendance at patient group meetings & community events**

Pharmacists universally reported that considerable time was needed to develop rapport & trusting relationships with patients & staff. Seeking permission to join gatherings such as Elders Group meetings, Women's group meetings, Stolen Generation meetings & smoking ceremonies proved to be an effective way to demonstrate genuine interest in the community & its priorities, & subsequently assisted with encouraging patients to come & see the pharmacist. Taking part in community events or celebrations (eg NAIDOC Week, National Reconciliation Week & National Sorry Day) supported by the health service was another effective way to increase acceptance as a member of the clinic team.
Pharmacists also commented that conducting comprehensive medication reviews for members of the health service staff, who then 'spread the word' to others, was an effective strategy to increase patient engagement.

- **Frequent contact with community pharmacy & external stakeholders**

Pharmacists commented that taking the time to meet (preferably in person) with key people external to the health service but involved in the patient medication cycle of care was very worthwhile to explain the integrated pharmacist role & to encourage open communication.
They added that it was important for this sharing of information to be a 2-way arrangement, enabling both parties to seek & provide relevant patient-related information to optimise patient safety throughout transitions of care.
Pharmacists stated that developing close working relationships with community pharmacy enabled the IPAC pharmacist to become a valuable conduit between the health service & community pharmacy, positively addressing any challenges associated with exchange of information (eg lost faxes) or medicines reconciliation. They added that this appeared to also facilitate improvement in relationships between the community pharmacy & the GPs at the health service.

Of note is the comment by pharmacists working part-time stating the importance of co-ordinating systems of communication with community pharmacy so that this works effectively even when the IPAC pharmacist is not on-site.

- **Pre-existing local knowledge**

Pharmacists reported that there were advantages associated with having already lived or worked in the community in which their health service was located. These advantages included already being a 'familiar face' to the health service, with an accompanying level of trust already developed, & an understanding of local issues.

- **Good understanding of local services**

Pharmacists commented that even if they were not originally based in the same community as the ACCHS, taking the time to explore & understand the support (eg housing, crisis accommodation, meals or transport) available locally to patients was invaluable. One pharmacist commented that sometimes a pharmacist needs to help a patient with a critical social issue before they are in a position to be able to address their health needs.

- **Availability of a predictable clinic room to work from**

Pharmacists described the consulting room 'pressure' which often existed at ACCHSs due to the number of visiting specialists & allied health staff, leading pharmacists to be relocated between clinic rooms or 'outed' altogether. In sites where a consistent room was available to the pharmacist, the pharmacist reported that this greatly assisted their ability to see & follow up patients as staff & patients could easily find the pharmacist.

- **Proximity of pharmacist consulting room to GP consulting room**

Pharmacists reported that having a room in close proximity to the GP's consulting room resulted in a greater number of opportunistic discussions with GPs, who could 'pop in' at any time with a patient or medication-related query. They added that they felt they received more HMR referrals by being in close proximity to the GP(s). Furthermore, the GPs could direct or escort patients to see the pharmacist, or vice-versa, from one appointment to the next, reducing the likelihood of patients leaving the clinic prior to seeing both clinicians.

- **IT support with clinical software at the local ACCHS level**

Pharmacists reported that despite some basic training, time was needed to become familiar with the functionality of the clinical information system (either Best Practice or Communicare) at their respective health services. Having the assistance of a staff member with significant IT expertise helped not only with ensuring that appropriate user settings & permissions were granted from the start, but also with the creation of new templates to streamline ongoing work & reporting processes.
Also, the quicker the pharmacist became familiar with navigating patient records, prior medical history, specialist letters & pathology results, the more confident they felt in making clinical recommendations to GP's. They added that having access to patient medical records enabled more meaningful clinical recommendations to be made, as they were privy to prior treatments already tried.
One pharmacist reported that in health services which are staffed predominantly by locum GPs, having a regular integrated pharmacist with access to clinical records & a good rapport with regular patients was seen by the GPs as being vital to continuity of care.
In some sites remote access to the clinical information system was granted to the pharmacist, which assisted with offsite completion of project activities.

- **Integrated pharmacist model**

Pharmacists commented that the model of service delivery offered by the IPAC Project itself assisted with integration into the health service clinical team as well as development of patient rapport by allowing time for multiple follow up encounters with patients & staff.
By being on-site pharmacists were able to participate in multi-disciplinary case conferences, & the opportunity for prompt interaction with other clinicians facilitated in many instances timely medication changes within the timeframe of the patient's appointment at the health service, rather than waiting for the next patient attendance.

- **Positive 'project culture' created by PSA, JCU & NACCHO Operational Team**

The pharmacists commented that having the members of the IPAC Project operational team readily available to answer any queries was invaluable.

Also, having regular monthly teleconference meetings facilitated by PSA to unite & update the IPAC pharmacists helped with understanding of the successes & challenges experienced across the various project sites, adding that this also made them feel less 'isolated' as new health professionals in their respective health services.

- **Consistent availability of peer/collegiate support**

Pharmacists reported that being able to communicate easily with their project managers and peers via either the PSA IPAC Discussion Forum or the less formal social media WhatsApp closed group was invaluable as they could seek and/or share information across the project pharmacists in a timely manner.
The availability of project-related training material, resources & references on the PSA IPAC Training portal was also predominantly found to be useful. This portal enabled pharmacists to double check project processes, explore links to websites & resources relevant to Aboriginal and Torres Strait Islander health, & acted as a central repository for forms related to consent, adherence assessments and medicines appropriateness index surveys.

- **Option of an Aboriginal Health Service pharmacist mentor**

All pharmacists were given the opportunity to be matched by PSA with an experienced Aboriginal Health Service pharmacist who would act as a mentor during the first 6 months of their project time. Of the pharmacists who opted to undertake formal support from such a mentor, most reported that this contact was especially helpful in the early months of the intervention phase. A number of the IPAC Project pharmacists were themselves highly experienced in working with Aboriginal and Torres Strait Islander people and acted as mentors to others, alongside an experienced project operational team who sometimes offered informal mentoring within their project management role.

- **Personal attributes**

Pharmacists reported that having a flexible and adaptable mindset was critical to their successful integration into the health services. They needed to be patient and willing to explain the project and the pharmacist's role repeatedly in response to staff turnover, & to proactively ensure that other clinicians were aware of how to contact them when on-site; this was especially important when the location and/or availability of the pharmacist's consulting room was unpredictable.
Being responsive to the needs and priorities of the health service, while ensuring that the core project roles were conducted & relevant data captured, was a delicate balance requiring sensitivity & diplomacy. Pharmacists needed to be responsive to rapid changes in health service activity (such as a local community outbreaks of syphilis or Acute Post Streptococcal Glomerulonephritis), considering how their medicines knowledge may best be utilised to assist in this situation.
They also needed to have a flexible and open-minded approach to the delivery of services, whether this be changing locations for comprehensive medicines reviews or adapting the language used in education sessions to accommodate the health literacy of the intended audience.
The pharmacists commented that they needed to demonstrate initiative & creativity when it came to following up patients, especially if contact by phone or mail was not an option or when language was a significant barrier to communication.

CHALLENGES

Pharmacists were asked to identify specific barriers which impeded or delayed their ability to effectively conduct their IPAC Project role; they were then asked to group these into themes for further discussion. These themes included…

- **Lack of a local project champion at some sites**

At some sites, the IPAC Project 'champion' identified by NACCHO during the establishment phase was either no longer employed at the site or was not available to assist the pharmacist as they commenced their role. The pharmacists reported feeling that this left them 'on their own', with additional time needed to identify the next project champion and develop relationships with staff, convey information about their role & understand the workflow processes at the health service. Furthermore, additional time was needed to work with staff to identify preferred ways of seeking informed patient consent for the project.

- **'Newness' of the integrated pharmacist role**

The majority of health services participating in the IPAC Project were previously unfamiliar with the potential scope of practice of an integrated pharmacist. As such some misconceptions, such as that the pharmacist was there to either supply medicines or solely to conduct Home Medicines Reviews, needed to be overcome. The pharmacists unanimously reported that a period of at least 3 months was needed to establish working relationships with key staff & to negotiate how & where the pharmacist might 'fit' in the flow of the patient experience at the clinic.

- **ACCHS preferences regarding how patients are directed to the pharmacist**

Pharmacists across the project reported a variety of different health service preferences when it came to the way in which patients would be approached to consider participating in the project. Some sites had a 'no humbugging' policy, meaning that the pharmacist was not permitted to approach patients directly, either in the waiting room or by telephone.
As such the pharmacist was reliant on other clinicians understanding and valuing their role enough to direct patients to see them, impacting upon the uptake of consented patients early in the project. Conversely at other sites where the GP workforce operated predominantly on a locum-only roster, the opposite scenario occurred, with pharmacists being required to pro-actively identify eligible patients either in the waiting room or by means of the daily appointment book.

- **Pressure to seek patient consent & commence capture data early in the project**

Pharmacists reported feeling pressure to meet project targets for patient consent and core role activity very early in the implementation phase, commenting that they felt it was necessary to develop trust and rapport with patients prior to seeking consent. They stated that these targets were optimistic and difficult to achieve, and universally agreed that it would have been better to wait a minimum of 3 months to 'settle in' to their respective health services first, establish working relationships with staff & understand how the ACCHS operates.

- **Activity requested by the ACCHS which didn't 'fit' a core IPAC role**

Key personnel at each health service worked with their IPAC Project NACCHO representative during the establishment phase to complete a Pharmacist Activity Work Plan detailing their preferred balance of core role activities. Despite this forward planning, several pharmacists reported that their health service asked them to spend a significant amount of time performing other duties which did not align with one of the project's core roles. One example was a pharmacist being asked to visit outreach clinics to assist with governance related to medication supply and documentation. This required negotiation & diplomacy, with pharmacists keen to meet the needs of their health service while being mindful of project deliverables. In some circumstances the time spent on 'other' activity compromised the pharmacist's availability to identify eligible patients to participate in the project, &/or to undertake core role activities. Furthermore pharmacists reported that they saw a proportion of patients eligible to participate in the project but who declined to give consent.

- **Limited availability of a consulting room**

At some sites, renovations or new construction meant that a consulting room was simply not yet available for the pharmacist upon commencement. Some pharmacists reported arriving on any given work day to find that all consulting rooms were already allocated to other clinicians, predominantly those with MBS billing capacity; this meant the pharmacist would not have a private space in which to see patients on that day. Pharmacists reported that this caused a delay in seeking patient consent & delivering patient-directed activity early in the project, & then later compromised the pharmacist's ability to conduct patient follow up.
Furthermore they reported that fluctuations in the availability and/or location of a consistent consulting room made them 'less visible' to other clinicians who may not realise the pharmacist was on-site & therefore not refer patients to see them

- **Pharmacist consulting room location far away from GPs**

Pharmacists with a consulting room located far away from the GPs rooms, or in another building altogether, reported that this physical separation limited the frequency of opportunistic discussions with prescribers about patient care.
Furthermore, GPs were less likely to refer patients to see the pharmacist directly after their GP appointment, & patients were more likely to leave the clinic after seeing the GP and prior to seeing the pharmacist.

In one site the only room space available for the pharmacist was in a separate building at the far end of the street, necessitating considerable time and effort by the pharmacist to develop workflow and referral processes to ensure that they were acknowledged in the flow of the patient experience at the clinic.

- **Low FTE pharmacist role in some project sites**

With an average FTE of 0.57 across the project, many of the pharmacists worked in a part-time capacity. Those working less than 3 days a week reported that considerable time was needed to develop trust & rapport with staff & patients as they were not present at the health service every day. One particular pharmacist commented that when she spread her 0.4FTE over 3 days, she felt that she was regarded more as a member of the team than a visiting service provider.
Similarly, when establishing new processes these pharmacists needed to adopt a systems-based approach rather than relying on an individual's input, so that continuity would be assured even when the pharmacist was not on site.

- **IT challenges**

Despite receiving clear written instructions from James Cook University and the GRHANITE™ team for correct set- up of user permissions and keywords in the clinical information systems at their respective health services, some pharmacists reported that this did not quite go to plan upon their commencement. Some health services had unique preferences or requirements for allied health staff as IT users, meaning that certain elements of a patient's clinical history were not available to the pharmacist; in some circumstances this limited the pharmacists' ability to make clinical recommendations.
Upon realising this, the pharmacists took additional time to liaise with the health service IT staff to ensure that they had full access to medical records. Other sites had a slightly different version of the clinical information system (Best Practice or Communicare) which resulted in the need to adjust setup instructions.
A number of pharmacists reported intermittent internal IT problems or 'crashes' at their health services, adding that on days when the computers were 'down' all patient appointments tended to be cancelled; this impacted the pharmacists' ability to seek consent from eligible patients & to conduct patient-directed activities.
At several sites a member of staff inadvertently deleted the 'JCU Consented Patient' flags from patient records, hampering data extraction for those patients & requiring considerable pharmacist time to identify deletions & re-enter this information.

- **Clinic closures**

Pharmacists reported that significant events occurring in community impacted clinic hours & occasionally resulted in clinic closures which diminished the pharmacist's ability to do their work. Examples of events included Sorry Business, funerals & celebrations of culture. Extreme weather events such as cyclones also caused clinic closures in affected regions.

- **Language barrier in remote locations**

Pharmacists working in remote or very remote sites described the difficulty associated with seeking informed consent from patients for whom local language predominates & English is not spoken. In the absence of a local interpreter this was found to compromise the pharmacists' ability to meet the project's target for consented patient numbers.

- **Change in governance structure & management**

A number of pharmacists reported significant change in the management structure of the health service throughout the IPAC Project, leading to loss of focus on the project and diversion or distraction of key staff who would otherwise have assisted the pharmacist. At one health service this involved a complete replacement of all members of the Board during the first week of pharmacist placement.

Pharmacists reported that different management preferences could significantly affect how pharmacist services were prioritised, as well as the allocation of other staff such as Aboriginal Health Workers whose support was required by the pharmacist to conduct project activity outside the health service.

- **Stability of GP workforce**

At sites employing GP registrars and/or where the GP workforce consisted predominantly or solely of locums, pharmacists found that they needed to take extra time to repeatedly explain their role to new doctors, & to discuss preferred ways to work towards a collaborative team approach to patient care. Some pharmacists reported that locum GPs were less inclined to write referrals for Home Medicines Reviews, on the basis that they may not return to the health service in a timely manner (if at all) to review the patient and complete a Medication Management Plan & subsequent MBS Item 900 claim. At some sites, a regular GP left the health service to work in another clinic nearby. Pharmacists reported that a proportion of consented patients would then 'follow' the GP to the next clinic, meaning they would be lost to IPAC follow up.

- **Clinic staff turnover**

Pharmacists reported that changes in staff tended to result in some loss of project continuity. For example if new reception staff commenced & did not have a good understanding of the pharmacist's role, they tended not to direct patients to see the pharmacist or would allow patients to leave the clinic prior to a booked appointment with the pharmacist. This compromised the pharmacist's ability to achieve targets for consent and core role activity.

- **Project duration**

Some pharmacists reported that the fixed term nature of the project initially seemed to cause staff to see the pharmacist as somewhat 'temporary' or external rather than as a member of the clinical team. While this sentiment changed over time, some pharmacists felt this slowed their integration into the primary healthcare team & therefore their ability to achieve early targets for consented patient numbers & other core role activities.

Pharmacists reported that achieving project targets within the allocated timeframes proved to be difficult for various reasons, including the time needed to integrate into the health services' clinical team & develop the trust and rapport of staff and patients alike. The initial target for patient consent within the first 5 months of the intervention phase was not achieved in any of the project sites. Furthermore pharmacists found that the aim of following up all consented patients within the middle and then final thirds of the intervention phase was difficult. Several explanations were cited for this, including competing patient community/family responsibilities, high rate of 'Did Not Attend' despite booked appointments & the fact that many patients did not have an operational phone service or fixed postal address & were therefore difficult to contact for follow up.

- **Access to remote sites**

A number of pharmacists relied upon chartered or alternate transport in order to reach their respective health services. As such, changes to transport availability sometimes compromised the pharmacists' ability to get to work. At one site the pharmacist was reliant upon a ferry service as the only way to get to the health service, with the ferry schedule changeable by season (dry vs wet) and occasionally cancelled altogether due to extreme weather conditions.

At some remote sites road access was adversely affected in the wet season, while at others the pharmacist's ability to provide core services to outreach clinics was limited by the availability of a seat/space in small planes or 4WD vehicles.

- **Data capture**

Pharmacists in health services with higher patient numbers reported that the time needed to capture project-related data each day was considerable, & impinged upon their ability to actually conduct project activity itself. Others commented that despite fully understanding the eligibility criteria for patient participation in the project they were sometimes asked to see patients who did not meet these criteria, or were asked to conduct tasks which did not 'fit' a logbook entry. While striving to minimise such occurrences the pharmacists felt this impacted upon the time available to conduct project activity.

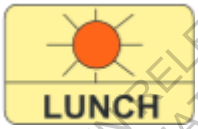
Appendix D. Templates and Resources created by integrated pharmacists

D1. Medication List 1.

Medication List

Name	**Allergies :** **- None known**

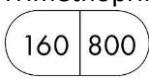
The information below will help you use the medication your doctor has prescribed safely and effectively

Medication	Dosage	Take at				Reason for medication
		B'fast 	Lunch 	Dinner 	Bed 	
Aspirin 	100mg	1				Thins the blood, helps stop heart attack and stroke
Atorvastatin 	80mg				1	Lowers cholesterol , helps stop heart attack and stroke
Bisoprolol  **Take after dialysis on dialysis days.**	10mg	1				Helps the heart + lowers blood pressure.

Ezetimibe 	10mg				1	Lowers cholesterol, helps stop heart attack and stroke
Calcitriol 	0.25mcg	4				Strong bones and heart.
Ramipril 	2.5mg	1				Helps the heart + lowers blood pressure
Sevelamer (Renegel) 	800mg	1	1	1		For strong bones + heart. **TAKE WITH FOOD.**
Multivitamin 		1				Multivitamin
Fortisip drinks		Drink ONE a day or as advised by the renal team (not in your webster pack)				For nutrition.

Medicines given at dialysis:

Folic acid 	5mg	One tablet given after dialysis while on Bactrim during the wet season.	Helps stop infections in the wet season
Sulfamethoxazole /	800	One tablet given after dialysis during	Helps stop

Trimethoprim 	mg/160 mg	the wet season.	infections in the wet season
Mircera injection	200mcg	Given one a month, in through the dialysis line, at renal.	For strong blood.
Entecavir	0.5mg	One tablet given once a week at renal	For hepatitis B (liver) protection.

Medicines to be taken only if needed:

Nitrolingual pumpspray 	400mcg/ dose	Use 1 spray under the tongue if needed for chest pain. Wait 5mins, if pain still there use another 1 spray. Maximum 2 sprays in 15mins then call 000 / ambulance.	Chest pain. If needed. Carry this with you.

If you have any questions about your medications or how to take them please contact (your local ACCHS), your dialysis team or speak to your community pharmacist.

List made by: (Pharmacist) Date: / /

D2. Medication List 2:

Medication List

The information below will help you use the medication your doctor has prescribed safely and effectively. Updated: (date)

Medication	Strength	Brand Name	Used for:	Directions	Take at			Date Started		Recent Changes	Prescribed by
					B	L	D	Bed			
Paracetamol	665mg, modified release tablet	Osteomol, Panadol Osteo	Pain	Take TWO tablets TWICE a day (can take up to two tablets three times a day if required)	2		2		15/3/17	23/10/18: Dose increased	Dr xx

Medication	Strength	Brand Name	Used for:	Directions	Take at				Date Started	Notes	Prescribed by
Short term medicines											
Sulfamethoxazole + Trimethoprim	800mg +160mg, tablet	Bactrim, Respirim	Antibiotic – treat recurrent urinary tract infection	Take ONE tablet TWCIE a day for FIVE days.	1		1		23/10/2018	For FIVE days ONLY.	Dr xx
Use when Required											
Glyceryl trinitrate	400 mcg/dose oromucosal spray 200 dose;		Treat angina pain.	Spray 1 or 2 sprays under the tongue; repeat after 5 minutes if necessary to a maximum of 3 sprays. If 3							Dr xx

				sprays are required or symptoms last more than 10mins seek urgent medical attention.							

Keep your Medication List up to date by crossing out any medicines you are no longer taking and adding new medicines as they change.

Medicines to include: prescription medicines, over the counter medicines, herbal and natural medicines. Medicines of all forms should be included, for example: tablets, liquids, inhalers, drops, patched, creams, and injections.

Take this list with you each time you visit the doctor, pharmacist or other healthcare professional or if you go into hospital. If you have any questions about your medications or how to take them please contact (ACCHS) clinic or speak to your community pharmacist.

Recently Stopped medications

Date of Change	Medicine / Causal Agent	Reason
27/6/2018	Perindopril 5mg + Amlodipine 5mg tablets	Ceased due to hypotension. Replaced by Amlodipine 5mg tablets.

Allergies & Adverse Drug Reactions

Date of Reaction	Medicine / Causal Agent	Reaction
Unsure	Pethidine	Nausea and vomiting

Ph**armacist Consult Summary:** **Date of Review:**

Medication Management Plan – For you, the patient:

Medication Management Plan – For you to discuss with your GP:

Next pharmacist review: Upon request or 3 months.

D3. Medication List 3:

Medication List

Patient information:

The information below will help you use the medication your doctor has prescribed safely and effectively

Medication	Dosage	Take at				Reason for medication
		B'fast	Lunch	Dinner	Bed	

If you have any questions about your medications or how to take them please contact (ACCHS) or speak to your community pharmacist.

Generated by:_____ (pharmacist)

Date: _____

D4. Protocol for crushing medicines:

Instructions for crushing (patient X)'s Medication

	Instructions:	**Photo**
1.	Check medication list	
2.	Gather equipment: crusher, cup of water, empty cup for crushed meds, yoghurt/custard tub, tea spoon, gloves and mask	
3.	Put on PPE- gloves and mask	
4.	Dissolve pantoprazole granules: - Empty content of pantoprazole sachet into water - Allow to dissolve	
	Crushing tablets:	
5.	- Crush tablet with crushing device and put in empty cup	
6.	- Repeat for all crushed meds	
7.	- Ensure all powder is removed from crusher	
8.	Empty out ramipil capsule into powder mix	
9.	Add yoghurt/custard to powder mix- stir	
10.	Ensure (patient X) is sitting upright (not in bed or recliner chair) and is alert	
11.	Give (patient X) yoghurt/custard and water immediately – use a teaspoon	

Training instructions and records

- Skill or Competency: **Following the crushing medication process correctly**
- Instruction Details: Read this guideline. Discuss with the supervisor the steps involved
- Modelling Details: Supervisor to model the crushing protocol and describe what they are doing- use real tablets e.g. Panadol.
- Rehearsal and Feedback Details: Staff member to practice by themselves. When they are done the supervisor to talk about what worked well and changes they could make. Repeat the process if needed.
- This record to be completed for **every** staff member

Learner Name:		Role:	*Disability Support Worker*
Trainer Name:		Role:	*Shift Supervisor*

Skills/competency to be updated once protocol is finalised.

Skill/Competency	Observed?	Proficient?	Signed:	Date:	Comments:
Check medication list					
Gather equipment: crusher, cup water, empty cup for crushed meds, yoghurt tub, spoon etc					
Put on PPE- gloves and mask					
Dissolve pantoprazole granules:					
- Place tablet in cup of water					
Crush tablets:					
- Crush tablet with crushing device and put in empty cup					
- Repeat for all crushed meds					
- Ensure all powder is removed from crusher					
Empty out ramipil capsule into powder mix					
Add yoghurt to powder mix- stir					
Give patient yoghurt and water immediately					

D5. Eyedrop instructions for patients

Eye drop instructions for: _____ Date: _____ (ACCHS logo)

Name of Eye drop:							
Instructions from Dr:							
Time	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**

Name of Eye drop:
Instructions from Dr:

Time	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**

Prepared by: Dr

D6. ACCHS pharmacist flyer

(ACCHS logo)

ACCHS name
ACCHS address
Phone:
Fax:

PHARMACIST

Do you have ANY questions about your medicines:

- What are they for?
- Why am I taking so many?
- Do they all go together?
- Do they have side-effects, can they make me sick?
- Can I take less?
- Do I have to eat when I take my tablets?
- What if I miss some?

There is now a PHARMACIST (name) at (ACCHS) available to help & answer your questions!

Make an appointment to come in and have a yarn…….
or make a time and he can come to you to you can talk about your medicines.

Phone: __ ________
to make an appointment.

(ACCHS logo)

ACCHS name
ACCHS address
Phone:
Fax:

D7. Patient contact letter

(ACCHS logo)

ACCHS name

Address

Phone:

Fax:

Dear TEST JERRY H SPRINGER

9 dumb lane

Caravonica QLD 4000

Dr has requested our pharmacist to come to your home to have a chat to you about your medication, or a home medication review.

We have been unable to contact you by phone – could you please contact our pharmacist on mobile ……to arrange a time for us to visit.

We are happy to sit outside and have a yarn about your medication to make sure everything is going ok for you at a time that suits you.

Kind regards,

Pharmacist (name)

D8. HMR tracking spreadsheet

HMR Tracking

Patient First name	Surname	HMR referral date	Pharmacist conducting HMR	Referring GP	HMR complete date	Report received	MBS Item 900 billed	Reminder completed
Bob	Down	1/02/2019	Ms AB	Dr CD	14/02/2019	Yes	Yes	NA
Fay	Smith	7/03/2019	Ms AB	Dr EF	28/03/2019	Yes	Pending	Yes

D9. HMR and MMP template for Communicare

Home Medicines Review (HMR) Report

Date:

General Practitioner	Accredited Pharmacist	Patient
Name ACCHS name	Name	TEST JERRY H SPRINGER 9 dumb lane
ACCHS address	ACCHS name	Caravonica QLD 4878
Phone:	ACCHS address	Phone: 0124 367 894 (M)
Fax:	Phone:	Date of Birth: 01/05/1973
	Fax:	Medicare No.:

Thank you for referring **TEST JERRY H SPRINGER** for a Home Medicines Review. We met at home on (insert date).

I note your concerns relating to risk of medication related adverse effects: .

- ☐ 5 or more medicines
- ☐ >12 doses per day
- ☐ Significant changes in last 3 months
- ☐ Medication with narrow therapeutic index or medication requiring therapeutic monitoring
- ☐ Symptoms suggestive of an adverse drug reaction
- ☐ Sub-optimal response to treatment with medicines
- ☐ Suspected non-compliance or inability to manage medication related therapeutic devices
- ☐ Patients having difficulty managing their own medications because of literacy or language difficulties, dexterity problems or impaired sight, confusion/dementia or other cognitive difficulties
- ☐ Patients attending a number of different doctors, both general practitioners and specialists
- ☐ Recent discharge from a facility/hospital (in the last 4 weeks).
- ☐ Unstable or deteriorating conditions.

The patients main medication related concern was:

Relevant patient information:

Pharmacy	
Dose aid/administration	
Devices	
Allergies	
Issues affecting medication adherence:	
Disabilities	
Carer	
Cognition	

Current/Regular Medication

Date	Until	Current/Regular Medication	Dosage	Comments
15/08/2018	11/02/2019	Metformin hydrochloride 850 mg coated tablet; 850 mg		
12/02/2018	31/07/2018	Amlodipine 10 mg tablet; 10 mg	one	
07/02/2018	08/04/2018	Lantus 3 mL Cartridge Solution for injection; 100 units/mL 3 mL cartridge	40U daily	
24/01/2018	24/07/2018	Metformin hydrochloride 1000 mg coated tablet; 1000 mg	two tablets with meals by mouth	
24/01/2018	24/04/2018	Ritalin LA Long acting capsules; 10 mg	30mg mane by mouth	
24/01/2018	24/04/2018	Paracetamol 120 mg/5 mL syrup 100 mL; 120 mg/5 mL 100 mL	1g four times a day	

14/03/2017	10/09/2017	Atorvastatin 10 mg coated tablet; 10 mg	one OD	
14/03/2017	16/04/2017	APO-Omeprazole Tablets; 20 mg	20mg	
22/09/2014	29/09/2014	Adrenaline acid tartrate 0.1 mg/mL solution for injections 10 mL; 0.1 mg/mL 10 mL 1:10,000	half a	

Please find my concerns, findings, interventions and recommendations in the following report.

I acknowledge there may be sound clinical reasons why my recommendations may not be considered appropriate for this patient. I would welcome advice on this and would be pleased to provide supporting literature or clarification in relation to any recommendations.

Thank you for the opportunity to contribute to this patient's care.

Yours faithfully,

(Name)

Pharmacist

References:

Therapeutic Guidelines Online

Australian Medicines Handbook Online

MIMS drug information Online

Royal College of Pathologists of Australasia RCPA Manual Online

American Geriatrics Society 2015 Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults http://onlinelibrary.wiley.com/doi/10.111/jgs.13702/full

NOTE: As of the 1st February 2018, a copy of the **Medication Management Plan** must be sent to the patient's community pharmacy (with patient's consent).

Verbal consent given? ☐

At the follow-up appointment,

- please make notes in the MMP column and save the document to the patient's file.
- please print the MMP, FAX to the pharmacy and provide a copy to the accredited pharmacist, then claim Item 900.

Your feedback is greatly appreciated. I can be contacted on the above phone numbers or by email to discuss the HMR Report.

Home Medicines Review (HMR) Medication Management Plan (MMP)

General Practitioner	Accredited Pharmacist	Patient
(Name) (ACCHS name) (ACCHS address) Phone: Fax:	(Name) (ACCHS name) (ACCHS address) Phone: Fax:	TEST JERRY H SPRINGER 9 dumb lane Caravonica QLD 4000 Phone: 0124 367 894 (M) Date of Birth: 01/05/1973 Medicare No.:

Issues / Findings & Interventions and Recommendations: (including issues resolved during visit)	**Medication Management Plan (MMP)** **(to be completed by GP)**
_____: • ***Recommendation for GP:***	☐ No action required ☐ Action (Comment):
_____: • ***Recommendation for GP:***	☐ No action required ☐ Action (Comment):
_____: • ***Recommendation for GP:***	☐ No action required ☐ Action (Comment):
_____: • ***Recommendation for GP:***	☐ No action required ☐ Action (Comment):
_____: • ***Recommendation for GP:***	☐ No action required ☐ Action (Comment):
_____: • ***Recommendation for GP:***	☐ No action required ☐ Action (Comment):

Date:

GP Name:

☐ **Completed MMP faxed to pharmacy**

☐ **Completed MMP to accredited pharmacist**

☐ **Item 900 claimed**

☐ **Updated Medication summary sent to pharmacy if changes**

Appendix E. Case studies and pharmacist reflections

Case study 1:

Patient Mr Male (MM) 55 year old, 16/3/19

MM attends multiple different doctors and health centres, and had multiple hospital discharges in (town) over the last 6-12 months.

MM has a history of active Hepatitis B with oesophageal varices, recently discharged from hospital with upper GI bleeding.

Going back through the notes and his history, I noticed a lot of medications seemed to be missing.

MM was initiated on entecavir following one of his previous hospital discharges but this had been recently ceased/omitted on discharge summaries with no apparent reasoning behind it, putting MM at risk of worsening hepatic symptoms and decompensation.

MM had been on propranolol and pantoprazole for his oesophageal varices and recent GI bleed and these too had been ceased with no apparent reason.

I completed a medication review for MM. Doctors were unsure as to why these medications had been ceased (I believe there were likely to be transcribing issues for at least one of the omissions).

There was a lot of digging required for this patient - involving (hospital), the local pharmacy, (ACCHS) and another local health centre to track what had been changed, when and why.

MM was a high risk patient with multiple recent hospital discharges, and possibly would have ended up with another admission if he had not been seen by the IPAC pharmacist at the clinic.

Doctors agreed to all recommendations in HMR report, patient was recommenced on antiviral therapy for his hepatitis, propranolol for the varices and pantoprazole to reduce his risk of GI bleeding.

Doctors made a note in the clinical information system to alert other health centres regarding this patient due to his constant movements and attendance at multiple health centres.

I believe this was a very important intervention which may not have occurred for some time (or at all) if the IPAC pharmacist hadn't been at the health centre when MM came in.

(pharmacist)
(ACCHS)

Case study 2:

From (pharmacist) 25/7/2019

Hi (PSA Coordinators),

I just wanted to share you with our little success story. (PSA Coordinator) I mentioned this lady to you when you were over for the visit, however we now have real results.
When I first met her, she did not have any real care for her health. She was eating sugar like it wasn't killing her and stocking up her fridge with insulin that never got opened. She was very standoffish to us all and it took a lot for her to accept me. I went to Elders group and sat next to her weekly until she opened up to me.
Her GP, the practice nurse and myself joined forces and made this lovely little lady our project. We convinced her to come into the clinic every Tuesday morning before she went to Elders group to have her Bydureon injection. She administers it to herself however she is supervised by the practice nurse to ensure she does it correctly. I also pop my head in to say hello and give her her weekly DAA.
She is now very compliant with her medication, she is proud as punch to tell me that she has lost weight. November 2018 she weighed 72.1kg and this month she weighs 66kg. She now with her extra energy she walks herself up the street to do her jobs, she proudly told me that she dislikes "those fatty pasta meals" and is avoiding sugar as much as possible (with the old treat every now and then).
Her HbA1c in November 2018 was 14% and then this month she had a reading of 8%. Her ACR in February 2019 was 103.4 mg/mmol and last month was 37.7mg/mmol.

It has been a slow process and she still has some distance to go, as her kidneys are still declining slowly, but she is so happy with her health, and the staff here at the clinic are very proud of everyone's efforts.

The diabetes educator has recently left the clinic, so we have decided to do case conferences with the patients. So we have had their GP, the practice nurse/ AHW and myself in the consults, and these are proving to be very beneficial for the client and the clinic. The client doesn't have to keep coming and going to see everyone individually and we are getting much more information from them whilst everyone is in the one room.

Just wanted to share with you both as to what is happening at the moment in (ACCHS).

Kind regards,

(pharmacist)

Case study 3:

HMR notes to GP regarding patient EF 17/07/19

Client seen at home for HMR with (ACCHS outreach worker) with thanks.

EF has just got out of hospital, lots of changes to meds, note due to start dialysis on 29/7/2019 (as per client). Given only one week Webster from (hospital) on discharge so will require new Webster packs via us at (ACCHS) until dialysis is started.

EF has booked an appointment with (doctor) tomorrow morning 8:30am to help with up-dating meds. I've asked EF to please take her (hospital) Webster-pack with her to this appointment, as I cannot see a discharge summary yet in documents.

Discussed all meds/ indications / changes but EF not given a medi-list as so many changes in hospital.

I gave a new spacer and demo on use. Reporting some SOB.

I explained to EF that once on dialysis her medications will be organised via the renal unit.

ISSUES:

- DIZZINESS F/I : EF reports dizziness today. Needing to rest a lot. Multiple med changes that may be contributing to this (increased frusemide, new prazosin, increased nicorandil). Please check BP and dizziness concerns at GP consult tomorrow. I've reiterated to take things slow getting out of chairs/bed etc.

- OLD GTN PATCH NEEDS REMOVAL: EF showed me a patch applied at (hospital) and wondering what this is. Good question, as not listed on discharge list and date of application (8/7/19) obscuring the name of patch. I rang (hospital) pharmacy once back at clinic and confirmed a stat GTN patch 5mg was applied on 8/7/19. So this can most definitely be removed now. Appears not intended to continue on discharge (and already on oral isosorbide mononitrate). I called client back and told her she can now take off that patch.

- ESA OVERDUE: Darbepoetin not given whilst in (hospital), now overdue, I've emailed (hospital staff member) who is involved in client care to please help give (with thanks).

MEDICATION CHANGES MADE AT (hospital):

- NEW calcium carbonate (as phosphate binder) 1250mg TDS with meals (outside of Webster)
- NEW calcitriol 0.25mcg caps, 3 caps mane
- NEW prazosin 0.5mg BD
- NEW pantoprazole 20mg mane (query to continue or query was for inpatient stress ulcer prophylaxis)
- INCREASED nicorandil dose now 20mg BD
- INCREASED frusemide to 250mg mane

- RESTARTED gliclazide-MR 30mg daily (however see previous note from Dr. X re: this). HbA1c taken at (hospital) 7/7/19 = 7.1%.
- INCREASED Coloxyl and senna packed regular as 2 BD, however pt reports no issues with constipation so suggest to make prn (not packed).

NB: Client has thyroxine not packed (in fridge at home) also. Also given short term course of K+ supps (3 days) and oral amoxy/clav (5 days).

Medication review:

1) <u>Please review dizziness concerns.</u>
   Multiple changes to meds recently, any of which may be contributing to dizziness. Currently now on: prazosin, nicorandil, frusemide, isosorbide mono, metoprolol and amlodipine. ALSO has been wearing a GTN patch left on by (hospital) in error (patch applied 8/7/19 and mentioned by pt at home visit on 17/07/19) – I have contacted (hospital) to notify them of this error.Patient asked to remove patch.

   I note from Communicare records a similar issue with dizziness previously when med changes ++ attempted quickly (eg see progress note dated 24/3/14).

Case study 4:

"Not everything that counts can be counted"

MR JK

A lovely patient with Parkinson's Disease has relocated back to (town) after 10 years away. He has moved into essentially low-level care (a cabin behind the nursing home) so in theory is allowed to manage his own meds. JK would like to do this very much but his PD shakes have got worse, and he's having trouble opening the medi-sachets or Websters (we tried both). He doesn't want to walk up to the nurses station BD for his meds (has doses 5 times a time on his PD meds, the nurses give him some doses to take back to his cabin), but he can't really manage on his own right now. It's hot in the sun walking up to see the nurses, plus he wants his independence to self-manage his meds.

Pharmacist interventions:

a) I called (3 different remote community) locations of both health centres and pharmacies to track-down what his most recent PD med regime should be. Turns out we'd accidently decreased his total daily dose of Levodopa due to confusion with meds rec / multiple moves around WA and NT. GP fixed this after I'd flagged it.
b) I purchased 2 sets of pill-boxes for JK (large ones with press-down lids) and labelled these for 5 times daily doses. Tested JK could open them. Delivered them to the community pharmacy who agreed to fill this (somewhat unorthodox) system.

Went back to see him again at his cabin yesterday - PD shakes are much better now! Compliance excellent. Getting to hydrotherapy to the pool. Loves the pill-boxes and is allowed to keep them in his cabin, no more walking up to the nurses station in the hot sun ☺

Case Study 5:

Patient WA

Biographics:

- Male
- 63 years

Medical history:

- Chronic sinusitis
- Back pain
- GORD
- Asthma
- Anxiety with depression
- High cholesterol
- Hypertension
- Eczema
- Epilepsy
- Bronchiectasis
- Melioidosis 2015
- MI 1991 and 1992

Current medical issue:

- Recent admission to hospital for elective left ankle fusion: WA was discharged from hospital in a Cam boot for 12 weeks, non-weight bearing for the first 6 weeks and partial weight bearing for the second 6 weeks. 3 months of enoxaparin was prescribed at a dose of 40mg per day.

Medications:

- Oxycodone/naloxone 5/2.5mg tablets nocte prn
- Enoxaparin 40mg daily
- Levetiracetam 1g daily
- Atorvastatin 80mg daily
- Aspirin 100mg daily
- Citalopram 40mg daily
- Perindopril/amlodipine 10/10mg daily
- Primidone 250mg BD
- Paracetamol MR 1330mg BD prn
- Budesonide/formoterol 200/6mcg 2 puffs BD
- Tiotropium 18mcg daily
- Salbutamol prn
- Thiamine 100mg daily
- Folic acid 5mg daily
- Atenolol 50mg daily
- Isosorbide mononitrate MR 30mg daily
- Mometasone nasal spray 2 sprays prn

Issues identified:

1. Duration of anticoagulant therapy:
   Issue: WA was complaining about the daily injections which were causing him pain and leaving him with bruising. After reviewing the literature (see appendix 1) I found no evidence to support the extended duration of anticoagulants in patient with lower limb injuries or immobility.

   Recommendation: ceased enoxaparin.

   Outcome: I spoke to the GP who agreed that the extended duration was not justified and ceased WA's enoxaparin therapy on 08/02/19 after a total of 8 weeks of therapy.

2. Folic acid:
   Issue: there is no clear indication for folic acid. WA was previously on high dose co-trimoxazole in 2015 for melioidosis. Folic acid appears to have been started at the same time but was not ceased when co-trimoxazole was ceased. Folate level from 11/17 showed high folate levels (>54nmol/L).

   Recommednation: cease folic acid

   Outcome: folic acid was ceased by the GP.

Pharmacist Reflection:

Email from (pharmacist) October 2019

Hi (PSA Coordinators)

Referring to the HMR report I was speaking to you about earlier - my first thought was 'after all this work he is still having difficulty'. But then I realised – this is the satisfaction, being able to build the relationships with clients – build the trust – so that you can continue to work with them throughout – chronic illness does not just go away – he would have well and truly slipped through the cracks – I can say that without a doubt.

And the last HMR doctor review – I was in there with him, along with his support worker and at the end of the consult I was rewarded with the biggest smile from this gentleman – I had not seen that smile before and when I commented on it, he gave me another.

In the report there where a few loose endings as I wrote it on a weekend, all loose ends were tied up by the time he left the clinic

I have another example of a similar outcome – but only one HMR report – where both (IPAC pharmacist) and myself have had frequent contact with a disabled client – who is fully cognitive- numerous interventions has now made his life so much easier – and this was a team effort with his support agency – meals on wheels, GP, community pharmacy – many of the challenges have been resolved, or are on the way – we have organised his son to become a paid carer, organised appointment times to be made here so they don't clash with other services, organised a change from MPS rolls to flat blister packs at no charge from his community pharmacy, and had a new aged care assessment organised with the final view of him being able to go home to his Island into an aged care facility there.

These are the ones that make me smile ☺

(Pharmacist)

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Pharmaceutical Society of Australia

Pharmaceutical Society of Australia

Pharmacy Trial Program Tranche 2

June 2020

Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) to Improve Chronic Disease Management (IPAC) Project

Pharmacist Recruitment

PSA Committed to better health

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The financial assistance provided by the Australian Government must not be taken as endorsement of the contents of this report. The trials are undertaken by independent researchers and therefore the views, hypotheses and subsequent findings of the research are not necessarily those of the Australian Government Department of Health.

Abbreviations

ASGS-RA	Australian Statistical Geography Standard Remoteness Area 2016
AACP	Australian Association of Consultant Pharmacy
ACCHS	Aboriginal Community Controlled Health Service
AHS	Aboriginal Health Service
AHW / ATSIHP	Aboriginal Health Workers/Aboriginal and Torres Strait Islander Health Practitioners
CEO	Chief Executive Officer
FTE	Full Time Equivalent
HMR	Home Medicines Review
HTA	Health Technology Assessment
IPAC	Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management
JCU	James Cook University
MBS	Medicare Benefits Schedule
MMM	Monash Modified Method
NACCHO	National Aboriginal Community Controlled Health Organisation
NT	Northern Territory
PBS	Pharmaceutical Benefits Scheme
PGA	Pharmacy Guild of Australia
PSA	Pharmaceutical Society of Australia
QLD	Queensland
QUMAX	Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander People
S100 RAAHS	Section 100 Remote Area Aboriginal Health Services Program
VIC	Victoria
6CPA	Sixth Community Pharmacy Agreement

Executive Summary

Introduction

The Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) to improve Chronic Disease Management (IPAC) project aimed to improve quality of care outcomes for Aboriginal and/or Torres Strait Islander adult patients with chronic disease by integrating a practice pharmacist within the primary health care team of ACCHSs. The Pharmaceutical Society of Australia (PSA) was responsible for recruiting suitably skilled pharmacists to integrate within all participating ACCHSs across Queensland, Victoria and the Northern Territory to deliver the required services in a culturally-responsive manner and to capture relevant data for evaluation of the intervention.

Method

Once ACCHS sites were recruited for the project, PSA worked with NACCHO and participating ACCHSs to ensure the respective needs and priorities were met. PSA Coordinators invited local community pharmacies, identified by participating ACCHSs as those with whom they worked, to nominate suitable pharmacist candidates to work in the project. Concurrent to this approach, an open call for expressions of interest was conducted by PSA Coordinators to generate a database of potential pharmacists interested in working within Aboriginal Community Controlled Health Services. This was done via PSA and Australian Association of Consultant Pharmacy (AACP) newsletters, social media channels, the NACCHO/PSA ACCHS Leadership Group and throughout the ACCHS network via NACCHO. Finally, where these two methods of recruitment were not successful, advertising through mainstream online job seeking platforms was utilised along with active, direct scoping of candidates through informal pharmacy networks, hospital pharmacy departments and a publicly available list of accredited pharmacists coordinated by the AACP. Respecting the principles of self-determination, each ACCHS was responsible for making the final decision on the appointment of the pharmacist to their service.

Results

Recruitment of 23 pharmacists enabled initial implementation of the project at all 20 participating ACCHSs. A total of 12.5 pharmacist Full Time Equivalent (FTE) was distributed across individual ACCHSs, who were each apportioned pharmacist time between 0.2 and 1.4 FTE according to patient numbers, capacity and priorities of both the pharmacists and health service. Re-recruitment and reallocation of FTE throughout the project, necessary due to pharmacist turnover and site attrition, enabled an overall delivery of 12.3 FTE to 18 ACCHSs. A total of 26 pharmacists participated as integrated pharmacists throughout the intervention. In all sites where community pharmacy nominated a candidate for the role, a community pharmacy nominated candidate was appointed. Seven pharmacists were employed under subcontract with community pharmacy, with the remaining 19 pharmacists employed directly by PSA.

Conclusion

Through a proactive and multi modal approach to recruitment, the IPAC project identified significant interest from pharmacists from a range of pharmacy sectors to work within the ACCHS settings. Maintenance of a register of pharmacists interested in undertaking integrated roles within an ACCHS may assist future efforts to recruit pharmacists for similar positions. Community pharmacies who have well developed and respectful relationships with ACCHSs are well placed to identify pharmacists to perform integrated roles.

The IPAC project assisted with the refinement of a position description for pharmacists working within ACCHSs, acknowledging the importance of providing culturally safe and acceptable services to Aboriginal people and Torres Strait Islanders within the holistic primary health care setting.

Regardless of the funding mechanism for future program role out, models of recruitment and employment must be flexible and underpinned by ACCHSs' right to self-determination. Funding mechanisms will need to factor in pharmacist recruitment, salary and retention, as well as the increased costs of program delivery in remote locations.

The successful completion of the implementation phase in 18 ACCHSs located across all geographic regions, including very remote locations, demonstrates that integration of pharmacists within ACCHSs is achievable across the entirety of Australia

Recommendations

1. Regardless of funding mechanisms, methods used to employ integrated pharmacists must recognise the principles of self-determination for ACCHSs. Recruitment should be flexible and be led by ACCHSs to enable selection of pharmacists with the 'right organisational fit'.
2. Develop proactive and multimodal strategies to assist future recruitment, encompassing engagement with community pharmacy and other pharmacy sectors. Program support enabling maintenance of a register of pharmacists interested in working within the ACCHS sector, and creation of generic templates for position descriptions guided by the core roles of the IPAC project, will assist all ACCHSs to access a suitable pharmacist.
3. Legislative barriers that inhibit an integrated pharmacist from practicing to their full scope of practice within an ACCHS should be identified and overcome.

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1. Introduction

The Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) project is a tripartite project with the aim of improving quality of care outcomes for Aboriginal and/or Torres Strait Islander adult patients with chronic disease by integrating a practice pharmacist within the primary health care team of ACCHSs.

The IPAC project is a partnership between the Pharmaceutical Society of Australia (PSA), NACCHO, and James Cook University (JCU) College of Medicine and Dentistry.

The PSA, as the lead agency, was responsible for managing the Head Agreement with the Australian Government Department of Health, and service agreements with partners and ACCHSs. PSA coordinated the appointment of practice pharmacists including their recruitment, selection, placement, training, mentoring and performance. Pharmacists delivered ten core roles in participating ACCHSs across Queensland, Victoria and the Northern Territory to deliver the required services in a culturally-responsive manner and to capture relevant data for evaluation. NACCHO provided Aboriginal governance leadership for the project and coordinated all communication with ACCHSs, Affiliates and the NACCHO Board. JCU has undertaken the project evaluation, having developed the research methodology based around a pragmatic, community-based participatory research model.

2. Methods

PSA was responsible for coordinating the recruitment, selection, placement, training and ongoing performance management of the integrated pharmacists.

Pharmacist eligibility criteria

The IPAC Protocol[1] outlined the criteria for pharmacists to be considered for an integrated pharmacist position within the ACCHS selected to participate in the project. These included:

- current registration with the Australian Health Practitioners Regulation Agency (AHPRA) as a pharmacist;
- more than 2 years post registration experience;
- post-graduate clinical qualifications or demonstrated clinical experience (eg. hospitals or HMRs)

A position description (Appendix 1) for the role was developed by PSA and endorsed by the IPAC Steering Committee and defined the selection criteria, qualifications and requirements to fulfil the core roles and key responsibilities of the IPAC roles. PSA and staff from the individual ACCHS would consider this position description when appointing pharmacists to the positions.

Along with appropriate clinical experience, selection criteria required pharmacists to have a demonstrated understanding and awareness of Aboriginal cultures, including acceptance of the principles of community control and self-determination. There was a preference for pharmacists who were accredited to undertake medication management reviews, however this was not considered mandatory due to concerns related to an adequate supply of accredited pharmacists in all participating ACCHS locations.

It was deemed essential that pharmacists have excellent communication skills, have well developed organisational skills and the ability to work with minimal supervision.

Recruitment of pharmacists

Once ACCHS selection for the project was finalised NACCHO also sought information from each ACCHS to identify the community pharmacy (ies) with whom services had existing relationship(s). PSA engaged with these local community pharmacies and invited them to nominate suitable pharmacist candidates for all sites. In addition to approaching community pharmacy, an open call for expressions of interest was conducted by PSA Coordinators to generate a database of potential pharmacists interested in working within Aboriginal Community Controlled Health Services. This was done via PSA and AACP newsletters, social media channels, the NACCHO/PSA ACCHS Leadership group and throughout the ACCHS network via NACCHO. Where these avenues of recruitment were not successful, advertising through mainstream online job seeking platforms was utilised along with active, direct scoping of candidates through known networks, hospital departments and publicly available accredited pharmacist lists.

Interviewing and appointing pharmacists.

Applicants were screened by PSA Coordinators by reviewing information provided via the nomination process and/or direct contact with the pharmacists. An IPAC Project Recruitment – Screening checklist (Appendix 2) was utilised to standardise the process.

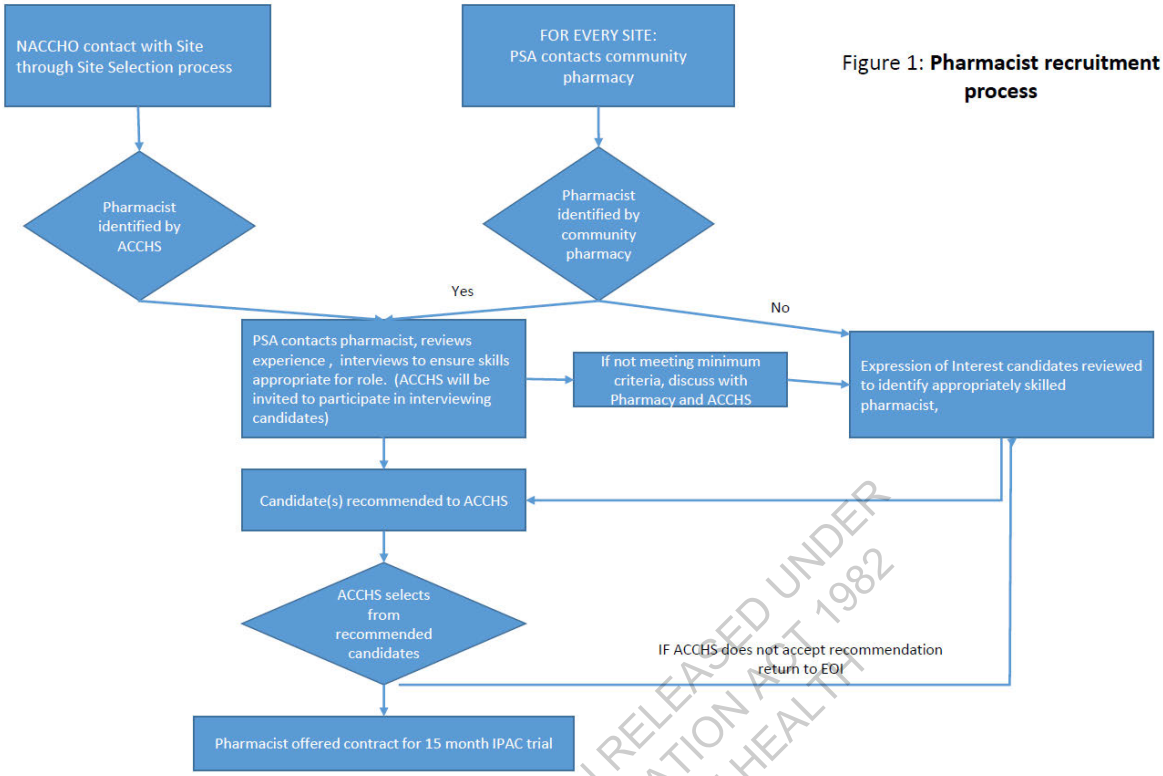
This process enabled preparation of a shortlist of candidates for each ACCHS, after which representatives of the ACCHSs were invited to review applications, select candidates for interview and participate in the interviewing process. In addition to the PSA Coordinators, participants from the ACCHSs involved in the interview process included CEOs, Senior Medical Officers, Clinic Managers, Aboriginal Health Practitioners, Aboriginal Health Workers and Practice Nurses. Standardised interview questions (Appendix 3) were prepared by PSA Coordinators and guided the interview process however each ACCHS was able to modify or add questions specific to their setting.

Following the screening and interviewing process, respecting the principles of self-determination, each ACCHS was responsible for making the final decision on the appointment of their pharmacist. Pharmacists were engaged either via a subcontract through community pharmacy or under an employment contract with the PSA.

PSA undertook checks on pharmacists' registration status and ensured that appropriate police clearance or working with children checks (as per state specific requirements) were sighted.

The following algorithm outlines the pharmacist recruitment process undertaken through the IPAC project. The process was endorsed by the IPAC Steering Committee, prior to the appointment of any pharmacist.

Figure 1. Pharmacist recruitment process



Induction

PSA-employed pharmacists undertook an induction process upon becoming an employee of the PSA, while community pharmacies retained their usual induction practices for their pharmacists participating in the project. Site specific workplace inductions were provided by the ACCHS upon commencement of the pharmacist. Pharmacists were expected to comply with site specific Work health and safety requirements at the ACCHS, as per the PSA ACCHS site agreement.

Induction training of the pharmacists by PSA Coordinators encompassed the lines of communication required for clinical, project, conflict resolution and human resources support[2]. Despite being employed either by community pharmacy or PSA, pharmacists were expected to seek permission from the ACCHS prior to taking leave and to notify the health service if personal leave was required, in addition to notifying either PSA or the community pharmacy.

Performance Management

PSA was responsible for the performance management of the pharmacists directly employed by PSA, and was also responsible for overseeing the delivery of the subcontracting arrangements through community pharmacy. NACCHO had undertaken a Needs Assessment with each ACCHS at the commencement of the project[3] to identify ACCHS priority areas from the range of core role activities expected to be undertaken by the pharmacists. The Needs Assessment informed a Pharmacist Activity Workplan that was provided to each pharmacist to guide their activity within the ACCHS. PSA utilised regular communication with pharmacists and community pharmacy owners via phone calls and emails to provide updates regarding their activity. NACCHO retained responsibility for liaising with the ACCHS managers regarding performance of the project. Site visits conducted by PSA Coordinators provided an opportunity to undertake a face to face review of pharmacist performance and offer additional support to optimise project delivery.[4]

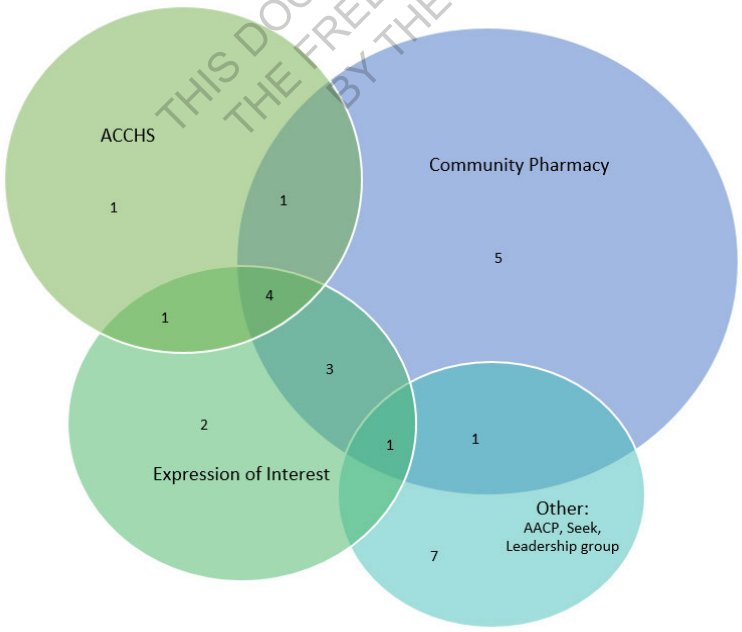
3. Results

Pharmacist recruitment

Pharmacists were nominated via a multimodal approach including community pharmacy, ACCHSs, an open expression of interest and other sources which are outlined below.

Figure 2 illustrates the number of pharmacists participating in the project according to the source of their nomination. Many pharmacists were identified through multiple processes, with community pharmacists assisting in the identification of 15 of the 26 integrated pharmacists ultimately employed within ACCHSs.

Figure 2 Integrated Pharmacist nomination sources



ACCHS Nomination

Through their site selection process, NACCHO requested participating ACCHSs to nominate the community pharmacy with whom they identified as having an existing relationship. At the time of receiving these nominations, 22 ACCHSs had identified interest in the project. Of the 22 ACCHS, 17 identified either one or multiple community pharmacies with whom they had a relationship. In one instance an ACCHS indicated they would only participate in the project if the community pharmacy with whom they had an existing relationship was involved with the project. These nominations were provided to PSA to assist in prioritising which community pharmacies to seek pharmacist nominations from.

In addition, some ACCHS had developed relationships with accredited pharmacists who undertook Home Medicines Reviews (HMR) with their clients. NACCHO provided PSA with the details of these pharmacists to consider through the recruitment process.

Community Pharmacy Nominations

For every site, local community pharmacies were approached to determine if they had any pharmacists who were interested in nominating to participate as the ACCHS integrated pharmacist for the duration of the project. Following input from the Pharmacy Guild of Australia (PGA), a subcontract was developed that enabled the pharmacist to remain employed by the community pharmacy.

Once the recruitment process had been endorsed by the Steering Committee, PSA communicated via direct phone call or emailed letters to 50 community pharmacies inviting them to nominate pharmacists who might be interested in the integrated pharmacist positions. The list of pharmacies was compiled with input from the PGA, ACCHSs, NACCHO and PSA. Each pharmacy involved in supplying medications via Section 100 Remote Area Health Service program (S100 RAAHS) and providing services via the Section 100 Support Allowance Program, had already been contacted by the PSA Project Coordinators to gauge their interest and capacity to participate in the project. The recruitment process generated pharmacist nominations from 11 community pharmacies interested in participating in the project within 11 ACCHS.

In the time between receipt of nominations and finalising the recruitment process, 5 of the community pharmacies withdrew their interest in being subcontracted to participate in the trial;

- For one of the ACCHSs the pharmacist nomination was made by a manager of the community pharmacy rather than the owner of the pharmacy. The owner subsequently advised that their current priority was to direct the pharmacist to alternate community pharmacy based activities, and withdrew their nomination.
- At another ACCHS, the nominated pharmacist was offered a position through a subcontract with community pharmacy however the community pharmacy owner declined the subcontracting arrangement. They did not provide a specific reason for this decision, however the pharmacist remained partially employed by the community pharmacy while undertaking the IPAC trial part-time as a PSA employee, and maintained this employment relationship with the community pharmacy for the duration of the project.
- At one site the community pharmacy initially expressed interest to nominate a pharmacist for the project but then withdrew their nomination.

PSA Coordinators proceeded to advertise externally for a pharmacist for this position through SEEK®, with a community pharmacy employee of the same pharmacy applying for the role. PSA re-offered a subcontract to the community pharmacy owner, however they declined and gave approval for PSA Coordinators to proceed with offering their pharmacist a direct employment arrangement with PSA.

- Two community pharmacies withdrew their nominations when they were advised that the ACCHS, which had multiple clinics, wanted the pharmacist to work at a specific clinic located between 80 and 300km away from the pharmacies.

Respect for the principles of self-determination was fundamental to the recruitment process. At one ACCHS, both the health service and community pharmacy nominated the same pharmacist to conduct the IPAC role. The pharmacist was not a direct employee of the community pharmacy at the time of being nominated, and had historically provided HMRs and limited consulting services to the ACCHS. The ACCHS requested that the pharmacist be employed directly by PSA throughout the project. The Steering Committee, respecting the principles of self-determination, endorsed this arrangement.

Two ACCHSs, on the basis of being associated with multiple community pharmacy providers of services under QUMAX, declared they did not want to have a pharmacist employed under a community pharmacy subcontract delivering the IPAC project; they did not want to be seen to prefer one community pharmacy over another, or to deal with any perceptions of conflicts of interest on the part of the community pharmacies. At one of these ACCHSs, pharmacists were nominated by two community pharmacies. A short listing and interview process was conducted, with two of the pharmacists nominated via community pharmacy being offered the roles. The community pharmacist who nominated the pharmacists was understanding of the request from the health service and supported PSA being the direct employer. The other ACCHS who had indicated their desire to not have a single community pharmacy provider received no nominations of pharmacists from their community pharmacy providers.

Despite a community pharmacy owner initially expressing interest in participating in the IPAC project, the community pharmacy did not nominate pharmacists for the 2 ACCHSs they had contracts to supply to during the recruitment phase. There was understandably some reluctance due to the initial lack of project funding available to support costs associated with recruiting and retaining pharmacists in remote locations eg initial relocation costs, housing costs, allowances to enable access to vehicles, professional development support. An open recruitment process including external advertising resulted in a candidate being offered one of the roles, however the candidate withdrew their interest after training but prior to commencement at the site due to another job offer. Following this withdrawal there were further discussions with the community pharmacy to address and overcome barriers to participating in the project, which resulted in the community pharmacy agreeing to be the subcontracted provider of pharmacists to 2 ACCHSs with whom they had a relationship.

There were another 2 pharmacists who, through the recruitment process, were identified as having ownership interests in community pharmacies. They were both offered employment under a subcontract arrangement, however chose to be employed directly by the PSA. Some community pharmacies contacted throughout the recruitment process did not have the capacity to participate themselves, however did provide contact details of pharmacists whom they identified as potential candidates.

Community pharmacy subcontracting arrangements saw the successful implementation of the project at 5 ACCHS, utilising a total of 7 pharmacists. Of these community pharmacies, all were existing suppliers of medications under S100 RAAHS and S100 Support Allowance Program providers. Two of the integrated pharmacists involved in delivering the IPAC project under community pharmacy subcontracts had ownership interests in the community pharmacy.

In summary, excluding sites where community pharmacy withdrew their nomination to participate, in all sites where community pharmacy nominated a candidate, a community pharmacy nominated candidate was appointed to the role. The employment arrangement was either via a subcontract with the community pharmacy or directly with PSA as per the preference of the community pharmacy owner or, in keeping with principles of self-determination, at the request of the health service.

Open Expression of Interest

PSA undertook an open expression of interest process via Survey Monkey to generate a database of pharmacists interested in working within Aboriginal Community Controlled Health Services and participating in the IPAC project. The expression of interest survey was circulated via PSA and AACP newsletters, social media channels, the NACCHO/PSA ACCHS Leadership group and via the ACCHS network via NACCHO. The aim of the Expression of Interest was to gauge broad interest in the roles and was run concurrently with the NACCHO process to identify sites to participate in the project. A total of 69 responses from pharmacists was received.

Following initial ACCHS selection, further correspondence was sent to the pharmacists who had registered their interest. This correspondence was to ensure the pharmacists who had indicated interest understood that the recruitment process prioritised community pharmacy nominations and to determine if they remained interested and willing to be considered for the project, once specific locations were known. This communication was circulated in early May 2018; 42 responses were received.

Some of the nominating pharmacists either owned or were employed by community pharmacies interested in participating in the project.

Of the 26 pharmacists ultimately employed to participate in the project, 11 had completed the original expression of interest. This validated the expression of interest process as a means of broadly identifying potential pharmacists for the role.

Advertising and alternate methods of identifying potential candidates

An active approach to recruitment was required in sites where no community pharmacy nomination was received and no alternate pharmacist had been identified via the open expression of interest process. Separate and prior to the IPAC Project, PSA had identified a number of pharmacists interested in working within general practice (GP-Pharmacist Connect); this list was also used to identify potential candidates for the IPAC Project. Pharmacists who were listed on AACP accredited pharmacist list within the vicinity of participating ACCHSs were contacted to determine if these roles were of interest; this approach resulted in 3 successful appointments. The NACCHO/PSA ACCHS Pharmacist Leadership group was notified of sites that did not yet have a candidate identified, and through this network another ACCHS had a pharmacist successfully appointed. Seek® was the platform used when external advertising was required. Advertisements were placed for positions at 4 ACCHSs, successfully identifying 2 pharmacists who proceeded to participate in the project.

A total of 26 pharmacists were employed over the duration of the IPAC project, including 21 female and 5 male pharmacists. At the time of being appointed to the role, 19 of the pharmacists were accredited to conduct medication management reviews, with another pharmacist gaining accreditation during the project. An additional 2 pharmacists have completed their accreditation since the end of the project, while a further 2 pharmacists who were not accredited have commenced studies to become Credentialed Diabetes Educators.

FTE Allocation

The initial project anticipated 0.57 FTE pharmacists aggregated across 22 participating sites, the equivalent of 12.54 FTE in total. ACCHSs were identified via a selection process coordinated by NACCHO[5].

The number of active patients attending each ACCHS was variable, with as few as 600 active patients at some sites and over 10,000 active patients over multiple clinic locations at other ACCHSs. As it was not equitable to apply the 0.57 pharmacist FTE universally to each site, a modified allocation of a 0.2 FTE baseline plus a ratio of the remaining FTE was allocated across all the ACCHS based on active patient numbers, as reported by the ACCHS to NACCHO. Initial pharmacist recruitment commenced for 22 ACCHS with an FTE allocation ranging from 0.2 FTE for smaller ACCHSs up to 1.2 FTE for larger ACCHS, effectively allowing an ACCHS with multiple clinic locations to have more than one pharmacist participating in the project. Prior to finalising pharmacist recruitment, 2 ACCHSs withdrew from the project prior to the implementation phase; the total 1.2 FTE originally allocated to those ACCHSs was redistributed across the remaining 20 ACCHS to optimise project delivery. As such, implementation was achieved in 20 ACCHS, with the FTE allocation per ACCHS ranging from 0.2 – 1.4 FTE (see Table 2). Some ACCHSs had limited consulting room availability, which also influenced the FTE that could be allocated (which are described in the NACCHO ACCHS support report)[6].

It was evident that participating ACCHSs in very remote locations (ASGS-RA 5, MMM 7) would require some flexibility in how the FTE delivery was accomplished. Blocks of pharmacist activity were permitted to ensure that a pragmatic and practical approach to the trial was adopted, enabling inclusion of very remote sites.

Throughout the project, one ACCHS withdrew and another ACCHS opted to discontinue the implementation phase due to resignation of the integrated pharmacist for personal reasons. Low patient numbers at that site made continuation unfeasible. Pharmacist FTE originally allocated to these services were redistributed throughout the project to maximise FTE allocation. Reallocations involved a process of engaging with the ACCHSs and pharmacists to determine if health services had space and time to accommodate additional pharmacist presence, and if the pharmacists had the capacity to undertake more hours for the project. A final FTE of 12.3 was achieved. The FTE allocation at varying stages throughout the project are outlined in Table 1.

Community pharmacy subcontracts delivered 7,461 hours of activity within the project, which was 89% of the hours anticipated to be delivered through these contracts.

Table 1 - Number of ACCHSs per geographic location and total FTE per State and Territory

No of ACCHS per geographic location, and total FTE per state and territory						
Proposed (project protocol)		Urban	Regional	Remote	Total	FTE
	NT		1	5	6	3.42
	Qld	3	3	2	8	4.56
	Vic	5	3	0	8	4.56
	Total	8	7	7	22	12.54

Initial allocation (upon site selection)		Urban	Regional	Remote	**Total**	FTE
	NT	0	1	6	**7**	4.9
	Qld	3	2	2	**7**	4.4
	Vic	4	4	0	**8**	3.2
	Total	**7**	**7**	**8**	22	12.5

At implementation		Urban	Regional	Remote	**Total**	FTE
	NT	0	1	5	**6**	4.9
	Qld	3	2	2	**7**	4.8
	Vic	3	4	0	**7**	2.8
	Total	**6**	**7**	**7**	**20**	12.5

Project End		Urban	Regional	Remote	**Total**	FTE
	NT	0	1	4	**5**	4.6
	Qld	3	2	2	**7**	5.1
	Vic	2	4	0	**6**	2.6
	Total	**5**	**7**	**6**	**18**	12.3

Table 2 - Final distribution of pharmacist FTE per ACCHS

FTE Allocation	ACCHS
0.2	1
0.4	6
0.6	3
0.7	1
0.8	2
1.0	3
1.2	1 (0.5 + 0.7 FTE)
1.4	1 (0.4 + 1.0 FTE)

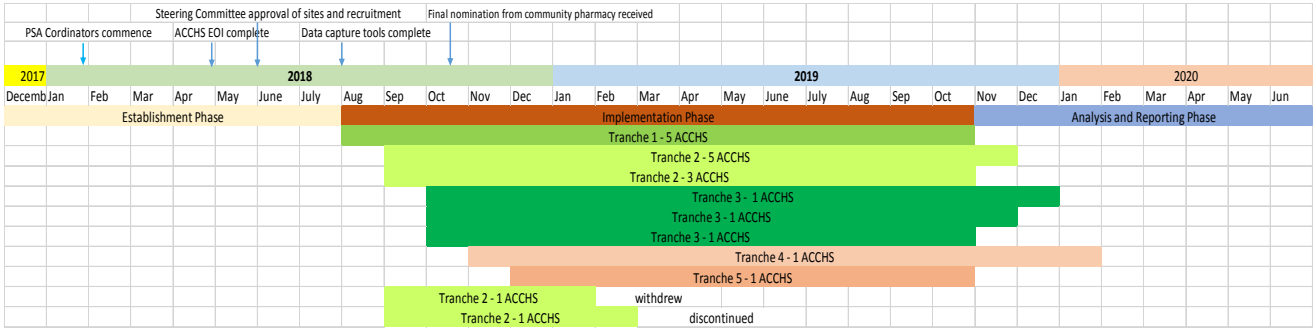
In some sites where pharmacists commenced in later tranches of the implementation phase, efforts to optimise project delivery within the data capture period were achieved by increasing the FTE allocation over a reduced period of time (ie 0.6 FTE over 15 months became a 0.8 FTE contract over 12 months). In instances where the pharmacist was recruited to a full time position and their contracted time could not be completed prior to the end of the data capture period, the project honoured the agreement made with the ACCHS and pharmacist to retain their services beyond the data capture cut off of 31st October 2019.

The trial funded pharmacist's salaries for a 15 month equivalent timeframe which included a provision for leave ie approximately 25 days per FTE. A pharmacist took maternity leave near the end of the project at a point in time where replacing them for a short time was not feasible. The PSA encouraged pharmacists scheduled to finish at the end of October, to have their leave entitlement paid at the end of the project, maximising pharmacist activity within the data capture period.

Timelines

The final timeline indicates the months of activity delivered across the project, and differs slightly from the original timeline which reflected a project commencing in December 2017. The head contract was signed late December 2017, commencement of Project Coordinators for PSA in late January 2018, Project Coordinators for NACCHO in late February 2018 and the contract for JCU research staff in mid-March 2018. The Steering Committee endorsed the ACCHS selection and pharmacist recruitment process at the end of May 2018. Data capture tools were finalised in July 2018 ready for the commencement of training in late July 2018. The final nomination of pharmacists from community pharmacy, to complete full project implementation, was received mid October 2018.

Figure 3. Final project timeline relating to recruitment.



Salary and additional costs

The budgeted salary for the pharmacist roles was $50 per hour plus on-costs. Normal recruitment processes were followed where pharmacists had the opportunity to negotiate conditions upon commencement in the project. In some instances due to the nature of the roles (eg. 'block' work of 2 weeks at a time), a casual rate was applied. Allowances were negotiated in relation to travel and leave entitlements.

Community pharmacy subcontracting arrangements were paid on the basis of $50 per hour plus 17% on costs, regardless of the salary the community pharmacy paid the pharmacist, plus negotiated allowances to cover housing and travel for delivery of services in remote areas.

Additional resources either in kind or funded were provided by ACCHSs and community pharmacies to enable delivery of the project. Examples of support provided by ACCHSs included covering the cost of travelling to remote clinics eg. charter flights, accommodation when in remote locations away from the pharmacist's home base, computer access and office provisions. Community pharmacy provided support with contributions towards salaries, time and housing. In one instance where block activity was provided, the community pharmacist owner did not charge the IPAC project for their time spent transiting to the remote clinic; if they were employing someone to undertake the same role, this could end up being a significant additional cost to deliver the service.

Re-recruitment

Pharmacist turnover within the implementation phase was minimal, with 17 of the pharmacists remaining in their positions until the end of the project. Reasons for turnover included ill health, relocation overseas for a partner's job, relocation to another regional centre for an alternate managerial role and the need to cover maternity leave at their community pharmacy.

Re-recruitment for 3 ACCHSs was undertaken proactively, with positions filled from either community pharmacy recommendations or the existing pool of participating trained integrated pharmacists.

A total of 26 pharmacists participated as integrated pharmacists throughout the intervention. Seven pharmacists were employed under subcontract with community pharmacy, with the remaining 19 pharmacists employed directly by PSA (Table 3).

Table 1 - Total number of pharmacists throughout the IPAC trial, by jurisdiction and employer

State	PSA employed pharmacists	Community pharmacy subcontracted pharmacists
Northern Territory	3	5
Queensland	7	2
Victoria	9	0
TOTAL	**19**	**7**

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4. Discussion

A very active recruitment program was undertaken by PSA Coordinators to ensure that project implementation was achieved across all geographic locations. A multimodal approach was used to identify and engage pharmacists for the integrated roles with pharmacists identified through community pharmacy, by the ACCHS, an expression of interest process, the AACP register of pharmacists and other known networks. The full implementation successfully achieved demonstrates the translatability of the project across all Australian ACCHS regardless of remoteness.

Coordination and scheduling of interviews was a time consuming process, at times delaying the ability to finalise recruitment, however it was it was important that ACCHSs approve every pharmacist appointment.

Community pharmacies successfully delivered the project in 5 ACCHSs across the NT and QLD. Victoria was the only state that did not have a community pharmacist take up the offer of a subcontract in the project, despite being offered the opportunity. One ACCHS reported to the PSA Coordinator that they only became involved in the project at the request of the community pharmacy who supplied medications under the S100 RAAHS program.

Some challenges experienced by community pharmacy in delivering their subcontracted hours included competing interests in ensuring community pharmacies remained adequately staffed, difficulties associated with travel during wet season and times of ill health. In recognition of the need for pharmacists to build rapport and trust with ACCHS clients and to integrate effectively into the primary healthcare team, the subcontracts specified participation by individual pharmacists rather than a service that could be delivered by any pharmacist employed within the community pharmacy. This restricted the community pharmacy from covering times of pharmacist absence with another staff member. Some of the participating pharmacists were long term employees of community pharmacy, and as such backfilling them with replacement staff required additional effort from the community pharmacy owner to maintain their core operation. Despite these challenges community pharmacy participants were able to deliver 89% of their contracted hours, demonstrating their ongoing commitment to the project. Community pharmacies who have well developed and respectful relationships with ACCHSs are well placed to provide pharmacists to perform integrated roles.

Ultimately, funding mechanisms may drive the employment structure of pharmacists providing services to ACCHS however underpinning any program rules and regardless of the funding sources there must be acknowledgement of the needs and preferences of individual ACCHSs. ACCHSs are founded on the mantra of "Aboriginal Health in Aboriginal hands'[7]. Upholding the principles of self-determination is necessary to enable a culturally acceptable mode of delivering effective and sustainable primary health care services to Aboriginal peoples and Torres Strait Islanders. The project identified situations where participating ACCHSs had a preference for a particular employment model, highlighting the necessity for this consideration in future programs.

The recruitment process demonstrated significant interest from pharmacists looking to work within ACCHSs, with 69 expressions of interest received from pharmacists for positions in QLD, Victoria and the NT. While there are documented concerns relating to alternate models of practice reducing the supply of pharmacists in regional and remote areas[8] the experience within the IPAC Project suggests this is not necessarily the case. The project identified a cohort of pharmacists who are seeking alternate career pathways, and willing to relocate to regional and remote locations for these positions. Rather than perceiving these roles as a drain on stretched staffing models, they could instead represent opportunities for more pharmacists to be employed within discrete geographical locations, thereby increasing opportunities for professional support, collaboration and additional workforce capacity to staff pharmacies "after hours" evenings and weekends. Indeed, some of the pharmacists who worked full time hours within the IPAC project elected to work additional hours within community pharmacies where they were located. In multiple locations, community pharmacies who did not have capacity to provide pharmacists to undertake the roles advised PSA Coordinators that they could offer hours of employment to supplement the integrated pharmacist's role.

The mechanisms of recruitment and employment used in the project achieved the ultimate goal of identifying pharmacists deemed by individual ACCHSs to be a good 'fit' for their community, while enabling full implementation and consistent employment of pharmacists for the duration of the intervention. The maintenance of a register of pharmacists interested in undertaking integrated roles within an ACCHS may assist future efforts to recruit pharmacists for similar positions. In supporting their members' efforts to recruit integrated pharmacists, ACCHS representative bodies at both the national (NACCHO) and state (Affiliate) level need to be made aware of the range of targeted strategies which may be used to identify potential pharmacist candidates. Such strategies may include engagement with community pharmacy and hospital pharmacy departments, as well as with connection to a PSA Aboriginal Health Service pharmacist register, AACP accredited pharmacist list, and the Society of Hospital Pharmacists of Australia (SHPA) jobs page.

Demonstrated sound clinical knowledge, good communication skills and a demonstrated understanding and awareness of Aboriginal cultures and healthcare, including acceptance of the principles of community control and self-determination were appropriate key selection criteria for the pharmacists. A position description has been created using the template from the IPAC project and is now available for use by ACCHSs looking to employ an integrated pharmacist. The template has removed the research specific components from the IPAC project (Appendix 4). The PSA Pharmacists in 2023 Roles and Remuneration report[9] has also documented the key roles of an Aboriginal Health Service (AHS) Pharmacist encompassing patient based activities, clinical governance tasks and education and training. This document assists in standardising language used to define the roles and therefore the qualifications and attributes of pharmacists performing these roles. The position description assists ACCHSs to understand the scope of practice of integrated pharmacists and also assists pharmacists in identifying the role as a distinct career pathway. While the scope of practice of an ACCHS pharmacist may have similarities to the General Practice Pharmacist, there is a uniqueness involved in delivering services within ACCHSs in a way that is culturally acceptable and consistent with the holistic care model.

Pharmacists' ability to work to their full scope of practice within an ACCHS can be limited by legislative barriers at a State or Territory level. An example of these legislative barriers identified through the IPAC project included pharmacists in the Northern Territory being able to provide an immunisation service when working within the community pharmacy however being unable to immunise when working as a pharmacist (employed by the community pharmacy) within the ACCHS. Ongoing efforts will need to be undertaken by peak bodies such as PSA to identify and advocate for changes to legislation to enable pharmacists to work to their full scope of practice within an ACCHS.

The FTE allocation undertaken with a base of 0.2 per ACCHS and a subsequent distribution of the remaining FTE based on active client numbers, provided an equitable distribution of pharmacists across sites of varying size. A pilot scheme of pharmacists working within general practices in the United Kingdom recommended that pharmacists be employed at least 2 days a week, with a preference for 3 days or more, to assist with successful integration.[10] Congruent with this recommendation, it was observed in the IPAC Project that the one site allocated a 0.2 FTE pharmacist was the location hardest to keep staffed, with 3 different pharmacists employed over the period of the intervention. Another pharmacist who was employed 0.4 FTE elected to deliver their hours over 3 days, instead of 2, to provide a presence in the clinic on more days each week. This pharmacist reported feeling more part of the team and more likely to receive patient referrals once moving to 3 days of activity.

The UK study[11] which reported this preference for minimum FTE allocation also suggested the time to realise the benefits of a pharmacist within a general practice may take longer in smaller practices. Given that 7 of the ACCHSs participating in the IPAC project had an allocation of less than 0.6 FTE, a timeframe of 15 months may not have allowed sufficient time to demonstrate the full benefit that can be achieved by having an integrated pharmacist as part of the team.

To accommodate challenges involved in delivering part time roles in remote locations in the IPAC Project, blocks of activity were conducted in 6 ACCHSs. At one ACCHS, a pharmacist appointed to a 0.4 FTE position delivered a 2 week block of activity at regular intervals, rather than 2 days per week, while in another setting the pharmacist spent 2 week blocks at one of the clinics that involved charter flights for clinic access. Based upon this experience, blocks of activity should be considered in future programs as an appropriate method of delivering integrated pharmacist services to ensure that smaller and more remote ACCHS are not excluded. The IPAC Project did not evaluate pharmacist activity versus FTE.

Availability of space to conduct patient consultations was a limiting factor at times throughout the project, and restricted some opportunities to increase pharmacist FTE allocation. GPs and allied health staff, with the ability to generate income through Medicare billing, were at times prioritised at sites with a limited number of consulting rooms. Future uptake of integrated pharmacists by ACCHSs could be influenced by the prioritisation of consulting space to professionals who can increase billing through Medicare funding. Noting that pharmacists currently have no ability to claim fees related to chronic disease management via Medicare in the primary care setting, specific pharmacist program funding may be required to overcome this barrier.

A salary of $50 per hour was budgeted for the integrated pharmacist roles throughout the project. For some pharmacists this rate was an increase on what they had been receiving prior to IPAC, while for others the rate was lower than the pay rate in their role immediately prior to IPAC. Hourly rates for employment within community pharmacy vary significantly depending on the market forces in place for specific geographic areas. Pay conditions of public health systems can influence pay conditions within ACCHS in the same jurisdictions. Comparative rates within the public hospital system of the NT at the time of the project were $45 - $59/hour with 6 weeks' annual leave provisions[12]. These comparative rates highlight that pharmacists' goodwill in the project's aims and objectives, rather than high levels of remuneration, was a factor in reaching full implementation.

Salary is only one component of the remuneration required to support integrated pharmacists. Adequate funding to support the known additional costs of delivering programs in rural and remote locations is essential. The Workforce Incentive Program incorporates rural loadings of between 20-50% to incentive payments to practices located in MMM 3-7, with the greater loading skewed to more remote locations[13]. In the IPAC Project, integrated pharmacists would not have commenced within some remote ACCHSs without the additional funding sourced from the project budget, ACCHSs in-kind support and community pharmacy contributions towards travel, housing and allowances.

5. Conclusion

Through a proactive and multi modal approach to recruitment, the IPAC project identified significant interest from pharmacists from a range of backgrounds to work within the ACCHS settings. Pharmacists were recruited from the community pharmacy, hospital pharmacy, primary care and consulting sectors. Maintenance of a register of pharmacists interested in undertaking integrated roles within an ACCHS may assist future efforts to recruit pharmacists for similar positions. Community pharmacies who have well developed and respectful relationships with ACCHSs are well placed to identify pharmacists to perform integrated roles.

The role of an integrated pharmacist within an ACCHS is unique, with similarities to other areas of practice however components which set it apart from all others. The IPAC project assisted with the refinement of a position description for pharmacists working within ACCHSs, acknowledging the importance of providing culturally safe and acceptable services to Aboriginal people and Torres Strait Islanders within the holistic primary health care setting.

Regardless of the funding mechanism for future program role out, models of recruitment and employment must be underpinned by ACCHSs' right to self-determination. Flexibility also needs to be incorporated to ensure that options for regular weekly work schedules and/ or blocks of activity can be delivered depending on pharmacist availability and health service capacity. Funding mechanisms will need to factor in pharmacist recruitment, salary and retention, as well as the increased costs of program delivery in remote locations.

The successful completion of the implementation phase in 18 ACCHSs located across all geographic regions, including very remote locations, demonstrates that integration of pharmacists within ACCHSs is achievable across the entirety of Australia.

6. **Recommendations**

1. Regardless of funding mechanisms, methods used to employ integrated pharmacists must recognise the principles of self-determination for ACCHSs. Recruitment should be flexible and be led by ACCHSs so that pharmacists have the 'right organisational fit.

2. Develop proactive and multimodal strategies to assist future recruitment, encompassing engagement with community pharmacy and other pharmacy sectors. Program support enabling maintenance of a register of pharmacists interested in working within the ACCHS sector and creation of generic templates for position descriptions, guided by the ten core roles of the IPAC project, will assist all ACCHSs to access a suitable pharmacist.

3. Legislative barriers that inhibit an integrated pharmacist from practicing to their full scope of practice within an ACCHS should be identified and overcome.

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Appendices

Appendix 1: Position Description approved for use with the IPAC project.

Aboriginal Health Service Practice Pharmacist

Key responsibilities/core roles

The role of the Aboriginal Community Controlled Health Service (ACCHS) Practice Pharmacist may differ between sites and should be adapted to the needs of the ACCHS setting through collaborative agreement. The main purpose of the position is to contribute to activities of the primary health care team to improve medication management for patients of the health service.

In performing the role of the ACCHS Practice Pharmacist, activities may include:

- Provide medication advice and education services to the clients of the health service according to the policies and cultural practices of the health service.
- Contribute to existing programs of chronic disease management in the health service to expand the capacity of patients to manage their own conditions through quality use of medicines.
- Provide expert professional support and advice to the multidisciplinary team.
- Undertake and/or facilitate medication management reviews for Aboriginal and Torres Strait Islander peoples
- Liaise with other agencies as appropriate to ensure optimal outcomes for the patients of the health service.
- Participate in initiatives to improve medication management quality through the development and review of clinical and procedural policies and protocols.
- Participate in activities identified as essential to the final evaluation of the IPAC project while being respectful to patient needs and wishes.
- Conduct all activities and services in accordance with professional, legislative and ethical standards and with respect for the culture of the clients and staff of the health service.

Work Plan

The pharmacist will work collaboratively with the health service to identify and document tasks in the early stages of the pharmacist's employment. These tasks will form the basis of a structured work plan based on the following 10 core roles of the IPAC project:

SUMMARY OF PRACTICE PHARMACISTS CORE ROLES **Patient Level activities are expected to be 75% of the pharmacist's time.** **Practice level activities are expected to be 25% of the pharmacist's time**			
	Focus	**Theme**	**Core activity examples**

1	Patient	Medication Management Reviews	Pharmacist reviews the medication the patient is taking. The pharmacist initiates and facilitates a medication management review- which may be a Home Medicines Review (HMR) or a non-HMR (medication management review not conducted in the patient's home)
2	Patient and practice	Team-based collaboration	Pharmacist participates in clinic activities that support team-based chronic disease care plans, and cardiovascular (CV) risk assessment
3	Patient	Medication adherence assessment & support	Pharmacist assesses the medication adherence of a patient while undertaking a consultation and provides support to improve adherence if necessary.
4	Patient and Practice	Medication appropriateness audit	Pharmacist assesses 'medication appropriateness and underutilisation of medicines' as an audit of a sample of patients with chronic disease.
5	Patient and practice	Preventative health care	Pharmacist provides preventive interventions to patients eg smoking cessation interactions.
6	Practice	Drug Utilisation Evaluation	Pharmacist conducts a DUE to undertake a systematic review of medication usage collaborating with the multidisciplinary team.
7	Practice	Education and training	Pharmacist conducts education sessions at the service
8	Practice	Medicines information service	Pharmacist provides medicines related information to staff within the service and responds to clinician medicines enquiries.
9	Practice	Medicines stakeholder liaison	Pharmacist develops a written stakeholder liaison plan supporting engagement with community pharmacy and other key organisation/business/individuals that provide medication related services to the site or its patients.
10	Patient and Practice	Transitional care	Pharmacist facilitates care coordination with relevant hospitals; residential aged care facilities, etc.

Qualifications and requirements

The selection criteria, qualifications and requirements to fulfil the core roles and key responsibilities of an Aboriginal Health Service Pharmacist will include:

- Tertiary qualification in pharmacy with current registration as a pharmacist with the Australian Health Practitioner Regulation Agency (AHPRA);
- Minimum of two years post-registration experience in pharmacy (hospital, community or primary care);
- Demonstrated understanding and awareness of Aboriginal cultures and healthcare, including acceptance of the principles of community control and self-determination;
- Ability to work in <<identified ACCHS location>>
- Preferably hold or be working toward accreditation for the delivery of Medication Management Reviews
- Demonstrated sound clinical knowledge;
- Abide by PSA's Privacy Policy and all relevant ACCHS policies
- Provision of a recent police check and Working with Vulnerable People card. (or equivalent for the state/territory of employment)
- May hold other certificates or be working toward other relevant qualifications. Examples may include but are not limited to postgraduate clinical pharmacy, diabetes educator, asthma educator.

Key attributes

- Excellent interpersonal and communication skills including the ability to influence and facilitate change and to work with a diverse range of colleagues and clients;
- Proven ability to provide medication educational sessions with clients, community members and other stakeholders
- The ability and the enthusiasm to work independently and as part of a team;
- Well-developed organisational skills including time management. The ability to work in an environment with minimal supervision;

Desirable:

- Knowledge of the health issues faced by Aboriginal Communities
- Experience in health promotion and the delivery of health education strategies
- Demonstrated experience in operating as part of the primary health care team, supporting chronic disease care, including prevention and management.
- Post graduate qualification in clinical pharmacy.

Appendix 2: Recruitment screening checklist

IPAC Project Recruitment – Screening checklist

PSA Project Co-Ordinator completing checklist: _____

Project Pharmacist's name			
Nominated by	**Community Pharmacy**	**ACCHS**	**EOI**
ACCHS of interest			
FTE allocated to this site			
Pharmacist's preferred FTE			
Date available to commence work			

Criteria	Met /Not met	Demonstrated via	Comments
AHPRA registered		Check via AHPRA website	
2 years experience	<2 2-5 >5	Resume/interview/ referee check/other interaction	
Aboriginal cultures		Resume/interview/ referee	

understanding and awareness including principles of community control and self determination		check/other interaction	
Further comments			
Ability to work at location		Resume/interview/ referee check/other interaction	
Further comments			
HMR accredited		Resume/interview/ referee check/other interaction	
Demonstrated sound clinical knowledge		Resume/interview/ referee check/other interaction	
Further comments			

Interpersonal skills		Resume/interview/ referee check/other interaction	
Further comments			
Education skills		Resume/interview/ referee check/other interaction	
Further comments			
Work independently		Resume/interview/ referee check/other interaction	
Further comments			

Organisation skills – time management		Resume/interview/ referee check/other interaction	
Further comments			
Desirable			
Knowledge of health issues in Aboriginal Communities		Resume/interview/ referee check/other interaction	
Further comments			
Health promotion activities		Resume/interview/ referee check/other interaction	
Further comments			
Experience as part of primary health care team		Resume/interview/ referee check/other interaction	

Further comments			
Post graduate qualifications		Resume/interview/ referee check/other interaction	
Further comments			

	Candidate appropriate for role (Yes or No)	Comment
PSA Recommendation		
ACCHS Recommendation		

Appendix 3. IPAC Project Pharmacist Recruitment – Interview Questions

Introduction

- What interests you most about the IPAC Project?
- Noting that we have received your CV, is there anything about your work history to date you would like to draw particular attention to?

Cultural (these questions or similar may be asked by a representative from the ACCHS)

- How would you describe your knowledge and experience of Aboriginal cultures & the health issues faced by Aboriginal communities?
- Please explain your understanding of community control in relation to Aboriginal Health Services, & the principles of self-determination…
- Do you currently provide a pharmacy-related service to _____ (ACCHS)? If so, please describe…
- Have you previously undertaken any cultural awareness training? If so please describe…

Clinical

- Please describe your clinical experience to date, particularly in relation to Aboriginal or Torres Strait Islander patients (eg accredited to conduct HMRs, hospital experience, public health)
- How would you describe your current knowledge surrounding chronic disease management, in particular cardiovascular disease, diabetes & chronic kidney disease?
- Have you participated in (or delivered) health promotion programs, or provided education to others (either consumers or health professionals)? Please describe…
- Please describe a situation in which you have been involved in clinical decision making
- Noting that the IPAC Project is a trial, do you have any previous experience with research projects or data capture & evaluation?

Availability

- You have expressed an interest in working with the _____ (ACCHS), which has been allocated a pharmacist FTE of _____. How do you see that this would fit with your other work commitments (if applicable)?
- When would you be available to commence work at the ACCHS?
- Which IPAC Project Pharmacists' Training session would you be able to attend? (end of July or end of August 2018)
- Do you have any existing leave/holiday plans?

Appendix 4: Generic position description

Aboriginal Health Service Practice Pharmacist

Key responsibilities/core roles

The role of the Aboriginal Community Controlled Health Service (ACCHS) Practice Pharmacist may differ between sites and should be adapted to the needs of the ACCHS setting through collaborative agreement. The main purpose of the position is to contribute to activities of the primary health care team to improve medication management for patients of the health service.

In performing the role of the ACCHS Practice Pharmacist, activities may include:

- Provide medication advice and education services to the clients of the health service according to the policies and cultural practices of the health service.
- Contribute to existing programs of chronic disease management in the health service to expand the capacity of patients to manage their own conditions through quality use of medicines.
- Provide expert professional support and advice to the multidisciplinary team.
- Undertake and/or facilitate medication management reviews for Aboriginal and Torres Strait Islander peoples
- Liaise with other agencies as appropriate to ensure optimal outcomes for the patients of the health service.
- Participate in initiatives to improve medication management quality through the development and review of clinical and procedural policies and protocols.
- Conduct all activities and services in accordance with professional, legislative and ethical standards and with respect for the culture of the clients and staff of the health service.

Qualifications and requirements

The selection criteria, qualifications and requirements to fulfil the core roles and key responsibilities of an Aboriginal Health Service Pharmacist will include:

- Tertiary qualification in pharmacy with current registration as a pharmacist with the Australian Health Practitioner Regulation Agency (AHPRA);
- Minimum of two years post-registration experience in pharmacy (hospital, community or primary care);
- Demonstrated understanding and awareness of Aboriginal cultures and healthcare, including acceptance of the principles of community control and self-determination;
- Ability to work in <<identified ACCHS location>>
- Preferably hold or be working toward accreditation for the delivery of Medication Management Reviews
- Demonstrated sound clinical knowledge;
- Provision of a recent police check and Working with Vulnerable People card. (or equivalent for the state/territory of employment)

- May hold other certificates or be working toward other relevant qualifications. Examples may include but are not limited to postgraduate clinical pharmacy, diabetes educator, asthma educator.

Key attributes

- Excellent interpersonal and communication skills including the ability to influence and facilitate change and to work with a diverse range of colleagues and clients;
- Proven ability to provide medication educational sessions with clients, community members and other stakeholders
- The ability and the enthusiasm to work independently and as part of a team;
- Well-developed organisational skills including time management. The ability to work in an environment with minimal supervision;

Desirable:

- Knowledge of the health issues faced by Aboriginal Communities
- Experience in health promotion and the delivery of health education strategies
- Demonstrated experience in operating as part of the primary health care team, supporting chronic disease care, including prevention and management.
- Post graduate qualification in clinical pharmacy.

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Pharmacy Trial Program Tranche 2

Integrating Pharmacists within ACCHSs to Improve Chronic Disease Management (IPAC) Project

Pharmacist Induction Training

PSA Committed to better health

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The financial assistance provided by the Australian Government must not be taken as endorsement of the contents of this report. The trials are undertaken by independent researchers and therefore the views, hypotheses and subsequent findings of the research are not necessarily those of the Australian Government Department of Health.

Abbreviations

ACCHS	Aboriginal Community Controlled Health Service
ACCHO	Aboriginal Community Controlled Health Organisation
AHS	Aboriginal Health Service
AHW / ATSIHP	Aboriginal Health Workers/Aboriginal and Torres Strait Islander Health Practitioners
AMH	Australian Medicines Handbook
AMSANT	Aboriginal Medical Services Alliance Northern Territory
APF	Australian Pharmaceutical Formulary
CIS	Clinical information system
CTG	Closing the gap
DAA	Dose administration aid
DNA	Did not attend
eMIMs	electronic Monthly Index of Medical Specialities
eTG	electronic Therapeutic Guidelines
FTE	Full time equivalent
GP	General Practitioner
HbA1c	Glycosylated Haemoglobin A1c
HMR	Home Medicines Review
IPAC	Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management
JCU	James Cook University
MBS	Medicare Benefits Schedule
NACCHO	National Aboriginal Community Controlled Health Organisation
N-MARS	NACCHO Medication Adherence Readiness Scale
NT	Northern Territory
PBS	Pharmaceutical Benefits Scheme
QAIHC	Queensland Aboriginal and Islander Health Council
QUMAX	Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander people
PSA	Pharmaceutical Society of Australia
VACCHO	Victorian Aboriginal Community Controlled Health Organisation

Executive Summary

Introduction

Pharmacists integrated within Aboriginal Community Controlled Health Services (ACCHSs) often work with complex patients who may have multiple chronic diseases and specific socio-cultural priorities and challenges. This necessitates an understanding of both complex chronic disease management and of the social determinants of health and the public health challenges related to Aboriginal and Torres Strait Islander peoples. Induction training for pharmacists participating in the IPAC Project aimed to prepare pharmacists to work within ACCHSs to deliver a diverse range of professional services within their scope of practice in a culturally-responsive manner while also meeting the project's requirements for consent and data collection.

Methods

Pharmacists participating in the project met initial selection criteria which included at least 2 years post-registration experience along with a post-graduate clinical qualification or demonstrated clinical expertise.

Prior to attending IPAC Project induction training, all pharmacists were asked to complete essential pre-reading which included PSA's 'Guide to providing pharmacist services to Aboriginal and Torres Strait Islander people' [1] and relevant components of the project's protocol. [2] They were also asked to refresh their understanding of the 6th Community Pharmacy Agreement rules related to Aboriginal and Torres Strait Islander programs and to complete a series of online learning modules of approximately 15 hours in duration. Modules were selected by PSA Coordinators for their relevance to chronic disease management services in Aboriginal and Torres Strait Islander primary healthcare settings and working in an integrated team environment.

IPAC Project-specific induction training workshops were held over two days as facilitated face to face group sessions in Sydney, Melbourne and Brisbane. Elements of the workshop program included cultural awareness training (delivered by experienced cultural trainers), project overview, consent process, integrated pharmacist core roles, activity work plans, use of the electronic logbook and clinical information systems, resources and lines of communication. A small number of pharmacists who were recruited after completion of the workshops were given a full day of one-on-one project-specific training in a mutually agreed location followed by another day of pre-arranged experience alongside an Aboriginal Health Service pharmacist at their place of work.

Results

All pharmacists completed the essential pre-reading activities and prescribed online modules, and reviewed the relevant 6th Community Pharmacy Agreement rules. A total of 26 registered pharmacists were trained to participate in the IPAC Project and appointed to ACCHS sites.

Of these 26 integrated pharmacists, 20 were accredited to offer Home Medicines Reviews (HMRs) during the implementation phase.

The general induction training program developed for use in the project was suitably comprehensive and tailored to ensure that participating integrated pharmacists would have the necessary skills to work within diverse ACCHS settings in a culturally-responsive manner to deliver the core roles and to capture relevant data for evaluation. Participating integrated pharmacists reported that the induction training adequately prepared them for their role.

Table 1 - Summary of IPAC Project Pharmacist Induction Training attendance

Date of training delivery	Delivery method	Location	Number of pharmacists attending
July 2018	Workshop	Sydney	11
August 2018	Workshop	Melbourne	7
October 2018	Workshop	Brisbane	3
October 2018	Small group	Melbourne	2
September 2018	One to one	Cairns (Qld)	1
March 2019 (replacement)	One to one	Geelong (Vic)	1
April 2019 (replacement)	One to one	Gove (NT)	1
TOTAL			**26**

Discussion

For the majority of pharmacists participating in the IPAC Project, induction training was delivered face to face by PSA Coordinators and experienced cultural trainers in a group workshop setting which encouraged dynamic discussion between participants. While this mode of delivery should be considered for future training programs, consideration could also be given to development of an online training course encompassing the necessary core role content. This would need to be combined with support for access to cultural awareness training, noting the importance of delivery by Aboriginal or Torres Strait Islander people where possible.

Based upon their experience throughout the project, the integrated pharmacists provided feedback and recommendations to PSA Coordinators to further enhance training and preparation of pharmacists to work in the ACCHS setting with broader rollout of this model of care. Importantly, the integrated pharmacists reinforced that training must be backed up by a comprehensive program of ongoing support to create a community of practice and foster a sense of '*teamwork*' for pharmacists working in this sector.

Conclusion

The substantial and consistently positive feedback received by PSA Coordinators from patients, clinicians and health service staff throughout the project indicated that participating integrated pharmacists fulfilled their role in a way that was acceptable, culturally safe and effective for ACCHSs and their communities. This, combined with the high level of core role activity achieved by the integrated pharmacists, confirms that the IPAC Project Pharmacist Induction Training Program met its aims.

Given the relatively low number of integrated pharmacists working within Aboriginal Community Controlled Health Services, sector-specific training is important for pharmacists to understand the holistic nature of care delivered by ACCHSs and how the pharmacist can best integrate into the primary health care team to improve chronic disease management and optimise quality of care outcomes for Aboriginal Australians and Torres Strait Islanders. As evidenced in the IPAC Project, training must be comprehensive and include integrated pharmacist core roles as well as an understanding of contributors to the disparity in health outcomes experienced by Aboriginal and Torres Strait Islander Australians, including social determinants of health.

We propose that the training program developed for use in the IPAC Project may be adapted to be generalisable for application in a national program to prepare pharmacists to work in ACCHS settings. A national program such as this is important to address the gap in tailored training currently available. It is anticipated that effective training and ongoing support for pharmacists will improve uptake and retention of integrated pharmacists by ACCHSs, ensure consistent practice quality and ultimately improve health outcomes for Aboriginal Australians and Torres Strait Islanders.

Recommendations

Table 2 - Recommendations for training integrated pharmacists to work within ACCHSs

Future opportunities to provide training to pharmacists	Potential pathways to implementation	Intended industry impacts
1. Further develop a foundation training program for pharmacists intending to work in the ACCHS sector.	1.1 Creation of an online multi-module Aboriginal Health Services Pharmacist foundation training course, as well as face to face workshops.	Implementing this recommendation will lead to: • Enhanced readiness of integrated pharmacists to work with Aboriginal Australians and Torres Strait Islanders with chronic disease • Consistency of skills provided by pharmacists integrated within ACCHSs • Increased workforce of appropriately skilled pharmacists available to work in ACCHSs

Future opportunities to provide training to pharmacists	Potential pathways to implementation	Intended industry impacts
2. Acknowledge and direct pharmacists to appropriate cultural awareness training	2.1 Support for pharmacists to access cultural awareness training, noting the importance of delivery by Aboriginal or Torres Strait Islander people where possible, as a combination of: • Introductory (general) cultural awareness training • Local cultural induction • Ongoing support from a cultural mentor if available	• Enhanced understanding by pharmacists of the cultural and social determinants of health influencing chronic disease outcomes for Aboriginal and Torres Strait Islander Australians • Enhanced understanding by pharmacists of their own connection to culture and unconscious biases, and how these are likely to influence their work

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1. Introduction

Prior to the IPAC Project several ACCHSs across Australia had sourced ad-hoc funding to employ pharmacists, however these appointments were few in number. Registered pharmacists have historically provided limited clinical services to Aboriginal Australians and Torres Strait Islanders due to existing barriers to service provision.[1]

The aim of the IPAC Project is to improve quality of care outcomes for Aboriginal and/or Torres Strait Islander adult patients with chronic disease by integrating a pharmacist within the primary health care team of Aboriginal Community Controlled Health Services.

To achieve the project's aim, pharmacist induction training needed to meet the specifications of the project protocol and thereby prepare pharmacists to work within ACCHS settings in a culturally-responsive manner to deliver the required services and to capture relevant data for evaluation. Training would also need to ensure an understanding of existing pharmacy programs and MBS services relevant to the health of Aboriginal and Torres Strait Islander people.

Integrated pharmacists would be working with complex patients, often with multiple chronic diseases, necessitating an understanding of social determinants of health and the public health challenges related to Aboriginal and Torres Strait Islander peoples.

This project was conducted in 18 ACCHSs across 22 health service settings located in urban, rural, and remote Australian regions in three jurisdictions: Queensland, Northern Territory, and Victoria. As such, it was necessary to take into account the unique requirements of each jurisdiction in terms of participant consent, state-specific evidence-based treatment guidelines and legislation relevant to the practice of pharmacy.

2. Methods

During the Establishment Phase of the IPAC project, training materials were developed by the Pharmaceutical Society of Australia in preparation for delivery to pharmacists early in the Implementation Phase (2 August 2018 to 31st October 2019).

Considerable expertise existed within the IPAC Project Team itself, with project coordinator roles for both PSA and NACCHO being filled by registered pharmacists with extensive combined experience working with Aboriginal and Torres Strait Islander clients, undertaking review and implementation of program delivery to the AHS sector, and providing clinical services such as conducting medication management reviews. . Additional pharmacist expertise was sought for feedback on training areas deemed to be of value to pharmacists commencing work in an Aboriginal primary health clinic setting. The opportunity to develop training material for the IPAC Project integrated pharmacists was offered to pharmacist members of the PSA/NACCHO ACCHO Pharmacist Leadership Group, chaired by an Aboriginal pharmacist and comprised of pharmacists working in the Aboriginal Health sector. While there was not capacity within the group to take a lead role, input from its members helped to inform the development of resources for the pharmacist induction training course facilitated by the PSA Coordinators.

Eligibility criteria for pharmacists participating in the IPAC project were specified in the project's protocol[2] and included*:*

- Current registration as a pharmacist with the Australian Health Practitioners Regulation Agency (AHPRA)
- More than 2 years' post-registration experience; and
- Post-graduate clinical qualifications or demonstrated clinical experience (eg hospital or HMRs)

The need for post-graduate qualifications was dependent on the ACCHSs preference of applicant and adequate availability of accredited and experienced pharmacist applicants. While some of the integrated pharmacists recruited for the project had prior experience working with Aboriginal or Torres Strait Islander people, others did not.

Training was initially intended as a 3-step process involving locally available health specific cultural safety training, project foundation training and facilitated on-site training at participating ACCHSs. Feedback from the Leadership Group however led to a decision to deliver the majority of training in a workshop setting to enable consistent face to face delivery of extensive cultural training by experienced cultural trainers, which would then be supplemented by local cultural induction if available.

A number of existing available resources were identified as being relevant to the induction training content needed for the project. These could be delivered online as a combination of essential pre-reading and course modules to be undertaken by the pharmacists prior to attending face to face training. This preparatory training content was compiled and made available to pharmacists via a customised IPAC Project Pharmacists Training portal accessible on the PSA website, with completion anticipated to take each pharmacist approximately 15 hours.

2.1 Essential Pre-reading

2.1.1 IPAC Project Master Pharmacist Participation Brief

The IPAC Project Master Pharmacist Participant Brief (Appendix 1) comprised the components of the project's protocol relevant to the integrated pharmacists. A slightly different version of the brief was made available to integrated pharmacists according to the Human Research Ethics Committee specifications of their respective jurisdictions. Pharmacists were instructed to read this document, answer the associated multiple choice questions (Appendix 2) to demonstrate understanding of the content, and bring the Statement of Completion to the face to face training session. A total of 4 Group 2 CPD points were allocated for this activity and could be included in the pharmacists' annual CPD plan.

2.1.2 PSA Guide to providing pharmacy services to Aboriginal and Torres Strait Islander people

PSA's *Guide to providing pharmacy services to Aboriginal and Torres Strait Islander people*[1] is intended to assist pharmacists to deliver a consistently high quality of service to Aboriginal and Torres Strait Islander people, to communicate effectively and to be culturally responsive health professionals. This guide was included in essential pre-reading to enhance pharmacists' understanding of culture, relationship-building, effective communication, provision of existing pharmacy services and programs as they relate to the health care needs of Aboriginal Australians and Torres Strait Islanders.

2.1.3 Aboriginal and Torres Strait Islander Specific Programs and measures to support QUM and medicines access

Aboriginal and Torres Strait Islander Specific Programs included under the 6th Community Pharmacy Agreement are targeted programs and services which improve quality use of medicines and culturally appropriate services for Aboriginal and Torres Strait Islander patients. For pharmacists participating in the IPAC project, an understanding of these programs and services was essential to being able to recognise the medicines-related support available across urban, rural and remote areas of Australia. As such, links to the following programs were provided to pharmacists via the training portal:

- 6CPA Program Rules for QUMAX -Quality Use of Medicines maximised for Aboriginal and Torres Strait Islander people.[3]
- 6CPA Program Rules for S100 Pharmacy Support Allowance.[4]
- The Closing the Gap – PBS Co-Payment Measure.[5]

2.2 Online modules

2.2.1 Medication management reviews, collaboration and motivational interviewing

Although the majority of pharmacists participating in the IPAC project were accredited to conduct Medication Management Reviews at the time of induction training, all pharmacists were directed to the 6CPA Program Rules for Home Medicines Review[6] to ensure a thorough revision and understanding of relevant current program requirements.

PSA provides a range of continuing professional development activities, practice support tools and guidance on recommended external resources via its Aboriginal and Torres Strait Islander Health Services Pharmacist Career Pathway.[7] Of the PSA online modules available at the time of induction training, the modules related to collaboration and motivational interviewing were selected for completion by the pharmacists due to their relevance to working in an integrated team environment.

2.2.2 Chronic Disease Management and Indigenous Health Services

Pharmacists were also directed to undertake the Chronic Disease Management online eLearning programs[8] intended for health professionals, provided by the Australian Government Department of Human Services. These Medicare eLearning programs were intended to up-skill pharmacists in the areas of GP Management Plans, Team Care Arrangements and Allied Health services.

Importantly, the Indigenous Health Service programs section included education on topics such as Medicare Indigenous Enrolments, Indigenous Health Incentive, Indigenous Health Assessments and CTG PBS Co-payment measures.

2.3 Development of IPAC-specific training materials for face to face induction training

Content for induction training to prepare pharmacists for participation in the IPAC project was developed in the following categories:

- Cultural Training
- Project Overview
- Consent process
- Core Roles
- Pharmacist Activity Workplans
- Logbook, resources and lines of communication
- Clinical Information Systems – Best Practice and Communicare

2.3.1 Cultural Training

Culture can influence Aboriginal and Torres Strait Islander people's decisions about when and why they should seek health services, their acceptance of treatment, the likelihood of adherence to treatment and follow up, and the likely success of prevention and health promotion strategies.[9] As such, pharmacists integrated within ACCHSs must be culturally competent to effectively deliver comprehensive and culturally appropriate healthcare.

Provision of introductory cultural awareness training for the participating pharmacists was acknowledged by the Project Team as a preliminary step for facilitating culturally safe and appropriate care for clients of the participating health services. In addition to a focus on history, the intention of introductory cultural training delivered in the group workshops was to explore practical strategies focussing on how to engage well with Aboriginal and Torres Strait Islander patients.

The small proportion of integrated pharmacists who were unable to attend one of the IPAC Project's group training workshops were given the opportunity to undertake the Royal Australian College of General Practitioners online *Introduction to Aboriginal and Torres Strait Islander Health Cultural Awareness*[10] course which was endorsed by NACCHO.
Feedback from pharmacist members of the PSA/NACCHO ACCHO Leadership group reinforced stakeholder belief that cultural training should be delivered face to face by Aboriginal or Torres Strait Islander people whenever possible. Taking this feedback into account, the Project Team engaged experienced cultural trainer Emma Walke (a Bundjalung woman) and pharmacist Associate Professor Lindy Swain to prepare and deliver this component of induction training. The result was a 5-hour session included in the group workshops called 'Pharmacists working with Aboriginal and Torres Strait Islander people', comprising interactive discussion, video clips, role plays and case studies. Content of the introductory cultural awareness training included:

Context

- What is culture? (Culture exercise)
- Aboriginal diversity
- History overview (Stolen generation video)
- How does history influence engagement and health?
- Identity, terminology

Aboriginal overview

- Population demographics
- Chronic disease
- Social determinants of health
- Racism (video)

Engagement, relationships and trust

- Building rapport
- Communication competency (Improving clinical practice video)
- ACCHSs
- Role of the AHW
- Engaging with ACCHSs

- What is culturally responsive care?
- What does a culturally secure health system look like?
- What does a culturally safe pharmacy look like?
- How do I make my practice culturally secure?

Service delivery and processes

- Dispensing, CTG
- Adherence and DAAs
- Medication counselling (Pharmacy video clip, Role play)
- Culturally safe medication review (Case study)

Links to the resources referred to during the cultural awareness training session were provided by Emma Walke and made available to all participating pharmacists via the dedicated IPAC Project online repository. These resources included;

- Stolen Generation testimonies
  http://www.stolengenerationstestimonies.com/
- AIHW report detailing the effects (on victims and their descendants) of being stolen
  https://www.aihw.gov.au/reports/indigenous-australians/stolen-generationsdescendants/contents/table-of-contents
- IQ2 Racism Debate – Stan Grant's speech 2017
  https://www.youtube.com/watch?v=uEOssW1rw0I
- Bringing Them Home Report 1997
  https://www.humanrights.gov.au/publications/bringingthem-home-report-1997
- Map of colonial massacres
  https://c21ch.newcastle.edu.au/colonialmassacres/map.php
- AIHW overview of the health of Aboriginal and Torres Strait Islander people
  https://www.aihw.gov.au/reports-statistics/population-groups/indigenousaustralians/overview
- AIHW National Key Performance Indicators for Aboriginal and Torres Strait Islander primary health care: results from June 2016
  https://www.aihw.gov.au/reports/indigenous-healthwelfare-services/nkpis-indigenous-australians-health-care-2016/contents/table-of-contents
- Australian Bureau of Statistics – Census information (enter postcode into Quick Stats Search)
  http://abs.gov.au/websitedbs/censushome.nsf/home/Census?opendocument&ref=topBar

Integrated pharmacists were given a further opportunity to seek guidance from A/Prof Lindy Swain and Emma Walke with questions related to engaging with Aboriginal and Torres Strait Islander people during a teleconference titled 'You can't ask that!'. This was scheduled and facilitated by PSA Coordinators early in the implementation phase.

Introductory cultural awareness training was to be supplemented by more targeted measures including local cultural induction and ongoing engagement with ACCHS staff as cultural mentors. As such, the integrated pharmacists were instructed to seek and undertake locally available cultural safety training upon commencement of work at their respective ACCHSs in order to tailor their knowledge to local community contexts.

2.3.2 Project Overview

During training conducted by the PSA Coordinators, pharmacists were given an overview of the increased burden of chronic disease experienced by Aboriginal and Torres Strait Islander people relative to other Australians, together with the lack of consistent or reliable funding to support integrated pharmacists to work within ACCHSs.

The presentation (Appendix 3) also included the aim of the IPAC Project, the three distinct phases of the project, and the role of each of the project partners (PSA, JCU and NACCHO). The project funder was acknowledged as the Australian Government under the Pharmacy Trials Program of the 6th Community Pharmacy Agreement.

The project protocol was discussed, detailing its development with input from the Evaluation Team and Project Partners, which include NACCHO, with NACCHO Affiliates; QAIHC, VACCHO and AMSANT. Emphasis was placed on the importance of this document to provide a framework for the requirements, management and conduct of the IPAC project.

The overview also included identification of the various Human Research Ethics Committees involved in the project, the community-based participatory research (CBPR) design of the project, and the intended aggregated pharmacist FTE to be offered to participating ACCHSs.

The spread of geographically diverse settings of participating ACCHSs was explained, along with the aim to recognise the diversity of Aboriginal and Torres Strait Islander peoples and models of care across Australia, to deliver an impact assessment that can best be generalisable to other Australian sites/settings in the future.

Pharmacists were given a broad overview of their role in the IPAC project, including provision of relevant healthcare activities to patients within their scope of practice, provision of education and training to existing staff within the services as appropriate, liaison with community pharmacies to overcome barriers to access of medication by patients, assistance in managing medications at transitions of care, and recording all activities related to the 10 core pharmacist roles.

An introduction to the methods of data collection (Appendix 4**)** throughout the project was given, noting that further training on the use of the pharmacists' electronic logbook and clinical information systems data entry would be provided later in induction training.

2.3.3 Consent

During the establishment phase, the project partners sought and received ethics approval from four Human Research Ethics Committees, encompassing the three jurisdictions relevant to the project. These included St Vincent's Hospital Melbourne (SVHM) Human Research Ethics Committee (Victoria), James Cook University Human Research Ethics Committee (mutual recognition of SVHM HREC), Menzies School of Health Research and the Central Australian Human Research Ethics Committee.

Upon reading the IPAC Project Master Pharmacist Participant Brief relevant to their jurisdiction, each pharmacist was asked to sign the related IPAC Project Master Pharmacist Consent Form (Appendix 1, Appendix 6) prior to commencing work.

Training included a detailed explanation of IPAC patient participant criteria. Pharmacists were advised of the need for informed patient consent as a requirement for participation in the project, with provision of verbal and written information to include the purpose and aims of the project, who is funding and running the project, what participation involves (including any risks and benefits), ownership and storage of information and the use and release of information and confidentiality. Written information was given to patients in the form of the *Master Participant Information Brief* (see example, Appendix 7) specific to each jurisdiction. Training highlighted the need for each ACCHS to develop a customised process for seeking participant recruitment and written consent considering local preferences and to ensure cultural safety.

Pharmacists were instructed to encourage early patient participation in the project to ensure maximum benefit from the services available, noting that patients could withdraw their consent at any stage without consequence. In the event of withdrawal of consent, pharmacists were to record the reason for withdrawal (if given) in logbook, and remove consent in the ACCHS CIS as per JCU procedure. Data for these patients would no longer be collected by GRHANITE™ and would be removed from the analysis.

2.3.4 Core Roles

Integrated pharmacists aimed to augment current practice within primary health care services, and introduce new services not currently delivered within ACCHS settings. The integrated pharmacists conducted pre-determined core roles and additional roles as specified by ACCHSs and the service agreement which would reflect the pragmatic approach to the intervention and evaluation of 'real-life' health service roles.

The pharmacist 10 core roles (for table of expanded core roles, see Appendix 8) included:

1. Medication Management Reviews
2. Team-based collaboration
3. Medication adherence assessment and support
4. Medication appropriateness audit, and Assessment of Underutilisation
5. Preventative health care
6. Drug Utilisation Review
7. Education and training
8. Medicines information service
9. Medicines stakeholder liaison
10. Transitional care

Of these ten core roles, five would be directed towards patients and the other five towards health professionals and systems:

- Activity targeted towards patients includes: the assessment of medication management, optimisation of medicines, in the home or out-of-home settings (such as the clinic), resolution of medication related problems, arrangements for multiple follow-up encounters with patients (core roles 1-5)

- Activity targeted towards health professionals and systems includes: recommendations to clinicians, ad-hoc and specific education sessions/training and support, liaison with community pharmacy and other healthcare service providers (core roles 6-10)

Core role 1 – Medication management reviews (presentation - Appendix 9)

Given the expectation of existing clinical experience associated with selection criteria for pharmacists participating in the project, this training reinforced the process of medication management review and consistency of recording the associated activity in the logbook rather than focussing on clinical aspects. Pharmacists were encouraged to use their existing processes for reporting findings and recommendations to doctors, and to consider creation of new templates specific for their ACCHS setting if deemed necessary.

Home Medicines Reviews

Training related to the provision of medication management reviews in the IPAC Project highlighted the many potential reasons for previously low uptake of the HMR service by Aboriginal and Torres Strait Islander people. [11]

The integration of pharmacists into the ACCHS model of care aimed to increase delivery of holistic medication management services to ACCHS clients in a culturally safe and appropriate way, with anticipated improvements in biometric data, medication optimisation and reduction in inappropriate polypharmacy.

6CPA Program Rules for Home Medicines Review were discussed and reinforced, including patient inclusion criteria and service eligibility, and exemption criteria for repeat HMR. IPAC participant inclusion criteria were used to prompt the integrated pharmacists to prioritise patients with cardiovascular disease (stroke, transient ischaemic attack, hypertension, coronary heart disease, dyslipidaemia or any other cardiovascular disease), chronic kidney disease or diabetes.

The project partners collaborated to develop IPAC Project Guidelines for the provision of Home Medicines Reviews to help ensure a uniform approach by integrated pharmacists to the delivery of the HMR service, including the process to follow when conducting HMRs within versus outside IPAC Project hours (Appendix 10). Particular emphasis was placed on supporting existing relationships between the ACCHS and external pharmacists providing HMR services.

Non-HMRs

The project protocol[2] identified known reasons why the offer of a HMR may be inappropriate for some Aboriginal and Torres Strait Islander patients. These were discussed during training and the pharmacists were encouraged to consider provision of medication management reviews in potentially more appropriate settings such as the clinic, according to the circumstances and preferences of participants. Such medication management reviews were referred to as non-HMRs, and were defined as comprising some or all the elements of a HMR but not fulfilling all relevant HMR criteria to be eligible to claim the MBS rebate.

Again, to ensure consistency in delivery of the non-HMR model of medication management review, the project team developed IPAC Project Criteria for Non-HMR (Appendix 11.). These criteria were covered in induction training, along with explanation of the IPAC Project Model (Appendix 12), which was created to represent the steps to be followed by integrated pharmacists when considering the most appropriate means of delivery of the medication management review service for individual patients.

Follow up to a HMR or non-HMR

By being integrated within the primary health care team of their respective ACCHSs, integrated pharmacists were well positioned to provide patient follow-up, intended as a process to review patient progress following a HMR or non-HMR. The essential elements of follow-up to a HMR or non-HMR were identified as:

1. Reinforcement of advice and recommendations provided with the HMR or non-HMR
2. Monitoring the impact of actions arising from the HMR or non-HMR
3. Assessment of the need for future pharmacist activity

Pharmacists were instructed to conduct follow-up as per usual clinic processes, ideally within 3-6 months of completion of a non-HMR, and within 12 months of completion of a HMR.

Advice was given to pharmacists on how to appropriately record the provision of HMRs, non-HMRs and follow-up activity for consented patients in the electronic logbook and CIS.

Core role 2 - Team-based Collaboration (presentation - Appendix 13)

Training for this core role included background information related to the establishment of Aboriginal Community Controlled Health Services and their delivery of holistic, comprehensive and culturally-appropriate primary health care to the communities they serve. An overview of the diversity of staff usually employed in such services was included, with emphasis placed on the potential for integrated pharmacists to contribute to clinic activities which support team-based care to improve chronic disease management. Training included ways in which integrated pharmacists could contribute to improved cardiovascular (CV) risk assessment by supporting clinic efforts to measure and stratify CV risk, and provided a basic overview of MBS claiming (in particular Team Care Arrangements and GP Management Plans) for services provided to Aboriginal and Torres Strait Islander patients. The broad kinds of activity to be logged here included (but were not limited to):

- Participation in multidisciplinary case conferences (these may or may not have related to consented IPAC patients) and similar discussions with clinicians involving direct patient care, even if not claimed/claimable under the MBS
- Working with staff (eg clinic manager) to create workflow processes to highlight how/where pharmacist fits in to the patient experience at the clinic
- Assistance with clinical governance activities, eg medicine-related policies, programs and procedures, imprest management
- Assistance with medicines-related response to, and management of, localised events of high public health significance, eg outbreaks of Acute Post-Strep Glomerulonephritis (APSGN)
- Participation in team meetings eg the 'morning huddle', and all-staff meetings to coordinate patient care activities
- Support for, and participation in, preventive health and chronic disease activities such as National Stroke Week, Diabetes Day

- Support for activities which improve cardiovascular risk assessment such as recording smoking status in patient records
- Participation in ACCHS-coordinated patient group meetings such as Women's and Men's Group meetings, diabetes 'yarning' groups, Elders' group gatherings.

Core role 3 - Medication adherence assessment and support (presentation - Appendix 14)

Training included discussion around the potential factors contributing to reduced medication adherence in Aboriginal and Torres Strait Islander populations, and the consequences of poor adherence. Types of reporting measures for assessment of medication adherence were covered, followed by explanation of the new Aboriginal-specific self-reporting measure of medication adherence, derived from literature review, developed for use in the IPAC project. This new adherence measure was created to be culturally appropriate and suitable to the Aboriginal and Torres Strait Islander patient context, and was referred to as the N-MARS (NACCHO – Medication Adherence Responses Scale) patient survey.

The aim of the N-MARS patient survey was to assist pharmacists and prescribers identify modifiable factors affecting patient adherence, thereby enabling health care staff to devise strategies to assist individual patients to overcome barriers to adherence.

Pharmacists were advised that this patient survey would ideally be conducted with each consented patient on a minimum of two occasions in order to explore change from baseline throughout the IPAC intervention.

The N-MARS patient survey (Appendix 15) comprised twelve questions in total, with one question exploring the extent to which doses are missed, and eleven questions exploring the reasons for non-adherence. Pharmacists were instructed to record the results of the survey in their electronic logbook, and most importantly to use the survey results to develop appropriate strategies to support chronic disease self-management and medication adherence.

Core role 4 – Medication appropriateness audit, and Assessment of Underutilisation

As a core role within the project, pharmacists were required to assess medication appropriateness and underutilisation of medicines as an audit of a sample (30 patients per 1.0 FTE pharmacist) of their consented patients, with the aim of assessing the potential for improvements in prescribing.

Medication appropriateness and overuse would be assessed by means of the Medication Appropriateness Index (MAI) audit, while medication underuse would be assessed using an Assessment of Underutilisation (AOU) tool.

<u>Medication Appropriateness Index (MAI) Audit</u>

The MAI tool used in the IPAC Project was based upon the internationally validated Canadian MAI model of scoring developed by Hanlon et al[12] adapted to the Australian context.

The MAI tool comprised 10 questions (Appendix 16), to be applied to each current medicine used by the patients who were selected pragmatically for the audit, with pharmacists allocating a response of A, B, C or Z in their electronic logbooks accordingly. A score of zero would be assigned by the evaluators (JCU) for A, B and Z responses, while a weighted score would be applied for responses rated as C. The calculation of mean score for each patient would be conducted by the evaluators, not the pharmacists.

Training (Appendix 17) in the use of the MAI tool aimed to provide a standardised approach to rating each medicine to enable individual pharmacists to use the tool accurately, consistently and reliably. To assist with understanding of the use of the MAI tool in the Australian context, a set of examples (Appendix 18) demonstrating how to assess each item in the MAI tool was developed by the Project Team and used during training.

Pharmacists were instructed to use Australian evidence-based references along with information such as the patients' usual medicines, medical conditions and laboratory results from the CIS when assessing medicines; patients did not need to be present in order for the pharmacists to conduct the MAI assessment. Pharmacists were expected to communicate the findings and recommendations from the MAI assessment to prescribers so that appropriate clinical action could be considered, and to follow-up participants as per usual clinic processes.

Pharmacists were instructed to conduct the MAI assessment twice for their sample of patients, first within the initial 3 months of the intervention period, and then for the same patients within the final 3 months in order for the evaluation team (JCU) to explore change from baseline. Training aimed to minimise intra-rater errors (the same person interpreting the same data differently). To minimise inter-rater errors (different observers reporting the same information differently), for sites with 2 pharmacists and patient overlap the same pharmacist was instructed to conduct the end of study MAI assessments they initially completed at baseline.

<u>Assessment of Underutilisation (AOU) (presentation - Appendix 19a)</u>

While the MAI tool would enable integrated pharmacists to assess overuse or inappropriate use of medicines, it would not enable assessment of potential underutilisation. As such pharmacists were instructed to conduct an Assessment of Underutilisation (AOU) to prompt identification of medicines that have been omitted despite being indicated and potentially beneficial.

The AOU comprised a set of 10 indicators (Appendix 19b) defined by the IPAC Project team, drawn from current recommendations within Australian best practice prescribing guidelines appropriate to the health context involving Aboriginal and Torres Strait Islander people, who have chronic disease at younger ages. During training, the patient group and components applicable to each indicator were discussed, along with the evidence base used to support the core recommendations.

Pharmacists were advised to take into account patients' medical history and medication lists, and to apply clinical judgment when considering whether prescribing has been adjusted to take into account clinical appropriateness, contraindications or clinical decisions to withdraw therapy. Ratings would be dichotomized as 'no prescribing omission' or 'omission of an indicated drug'.

In addition to assessing against the 10 extrinsic indicators, pharmacists would also use clinical judgement to identify any other potential prescribing omissions. As for MAI assessments, pharmacists would be expected to communicate the findings of the AOU to the prescribing team so that appropriate clinical action may be considered. The AOU was to be conducted twice by the integrated pharmacists for the same participants selected for the MAI audit (ie once at baseline then repeated within the final 3 months of the intervention), as well as for each HMR and non-HMR conducted. As for the MAI assessment, completion of the AOU would not require the patient to be present.

Pharmacists were instructed to record the results of the AOUs in their electronic logbooks.

Core role 5 - Preventative health care (presentation - Appendix 20)

As preventable chronic disease remains the largest contributor to the health differential between Aboriginal or Torres Strait Islander peoples and other Australians[13], pharmacists were instructed to promote preventive interventions with every participant contact. This could include ensuring that height, weight, smoking status and recent BP are recorded in patients' medical records, along with assessment and recording of absolute CVD risk, and checking that patients are up to date with age-appropriate health checks (eg. MBS Item 715 - Annual Health Assessments for Aboriginal people).

As most ACCHSs already have preventive health strategies, programs (eg Tackling Indigenous Smoking), activities and processes in place, pharmacists were encouraged to familiarize themselves with these health programs and actively participate wherever possible.

Pharmacists were encouraged to adopt a 'co-creation approach' by liaising with other members of the primary healthcare team within the ACCHS to identify priority areas for preventive care. This would enable strategies to contribute to preventive care activities to be tailored to local context, aiming for provision of standardised information used by all staff at the service for particular lifestyle issues. Integrated pharmacists would also be well placed to promote participation in preventive programs provided at the ACCHSs or others they are linked into.

Training also included a discussion about the various resources and guidelines available to assist with preventive health recommendations involving lifestyle issues such as smoking, nutrition, alcohol and physical activity.

Core role 6 – Drug Utilisation Review (presentation – Appendix 21)

Within the intervention phase of the project, each integrated pharmacist was required to conduct a minimum of one drug utilisation review as part of a broader program to improve the quality, safety and cost effectiveness of medicine use at their respective ACCHS. The aim of the DUR was to recommend interventions in collaboration with practice staff to improve the standard of care at the practice.

Training included discussion around the process of DUR, intended as a continuous cycle of quality evaluation and improvement and the key steps :

- Identify priority issue for DUR
- Identify best-practice evidence to support DUR
- Define criteria for best practice
- Define data collection method
- Collect data
- Evaluate
- Provide feedback of results
- Action
- Assess results of action

Pharmacists were encouraged to liaise with ACCHS staff to identify a relevant priority issue for DUR, which may relate to a medicine or therapeutic class, disease state or condition, or a medicine use process. It was noted that identification of a priority issue may actually take quite some time, and may occur once the integrated pharmacist has had time to work collaboratively within the ACCHS primary health care team.

The project team created a basic report template (Appendix 22) for collection of DUR information, which could then be uploaded to the pharmacists' electronic logbook.

Core role 7 – Education and Training (presentation – Appendix 23)

Pharmacists have been shown to increase patient and health staff medication knowledge, and are particularly needed in remote areas, where there is often a scarcity of medical practitioners and lack of continuity of health professional staff. [14]

Within the IPAC Project, integrated pharmacists would provide education and training to patients and clinic staff by way of workshops, written information and a variety of other activities. Workshops could be delivered to various groups such as GPs, specialists, registered nurses, AHWs, ATSIHPs, tobacco control officers and community members. Pharmacists were instructed to use culturally appropriate educational resources whenever available, such as those provided by the Australian Indigenous HealthInfoNet, to plan and implement evidence-based education sessions.

It was recommended that pharmacists liaise with ACCHS staff to help identify learning needs, both for patients and members of the ACCHS primary healthcare team, prior to development and delivery of education and training sessions. In this way, sessions would be co-designed to ensure relevance in the ACCHS setting. Pharmacists would also need to take into account the following:

- Target audience – consider prior knowledge and health literacy - adapt content and facilitation style accordingly
- Learning objectives – aim for maximum of 3 key points to maintain audience engagement
- Structure - include brief background, evidence-based best practice, and practical application of new concepts

In the event that pharmacists created new educational material, a PDF example was to be uploaded into the logbook.

Pharmacists were encouraged to seek feedback from individual participants of training and education sessions. To provide a consistent means of capturing this feedback, the project team created a basic Education Session Evaluation Form template (Appendix 24) which could be used by pharmacists at their respective ACCHSs, as well as an Education Session Evaluation Summary Report template (Appendix 25), both which could be uploaded directly to the pharmacists' electronic logbook.

Core role 8 – Medicines Information Service (presentation – Appendix 26)

As integrated members of the ACCHS clinical team, it was anticipated that integrated pharmacists would be well positioned to provide medicines related information to staff within the service and respond to enquiries by clinicians. Such enquiries may include ad-hoc medicine queries, PBS queries, information requests involving dose titration and interactions, new and emerging drugs, and out of stock items.

Throughout the intervention phase, the PSA Coordinators ensured that integrated pharmacists had access to the range of professional reference texts recommended by the Pharmacy Board of Australia. This included online access to current editions of the Australian Medicines Handbook[15], eMIMS[16], Therapeutic Guidelines[17] and the Australian Pharmaceutical Formulary. [18]

Integrated pharmacists were also encouraged to identify and utilise a variety of online references and treatment protocols relevant to the health of Aboriginal and Torres Strait Islander patients in their state/jurisdiction. A range of such resources was compiled by PSA Coordinators and made available to the integrated pharmacists via the dedicated IPAC Project Pharmacist Training portal (see section 2.3.6) on the PSA website.

Pharmacists were instructed to record details of each discrete 'event' in their electronic logbook, including the date and type of activity, how the request for information was received, which clinical reference was used to support the advice given, which staff were supported, total time taken, and evidence of an outcome (if known).

Core role 9 – Medicines Stakeholder Liaison (presentation – Appendix 27)

As integrated members of the ACCHS team, the integrated pharmacists were expected to perform an important liaison role by collaborating with, and supporting, local community pharmacies and external health care providers to optimise the care of patients with chronic disease. The anticipated benefits of building networks and relationships included improved patient access to medicines, support with medication adherence and enhanced continuity of care especially during transitions such as discharge from hospital.

The pharmacists were encouraged to engage a member of the ACCHS staff to understand existing communication arrangements in place between the ACCHS and stakeholders, any known barriers to communication, and to take into account ACCHS policies when considering their liaison role. They were instructed to develop a written Stakeholder Liaison Plan (Appendix 28) supporting engagement with each of the community pharmacies predominantly associated with their respective ACCHS, as well as with other external stakeholders involved in the medicines cycle of care for their patients.

Such external stakeholders included (but were not limited to) hospitals, other GP service providers, aged care facilities, pathology providers and tertiary referral centres such as renal units.

The aim of the written plans was to support the provision of referrals and communication of all relevant patient information (such as for HMRs) with community pharmacies and other relevant stakeholders. It was anticipated that enhancement of communication processes would continue to have benefit and relevance to the ACCHSs even after completion of the project.

Pharmacists were instructed to record details of each contact with community pharmacy as a discrete event in their electronic logbooks under 'Stakeholder Liaison – Community Pharmacy', including details such as date of contact and data entry, who initiated the contact, the reason contact was made, and the method of contact used.

Core role 10 – Transitional Care (presentation – Appendix 19)

People with complex medication regimens, older people, those with mental health problems, people who are poor or have low literacy, migrant and Aboriginal and Torres Strait Islander populations are particularly at risk of medications discrepancies with transitions of care.[19] Transitional care provided by the integrated pharmacists within ACCHSs aimed to optimise management of medication for patients across the continuum of care.

During induction training, pharmacists were instructed to facilitate ad-hoc care coordination with relevant hospitals, renal/dialysis units, residential aged care facilities and any other services involved in patient care. The aim was to ensure seamless care by relaying all relevant information including contact details, current medications list, management plan and monitoring requirements.

Improved transitional care coordination was anticipated to lead to improved discharge summary management and medicines reconciliation. A link to an online education module[20] focusing on medicines reconciliation was provided on the IPAC Project portal.

Transitional care activities were to be recorded as discrete events in the pharmacists' electronic logbook, including the agency engaged with in supporting transitional care of the patient, the reason for contact, how the contact was made, date of contact and time taken for the communication.

2.3.5 Activity Work Plans

During training, acknowledgement of culturally mediated differences in the model of care for integrated pharmacists' roles was reinforced as an important outcome of the project. This acknowledgement was vital to demonstrate respect for the expertise of Aboriginal staff and ACCHSs on what processes may work best within each individual community setting.

Whilst the project comprised 10 core pharmacists roles which formed the foundation for the impact and outcome evaluation, each participating ACCHS had the flexibility to utilise the services of the pharmacist according to service and client priorities at the local level.

As such, a Pharmacist Activity Work Plan template (Appendix 30) was created by the NACCHO project coordinators.

Development of an individual work plan would be facilitated by a NACCHO Project Coordinator for each integrated pharmacist in consultation with their respective health service. This would follow an assessment of the needs of the health service, existing pharmacy support through the S100 or QUMAX programs and with consideration of the skills of the pharmacist.

The induction training incorporated an explanation of the purpose of the Pharmacist Activity Work Plan, in particular to:

a. Clarify the specific role of the pharmacist within the health service according to identified need.
b. Clarify the work requirements of the project evaluation
c. Allow review of the performance of the pharmacist in meeting the needs of the health service and the goals of the project.
d. Identify learning needs of the project pharmacist

The various components of the work plan were discussed, including key action steps associated with core roles, timelines, expected outcomes, data sources and evaluation methodology, and resource needs.

Anticipated timelines for completion of work plans were discussed, along with the intention to undertake review after approximately 3 months to assess continuing applicability.

2.3.6 Logbook, resources and lines of communication

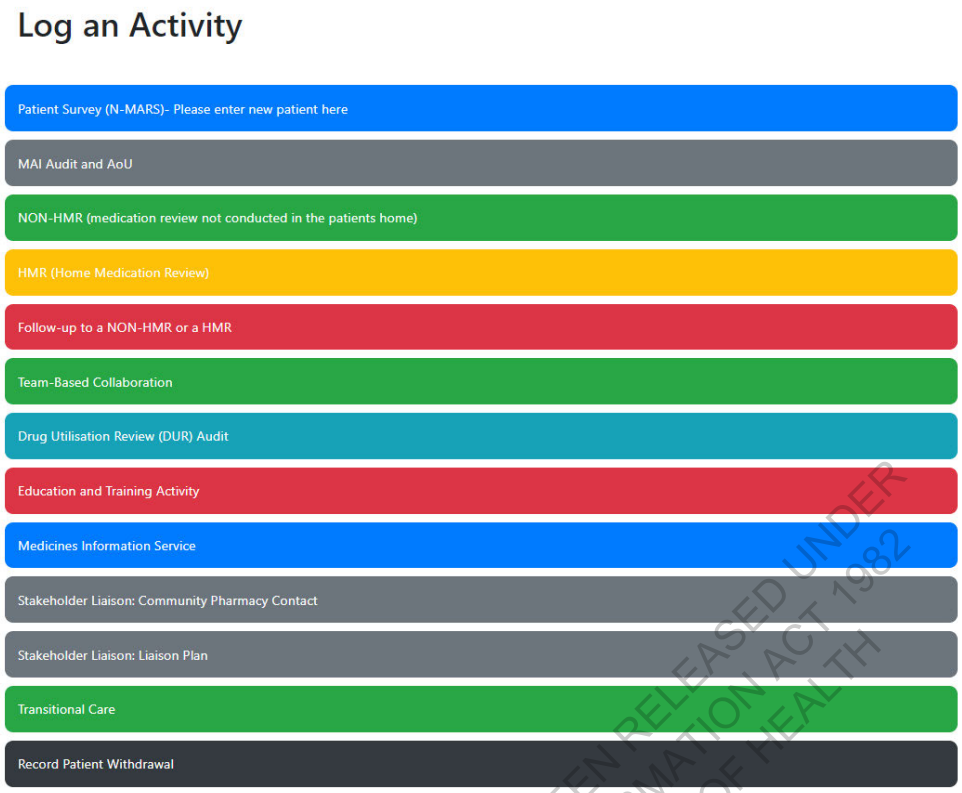
Pharmacists' Electronic Logbook

Written IPAC Project Pharmacist Logbook Instructions (Appendix 31) were developed by Commonline Pty Ltd and the system administrator at JCU. These instructions were conveyed to the integrated pharmacists during induction training. The electronic logbook could be accessed from any internet connected device, and was used to record details of the core roles to be undertaken by integrated pharmacists throughout the project. Contents of the instruction manual included;

- Introduction
- Initial account confirmation
- Password management
- General data entry
- Entering and editing patient details
- Withdrawing patients
- Monitoring activity

Throughout delivery of training in relation to each of the project's core roles, the integrated pharmacists were given access to a 'Test' version of the electronic logbook and encouraged to explore entry of data by means of clicking on the relevant colour-coded tab on the home page (see Figure 1).

Figure 1 - Pharmacist Electronic Logbook screenshot



Resources

To assist the integrated pharmacists in conducting their professional activities, the PSA Coordinators compiled a contemporary online repository of resources related to medicines use and management of chronic disease in Aboriginal and Torres Strait Islander peoples, taking into account jurisdiction-specific differences in legislation and best-practice guidelines. This online repository was available to all participating integrated pharmacists via the Pharmacist Resources tab of the dedicated IPAC Project Pharmacists Training portal on the PSA website.

Induction training described the content of the resources repository. The resources compiled and collated could be broadly categorised as:

- References and evidence-based guidelines
- IPAC Project consent
- Clinical information systems
- IPAC Project core roles (training presentations, forms, useful website links)
- Pharmacists working with Aboriginal people
- Disease state specific information
- Other useful resources
- Legislation related to the practice of pharmacy

For further content within the IPAC Project Pharmacists' Resource List see Appendix 32.

Pharmacists were also encouraged by PSA Coordinators to explore the availability of additional professional references and resources provided by their state-based health library. In Victoria, for example, pharmacists working within ACCHSs could access the Clinicians Health Channel and its significant drug information databases, journals and guidelines. Another source of locally-relevant treatment guidelines accessible by the integrated pharmacists included HealthPathways, a web-based information portal supporting clinicians to plan patient care through primary, community and secondary health care systems.

Lines of Communication

Induction training for the integrated pharmacists included a session dedicated to lines of communication, during which instructions and relevant contact details were given for use in the event of queries related to:

- Information technology (clinical information/software systems, pharmacists' electronic logbook, GRHANITE data extraction, online access to PSA's IPAC Project related resources)
- Clinical information
- Personal and annual leave requests
- Conflict resolution

Throughout the intervention phase of the project, integrated pharmacists were able to contact the project coordinators from PSA, NACCHO and JCU via phone or email during business hours, enabling prompt response to queries.

2.3.7 Clinical Information Systems

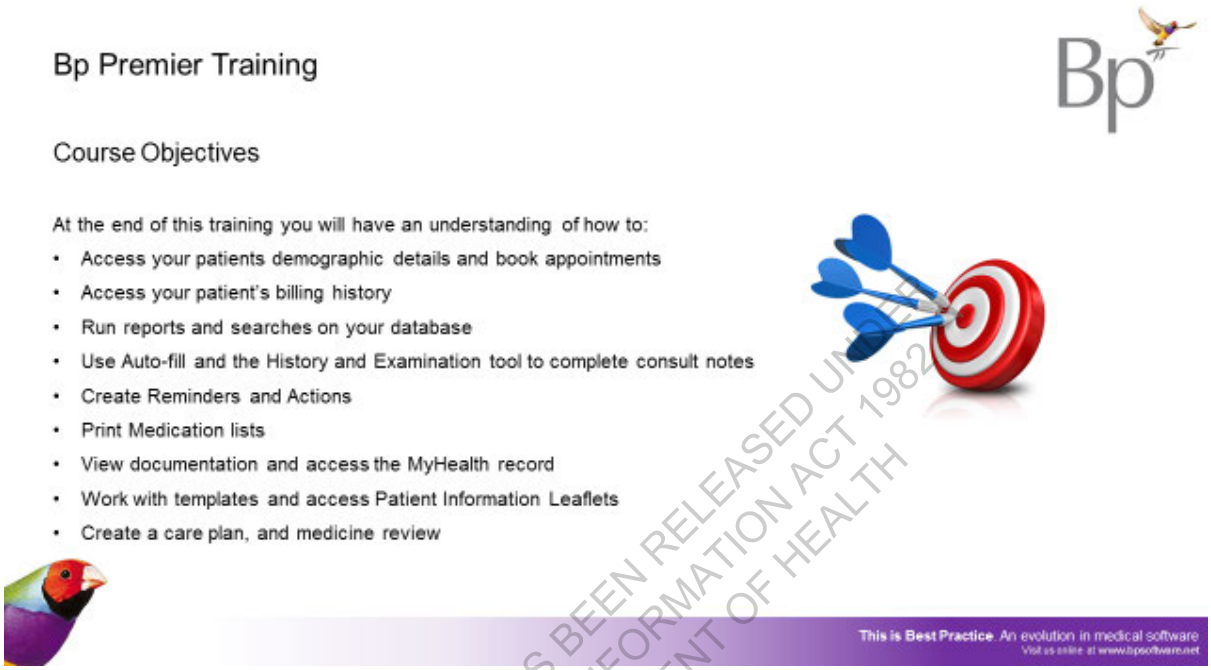
In order to provide optimal patient care, integrated pharmacists would require full access to patients' electronic health records. This would enable informed clinical interventions and recommendations, and enhance collaboration and communication between pharmacists, GPs and other clinicians within the ACCHS. Continuity of care would require an understanding of ACCHSs recall and reminder systems and how healthcare and wellbeing services are coordinated within the entire community. Thus integrated pharmacists would need to be familiar with and use the clinical information systems within their respective ACCHSs.

During the establishment phase of the project, ACCHS site eligibility was refined to include those with one of two clinical information systems, Communicare or Best Practice.

The Department of General Practice University of Melbourne, with the assistance of project staff at JCU, prepared guidelines for the use of Communicare (Appendix 33) and Best Practice (Appendix 34) software by integrated pharmacists participating in the IPAC Project. These guidelines incorporated instructions for pharmacist login, user setup, access and use of the patient record, recording patient consent to participate in the study, and use of clinical item types and key words to enable entry and extraction of information related to certain core role activities. These instructions were conveyed to the integrated pharmacists during induction training.

For pharmacists using Best Practice software, additional training was made available by means of a 3-hour bespoke training webinar commissioned by PSA to assist pharmacists in their professional practice. A link to the Best Practice webinar was added to the Pharmacist Resources section of the IPAC Project Pharmacist Training portal accessible via the PSA website, enabling pharmacists to revise this training content whenever necessary. For components of the webinar see Figure 2.

Figure 2 - Best Practice IPAC Project webinar screenshot



Pharmacists using Communicare software were invited to undertake eLearning modules available online as part of the Introduction to Communicare (Clinical) suite. Topics available for eLearning included;

- Introduction to Communicare (clinical use)
- Login, password maintenance, and the Communicare Toolbar
- Patient biographics
- Appointment book
- Service recording
- The clinical record (basic data entry, using clinical Items and qualifiers)
- Recalls and referrals
- Documents and results
- Getting Help

3. Results

The resources and plan developed for the project induction training were finalised during the establishment phase and subsequently approved by the Project Operational Team and Steering Committee. All participating pharmacists successfully completed the specified essential pre-reading and online course modules prior to attending face to face training.

3.1 Cultural Induction

Of the 26 integrated pharmacists who participated in the project, 18 undertook five hours of introductory cultural awareness training in the group workshop setting. The remaining eight pharmacists were invited to complete the Royal Australian College of General Practitioners online 'Introduction to Aboriginal and Torres Strait Islander Health Cultural Awareness' course. Four of these eight pharmacists completed the course, while the remaining four declined as they had already undertaken introductory cultural training as a requirement of prior employment.

Availability of local cultural training varied between participating ACCHSs, with some sites providing a formal program to be attended by all new employees, others providing cultural mentor support from a staff member such as a cultural liaison officer or Aboriginal Health Practitioner, whilst others had no existing programs in place. The timing of this training was also variable, with some integrated pharmacists undertaking local cultural induction more than six months after commencement at their ACCHSs. The nature and content of local cultural induction varied between health services, and included video presentations, programs hosted entirely within the ACCHS, visits to culturally significant areas (eg 'The Keeping Place') and meetings with local Elders.

Feedback from integrated pharmacists regarding their local cultural induction was sought by the qualitative evaluation team and documented in the Qualitative Evaluation Report.[21] Integrated pharmacists deemed that provision of induction to both the ACCHS and the local community was important. Feedback was also sought from staff at participating ACCHSs, with managers rating the cultural sensitivity of their integrated pharmacists at an average of 9.3 on a scale of 1 (not sensitive at all) to 10 (very sensitive) (n=9).

Of the nine managers who provided a response, eight rated their integrated pharmacist as a 9 or 10 on the scale. One manager commented;

"[IPAC pharmacist] *works really well with community and staff to provide culturally appropriate care."*

3.2 Delivery of workshops and one to one project induction training

Induction training (presentation - Appendix 35) for pharmacists participating in the IPAC Project was delivered by PSA Coordinators and external cultural trainers. Workshops were held over 2 days (15 hours) as facilitated group sessions in Sydney, Melbourne and Brisbane (see Table 1 in Executive Summary).

A small number of pharmacists who were recruited after completion of the workshops were provided with a full day of one-to-one project-specific induction training in a mutually agreeable location (Cairns, Geelong, Melbourne) followed by another day of pre-arranged experience alongside an Aboriginal Health Services pharmacist at their place of work (eg Victorian Aboriginal Health Service).

A total of 26 registered pharmacists were trained to participate in the project and appointed to ACCHS sites. Additionally, two community pharmacy owners with staff participating in the project undertook the training workshop in Brisbane to ensure an understanding of the overall expectations of the project. Of the 26 pharmacist participants, 20 were accredited to offer HMRs during the implementation phase of the study. Table 1. Pharmacist induction training by delivery method, location and number of attendees.

Date of training delivery	Delivery method	Location	Number of pharmacists attending
July 2018	Workshop	Sydney	11
August 2018	Workshop	Melbourne	7
October 2018	Workshop	Brisbane	3
October 2018	Small group	Melbourne	2
September 2018	One to one	Cairns (Qld)	1
March 2019 (replacement)	One to one	Geelong (Vic)	1
April 2019 (replacement)	One to one	Gove (NT)	1
TOTAL			**26**

PSA Coordinators observed a strong sense of teamwork, comradery and professional networking between pharmacists attending the induction training workshops, noting that this environment was not readily achievable during one to one training sessions.

Feedback from integrated pharmacists regarding their induction training was reported elsewhere.[17] Pharmacist feedback on induction training was positive and the pharmacists felt prepared for their role. Some pharmacists described areas in which more in-depth training would have been useful, in particular related to how primary health care clinics work and Medicare billing processes used by ACCHSs. Some pharmacists had not previously worked in a primary health care setting and struggled to understand how certain aspects of practice worked. Pharmacists reported that a more detailed explanation of the MBS health program payments and services relevant to Aboriginal and Torres Strait people would be helpful in training for the role.

They added that ideally this should include further details of the MBS services relevant to the sector and where the pharmacist may have input, with an example being the creation of a chronic disease 'flowchart' to identify and outline where potential pharmacist input into MBS items for Chronic Disease Management could attract a rebate.

3.3 Logbook data entry

Throughout the implementation phase, integrated pharmacists entered data related to discrete core role activities in the electronic logbook. A summary of total data entered is included in Table 3.

*Table 3 - Logbook activity from 2/8/2018 - 31/10/2019**

Pharmacist activity	Number of discrete 'events'
Total patients consented	1,733
Patient survey N-MARS	2,579
Medication Appropriateness Index (MAI) Audits and Assessments of Underutilisation	789
HMRs	639
Non-HMRs	757
Follow-up to HMR or Non-HMR	1,548
Team Based Collaboration	3,165
Medicines Information	1,715
Education and Training	358
Drug Utilisation Reviews	26
Stakeholder Liaison Plans	47
Stakeholder Liaison – Community Pharmacy Contact	3,233
Transitional Care	1,901
Patient Withdrawal	81

* Source: Integrated pharmacists within ACCHSs: Support for practice-based activities, Report to the Pharmaceutical Society of Australia for the IPAC Project [22]

The IPAC Project pharmacists' electronic logbook was created as a bespoke product completed on 30th July 2018, just prior to the commencement of induction training.
Feedback from the integrated pharmacists during site visits by PSA Coordinators reported that, after some initial confusion, most found use of the logbook and entry of data to be quite straightforward. Furthermore they found it to be a useful way to reflect upon the activities they had undertaken each day. Some pharmacists reported a lack of clarity about where or how to enter certain information into the logbook for activity which did not seem to clearly 'fit' into one of the defined core roles. Ongoing support, especially during site visits, was provided by PSA Coordinators throughout the project to help integrated pharmacists optimise capture of data in the logbook. One pharmacist stated;

> *"So, I think when [PSA Project Coordinator] came around it was useful because she had ways of entering more stuff on the logbook that I kind of didn't really enter because I didn't know where to enter it."* (Pharm06)

3.4 Clinical information systems

Of the integrated pharmacists who participated in the project, 18 undertook training in the use of Communicare software while eight were trained to use Best Practice, as per the requirements of their respective ACCHSs. Feedback related to induction training on the use of clinical information systems was sought from the integrated pharmacists as part of the project's qualitative evaluation[17] and during a workshop[23] held in Darwin at the end of the project.

The integrated pharmacists reported that access to the clinical information system was essential to being able to perform their role effectively, providing them with a more comprehensive and contextual insight into the patient, allowing them to leave notes in the patients' file, manage their own appointments, and saving a lot of time for both the pharmacists and the GPs.

A sound basic understanding of the clinical information system used by an ACCHS was deemed by the integrated pharmacists as an essential starting point, ideally with additional support from ACCHS IT staff when necessary. A small number of the integrated pharmacists noted that certain aspects of the clinical information software were particularly challenging to use effectively, so while general orientation to the clinical software is important, some further guidelines on what information to record in the patients' files would have been useful.

3.5 Pharmacist feedback on preparation required, in addition to induction training

At the end of the implementation phase, all participating integrated pharmacists were invited to attend a workshop (facilitated by PSA Coordinators) in Darwin where they were asked to provide additional feedback to supplement the project's qualitative evaluation. Of the twenty pharmacists participating in the project at the end of the implementation phase, eighteen attended the workshop, with two pharmacists unavailable due to personal or annual leave arrangements. From their experiences in the IPAC Project, the pharmacists attending the workshop were asked to identify individual enablers beyond induction training which would assisted with successful integration into the ACCHS setting.

They then grouped these into themes for further exploration and discussion. In addition to information on core pharmacist roles of the project covered in induction training, the key 'essential' elements of preparation identified by the integrated pharmacists required for the role included:

- Professional skills and personal attributes

Strong clinical skills and prior experience working as a pharmacist were identified as important attributes for pharmacists intending to work in ACCHSs. Of the integrated pharmacists participating in the IPAC Project, many felt it was important to be accredited to conduct HMRs. Whilst a small number commented that even without being accredited, they still possessed valuable skills and knowledge, others observed that the health service valued being able to claim the additional MBS Item 900 income through Medicare.

Pharmacists described a range of personal attributes and qualities they considered to be valuable when working in an ACCHS setting. These included professional confidence, emotional intelligence, leadership, initiative (one pharmacist stated '*don't sit still*!'), flexibility, adaptability and open-mindedness. They also advised being patient, flexible, and open to new experiences to make the most of opportunities as they were presented.

The vast majority of the pharmacists identified that good communication skills were essential to working as an integrated pharmacist in an ACCHS; this included being able to communicate succinctly with GPs. Some pharmacists reiterated that listening was a crucial aspect of communication, and a particularly important skill to have when working in an ACCHS. It was also noted that the ability to adopt different communication styles for different health professionals within the team was important, and particularly relevant for clients with varied levels of health literacy or education, and for those for whom English may not be their first language.

- Local induction

Pharmacists reported that general cultural training must ideally be enhanced by locally-relevant cultural induction and that this should be combined with an ongoing willingness to continue to learn about the culture and social determinants of health relevant to the local community. Being involved with the community outside the clinic as well as developing relationships with the other members of staff (particularly the Aboriginal Health Workers) was advice that was reiterated by the pharmacists.

- On-site staff induction at the ACCHS

Pharmacists reported that identifying a regular staff member at the ACCHS who could facilitate introductions and explanation of staff roles and responsibilities would be beneficial to new pharmacists. One pharmacist stated that additional practical advice on 'fitting into' the primary health care team and clinic would be helpful as they found this to be an initial challenge.

A 'go-to' person would also be valuable to help the integrated pharmacist understand the usual 'flow' of the patient experience while attending the clinic, share details of community events, and raise awareness of the local issues and priorities which may affect patient engagement. Overall, the availability of a 'go-to' person would assist with integration of the pharmacist into the ACCHS team.

- Understanding clinical services available within the ACCHS

Pharmacists reported that having a comprehensive awareness of the services provided by the various clinicians within the ACCHS, as well as those provided by visiting clinicians, would be helpful to clarify where the pharmacist might 'fit' and therefore best contribute to patient care.

- Understanding health and social services available in the local community

Pharmacists recommended that those new to the role create a contact list of health and social service providers in the local community, meeting with these providers in person if possible to explain their role at the ACCHS and to identify the best way to connect when necessary for optimal patient care.

Given the interplay between physical health, mental health and social and emotional wellbeing which impacts upon patient wellbeing, the development of effective working relationships with different agencies and external stakeholders was considered essential to the planning and provision of effective patient-centred holistic care in ACCHSs.

- Peer Support and community of practice

Throughout the IPAC Project implementation phase, support was provided to the integrated pharmacists through various means, including (but not limited to) phone and email support by PSA Coordinators and the wider Project Team, site visits by PSA Coordinators, mentoring, access to an online repository of relevant resources, regular monthly teleconferences, access to an online discussion group and contact by closed-group social media. Feedback from the integrated pharmacists confirming the value of this program of support is included in the IPAC Project Support for Pharmacists Report.[24]

A couple of pharmacists suggested that 'shadowing' a pharmacist already working in an ACCHS setting and attempting to obtain as much information as possible beforehand would be ideal steps to prepare for the role. Pharmacists also recommended maintaining contact with others working in similar roles, particularly if working remotely.

The feedback provided by the integrated pharmacists in the Darwin workshop was consistent with comments made during the project's qualitative evaluation[21], which included the following quotes;

> *"I mean I think being HMR accredited probably is pretty important. I know not everyone on the project is, but I feel like, A) it just means you're more comfortable with your clinical recommendations and B) it does help that the health service can bill for our work. I know it's not the be all and end all but until pharmacists have Medicare billable numbers it's the only one we got. And I think that that's just a nice extra thing for the health service to be able to do."* (Pharm20)[17]

> *"Great communication skills. Respect for the culture and where the patient [come from], respect for the client's life. I guess their socioeconomic background the literacy background and what other things are impacting on their health. Other than just the fact that they've got health problems, there's lots of other things that are priority in their life as well as a good knowledge of what medicines are around and how they work."* (Pharm11)[17]

> *"I would say stay in contact with the other people in the same type of role. I would get in contact with some other remote pharmacies because they often have ideas that you haven't even thought of, or like they've got exactly same problem that you might have and don't really know how to deal with it. I think that's really important. Don't give up because your computer doesn't work for six weeks. It will eventually. It's just how it is. You have just got to work with what you got. That's about it, and they will appreciate you. People appreciate you so much."* (Pharm07)[17]

4. Discussion

The IPAC Project identified core roles which were conducted by pharmacists integrated within ACCHSs. The induction training program developed for use in the IPAC Project was comprehensive and tailored to ensure that participating pharmacists, acknowledged as already possessing existing clinical expertise, would have the necessary skills to work within diverse ACCHS settings in a culturally-responsive manner to deliver the required core services and to capture relevant data for evaluation. Participating pharmacists reported that the induction training program adequately prepared them for their role, and provided constructive feedback regarding recommendations for additional consideration in future training models.

The enablers to successful integration reported by pharmacists participating in the IPAC Project were consistent with those previously identified in the Integrating Models of Pharmacists Across Care Teams (IMPACT) Framework.[25] The IMPACT project undertook a systematic literature review and interviewed primary health care professionals and community members to identify factors expressed as critical to enabling successful integration of pharmacists into primary health care teams. This led to the development of the IMPACT Framework which consists of six overarching domains including characteristics, skills and experience of the pharmacist; relationships; scope of practice; connectivity; localisation and sustainability. The domains and their underlying enablers are recognised as being interdependent.

When combined, these learnings may be used to inform the development of a tailored training program for pharmacists intending to work in the ACCHS sector, with associated mapping against national competency standards for pharmacists in Australia.

Advances in digital technology over time have significantly improved the user experience of online training programs, as evidenced by PSA's online General Practice Pharmacist Foundation Training course.[25] Online modules are cost effective and enable convenient and timely access by users regardless of geographic location. The creation of an online multi-module training course is one key mechanism to prepare more pharmacists to work within ACCHSs. . It is also important however to acknowledge the value of the dynamic and supportive environment created by face to face group workshops for delivery of training, as noted by PSA Coordinators in the IPAC Project. Provided such workshops utilise skilled and engaging facilitators, it likely that a proportion of pharmacists would prefer this style of learning and would value the community of support this offers.

Regardless of the preferred mode used to deliver training, the IPAC Project provided evidence that preparation of pharmacists to work within ACCHSs should include components such as;

1. Working in a culturally safe manner, taking into account social determinants of health
2. What is an Aboriginal Health Service pharmacist?
3. Australia's health care system (including governance models for Aboriginal Health Services)
4. Aboriginal Health Service funding (including Medicare, Practice Incentive Payments and Indigenous Health Incentives in Aboriginal Health Services)
5. The Aboriginal Health Service team, including health professionals and non-clinical staff

6. Comprehensive medication management reviews and patient follow up, medication adherence assessment and support
7. Chronic disease management, preventive health care, team-based collaboration, multidisciplinary case conferences and the MBS
8. Supporting medicines safety in Aboriginal Health Services (education and training, medicines information, clinical governance, drug utilisation review, accreditation requirements)
9. Clinical information systems (including all basic functionality, how to generate quality improvement reports and how to set up patient recalls) and health records in Aboriginal Health Services
10. Collaborating with community pharmacists and external stakeholders, transitional care

Throughout the implementation phase of the project, PSA Coordinators made some additional key observations which should ideally be taken into consideration when proposing a model for broader rollout of integrated pharmacist services to ACCHSs across Australia. These include the need for allocation of additional training time to work through certain complex core pharmacist activities such as medication management reviews (especially if pharmacist attendees are not yet accredited) and assessment of prescribing quality in the Aboriginal and Torres Strait Islander health sector.

In view of pharmacist feedback suggesting that more in-depth initial knowledge of the clinical information systems may have enabled them to use the systems more efficiently from the early stages of the project, consideration could be given in future training programs to linking pharmacists with existing providers of CIS training such as Primary Health Networks or state-based Affiliates of NACCHO.

Furthermore, development and provision of additional profession-wide training resources related to implementation of drug utilisation reviews (as previously done by the Society of Hospital Pharmacists of Australia) would assist pharmacists by ensuring a thorough and consistent understanding of the process involved. It is noted that consultation on the first draft of the new Medicines Use Evaluation Guideline has now closed, with the new guideline intended to refresh and merge two documents, these being the previous Drug Usage Evaluation Standard (2004) and the SHPA publications Australian Drug Use Evaluation Starter Kit (1998). *https://www.shpa.org.au/standards-of-practice#Guidelines*

The considerable burden of data capture for the evaluation of the project was noted by PSA Coordinators, along with the impact this had on the time available to pharmacists to provide professional services. While the research burden would not exist with future program rollout, minimising requirements for data capture should be taken into account when considering any associated monitoring and evaluation components.

It is very important to acknowledge from integrated pharmacist feedback provided during the IPAC Project that training must be backed up by a comprehensive program of support to create a community of practice and foster a sense of '*teamwork*' for pharmacists working in this sector.

5. Conclusion

Pharmacists integrated within ACCHSs work with complex patients, often with multiple chronic diseases, necessitating an understanding of social determinants of health and the public health challenges related to Aboriginal and Torres Strait Islander peoples.

Given the relative infancy of the Aboriginal Health Service pharmacist role in Australia, sector-specific training is important for integrated pharmacists to understand the holistic nature of care delivered by ACCHSs and how the pharmacist can best integrate into the primary health care team to optimise quality of care outcomes for Aboriginal and Torres Strait Islander Australians.

As evidenced in the IPAC Project, training must be comprehensive and include integrated pharmacist core roles as well as an understanding of contributors to the disparity in health outcomes experienced by Aboriginal and Torres Strait Islander Australians, including social determinants of health.

While the comprehensive induction training program developed for use in the IPAC Project included some elements specific to the project, a large proportion of its content could be considered for incorporation into a future training program for pharmacists upon broader rollout of integrated pharmacist services to ACCHSs across Australia.

Understanding of the detailed role description and list of activities undertaken by pharmacists integrated within ACCHSs as part of the IPAC Project, together with observations and feedback provided by the integrated pharmacists and Coordinators, will enable educators to establish educational needs and learning objectives to inform future instructional design.

Such an induction training program could be modelled on PSA's existing *General Practice Pharmacist Foundation Training*[26] course, a multi-module online course intended to prepare pharmacists to work in a general practice setting; this concept could then be tailored to the ACCHS context.

Beyond training, the provision of ongoing support, along with the creation of a community of practice for pharmacists working with Aboriginal and Torres Strait Islander peoples, will enable sharing of sector knowledge and expertise with the aim of increased uptake, up-skilling and retention of pharmacists working in the ACCHS sector. Support for integrated pharmacists may be provided by various means as demonstrated in the IPAC Project and should be multi-modal to take into account accessibility, ease of utilisation and responsiveness.

6. Recommendations

Future considerations for training integrated pharmacists to work in the Aboriginal Community Controlled Health Service setting are included in Table 2, repeated below.

Future opportunities to provide training to pharmacists	Potential pathways to implementation	Intended industry impacts
1. Develop a foundation training program for pharmacists intending to work in the ACCHS sector.	1.2 Creation of an online multi-module Aboriginal Health Services Pharmacist foundation training course and face to face workshops.	Implementing this recommendation will lead to: • Enhanced readiness of integrated pharmacists to work with Aboriginal and Torres Strait Islander Australians with chronic disease • Consistency of skills provided by pharmacists integrated within ACCHSs • Increased workforce of appropriately skilled pharmacists available to work in ACCHSs
2 Acknowledge and direct pharmacists to appropriate cultural awareness training, (also noting AHPRA requirement for cultural competence)	2.1 Support for access by pharmacists to cultural awareness training, noting the importance of delivery by Aboriginal or Torres Strait Islander people where possible, as a combination of: • Introductory (general) cultural awareness training • Local cultural induction • Ongoing support from a cultural mentor if available	• Enhanced understanding by pharmacists of the cultural and social determinants of health influencing chronic disease outcomes for Aboriginal and Torres Strait Islander Australians • Enhanced understanding by pharmacists of their own connection to culture and unconscious biases, and how these are likely to influence their work

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Appendices

(See associated Zip folder)

Appendix 1. Master Vic Pharmacist Participant Brief

Appendix 2. MCQs for IPAC Project Master Pharmacist Participation Brief

Appendix 3. IPAC Project Overview (presentation slides)

Appendix 4. Data collection table

Appendix 5. Consent (presentation slides)

Appendix 6. Master Vic Pharmacist Consent Form for IPAC

Appendix 7. Master Vic Participant Information Brief for IPAC

Appendix 8. Summary of Pharmacist 10 core roles

Appendix 9. Core role 1 - Medication Management Reviews (presentation slides)

Appendix 10. IPAC Project HMR Guidelines

Appendix 11. IPAC project non-HMR criteria

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Appendix 13. Core role 2 - Team-based collaboration (presentation slides)

Appendix 14. Core Role 3 - Medication adherence (presentation slides)

Appendix 15. NMARS survey with SF1

Appendix 16. MAI Patient Survey form

Appendix 17. Core Role 4 – Medication Appropriateness Index (presentation slides)

Appendix 18. Medication Appropriateness Index examples

Appendix 19a. Core Role 4 – Assessment of Underutilisation (presentation slides)

Appendix 19b. Assessment of Underutilisation Patient Survey collection form

Appendix 20. Core Role 5 - Preventive Health Care (presentation slides)

Appendix 21. Core Role 6 - Drug Utilisation Review (presentation slides)

Appendix 22. Drug Utilisation Review Report (presentation slides)

Appendix 23. Core Role 7 - Education and Training (presentation slides)

Appendix 24. Education Session Evaluation form

Appendix 25. Education Session Evaluation Summary Report

Appendix 26. Core role 8 - Medicines Information Service (presentation slides)

Appendix 27. Core role 9 - Medicines Stakeholder Liaison (presentation slides)

Appendix 28. Medicines Stakeholder Liaison - Plan and Outcomes

Appendix 29. Core role 10 - Transitional Care (presentation slides)

Appendix 30. Pharmacist Activity Workplan template

Appendix 31. Logbook Instructions

Appendix 32. IPAC Project Pharmacist Resources list

Appendix 33. Pharmacists in GP Clinic BP HowToGuideVersion1.4

Appendix 34. Pharmacists in GP Clinic CC HowToGuideVersion1.5

Appendix 35. Training Presentation Schedule

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Pharmacy Trial Program Tranche 2

Integrating Pharmacists within ACCHSs to Improve Chronic Disease Management (IPAC) Project

Support for Pharmacists

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The financial assistance provided by the Australian Government must not be taken as endorsement of the contents of this report. The trials are undertaken by independent researchers and therefore the views, hypotheses and subsequent findings of the research are not necessarily those of the Australian Government Department of Health.

Abbreviations

ACCHO	Aboriginal Community Controlled Health Organisation
ACCHS	Aboriginal Community Controlled Health Service
AHS	Aboriginal Health Service
AHW / ATSIHP	Aboriginal Health Workers/Aboriginal and Torres Strait Islander Health Practitioners
AMH	Australian Medicines Handbook
APF	Australian Pharmaceutical Formulary
CIS	Clinical information system
CKD	Chronic Kidney Disease
HMR	Home Medicines Review
IPAC	Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management
JCU	James Cook University
MAI/AOU	Medication Appropriateness Index/Assessment of Underutilisation
MBS	Medicare Benefits Schedule
N-MARS	NACCHO Medication Adherence Readiness Scale
NACCHO	National Aboriginal Community Controlled Health Organisation
PBS	Pharmaceutical Benefits Scheme
PSA	Pharmaceutical Society of Australia Ltd.

Executive Summary

Introduction

Historically, a small number of Aboriginal Community Controlled Health Services (ACCHSs) across Australia have considered the need to improve chronic disease management and prescribing quality and sourced ad-hoc funding to support the role of an integrated pharmacist. However, these appointments remain few in number and there is no national support program for these roles.

The majority of integrated pharmacists participating in the IPAC Project had no prior experience working with ACCHSs and Aboriginal and Torres Strait Islander clients. Although induction training was specifically developed to ensure pharmacists had adequate cultural, clinical and technical skills, it was acknowledged that the integrated pharmacists would predominantly be working in physical isolation from their professional peers. Moreover, given the relative novelty or 'newness' of the role it was anticipated by the Project Team that substantial support would be needed in order for participating pharmacists to integrate effectively within their respective ACCHSs, understand and conduct core roles, and enter data essential for project evaluation.

Methods

Following induction training, a multifaceted and tailored program of support was provided to the integrated pharmacists throughout the project's implementation phase. Support methods included phone and email support from the Project Team, comprising representatives from PSA, NACCHO and JCU, as well as formal and informal mentoring by experienced Aboriginal Health Services pharmacists. Substantial further support was provided by means of site visits by PSA Coordinators, participation in regular monthly teleconferences, inclusion in an online discussion group and contact by closed-group social media. The integrated pharmacists were also given access to a contemporary online repository of resources related to medicines use and management of chronic disease in Aboriginal and Torres Strait Islander peoples, taking into account jurisdiction-specific differences in legislation and best-practice guidelines. PSA's Project Coordinators, who had considerable combined experience conducting medication management reviews as well as undertaking review and implementation of program delivery to the Aboriginal Health Service sector, were primarily responsible for coordinating and managing the delivery of these support measures.

Results

Throughout the project's implementation phase, significant uptake and consistent utilisation of the various platforms of support provided to the integrated pharmacists was demonstrated (see Table 1)

Table 1 - IPAC Project utilisation of support platforms

Support platform	**Frequency**
Site visits by PSA Coordinators	20 site visits across 16 ACCHSs
Monthly teleconferences	11
Discussion Forum	91 unique topic threads
Social Media (WhatsApp®)	530 individual messages
Mentor Program Support	11 formal + 3 informal agreements

Regular communication by phone or email occurred between PSA Coordinators and integrated pharmacists. The integrated pharmacists contacted PSA Coordinators for support on at least a daily basis. The significant perceived value of support received by the integrated pharmacists from PSA Coordinators and the Project Team was evidenced by means of feedback received during the project's qualitative evaluation. The importance of support was further reinforced during a workshop held at the end of the project to explore the many enablers and challenges experienced by the integrated pharmacists as they undertook their professional activities.

During site visits to participating ACCHSs, the PSA Coordinators observed a strong sense of teamwork and collaboration between the integrated pharmacists.

Discussion

The value of the support received by integrated pharmacists in the IPAC Project was clearly validated by several measures, including qualitative evaluation, personal and face-to-face communication with integrated pharmacists and frequent use of Project Team's expertise and platforms.

The methods to support pharmacists during the IPAC Project were acceptable and effective across a wide range of healthcare settings. Integrated pharmacists' utilisation of the various means of support on offer differed according to personal preference and ease of access from their respective ACCHSs. The combination of scheduled and ad-hoc opportunities to communicate with PSA Coordinators and colleagues, as well as the option to connect by a variety of electronic platforms, meant that the integrated pharmacists could identify and use the method best suited to their individual circumstances.

Given the geographic spread of ACCHSs around Australia and the relative novelty of the integrated pharmacist role in this sector, it is expected that effective support will be required for integrated pharmacists to adapt to new healthcare activities and workflow and to overcome feelings of professional isolation. We propose that the support methods used in the IPAC Project are generalisable for application in a national program that supports the integration of pharmacists into ACCHSs.

Conclusion

Substantive and considered support for pharmacists integrated within ACCHSs is essential to enable effective delivery of medicines-related services through a coordinated and collaborative approach to improve the quality of care received by Aboriginal and Torres Strait Islander patients. Indeed there is a risk that integrating pharmacists into ACCHSs without adequate support may limit the uptake and effectiveness of an integrated pharmacist service.

Support for integrated pharmacists may be provided by various means as demonstrated in the IPAC Project, and should involve multi-modal strategies to take into account accessibility, ease of utilisation and responsiveness. Beyond the IPAC Project, provision of adequate training and support, along with the creation of a community of practice for pharmacists working with Aboriginal and Torres Strait Islander peoples, will enable sharing of sector knowledge and expertise with the aim of increased uptake, up-skilling and retention of pharmacists working in the ACCHS sector.

Recommendations

Table 2 - Recommendations for support needed for integrated pharmacists in the ACCHS sector

Support needed for integrated pharmacists	**Resources required for implementation**	**Intended industry impacts – Implementing this recommendation will lead to:**
1/ Establish a program to provide ongoing support to integrated pharmacists working (or intending to work) in the ACCHS sector	Pharmacist ACCHS Support Program role will: 1.1 Facilitate access to training pathways for pharmacists commencing work within ACCHS. 1.2 Provide a clinical mentoring service. 1.3 Coordinate a mentoring program for pharmacists commencing working in the AHS sector to connect with pharmacists with prior experience. 1.4 Maintain a contemporary online repository of resources related to medicines use and management of chronic disease in Aboriginal and Torres Strait Islander peoples. 1.5 Coordinate a "community of practice" utilising a range of tools to connect integrated pharmacists in the AHS sector eg facilitated online discussion forum, social media, gathering at forums.	• Enhanced support for pharmacists working (or intending to work) in the ACCHS sector, with resultant increase in available workforce of AHS pharmacists • Increased access to integrated pharmacist services by Aboriginal and Torres Strait Islander peoples with chronic disease • Increased retention of integrated pharmacists due to reduced feelings of professional isolation in the ACCHS workplace • Enhanced sharing of professional expertise between AHS pharmacists, with resultant up-skilling of integrated pharmacists working in the ACCHS sector

Support needed for integrated pharmacists	Resources required for implementation	Intended industry impacts – Implementing this recommendation will lead to:
2/ Promote availability of relevant continuing professional development (CPD) for pharmacists working in the ACCHS sector	2.1 Provision of accredited CPD activities related to Aboriginal and Torres Strait Islander health care, for inclusion in pharmacists' annual CPD plans	• Continuous improvement in the quality of care provided by pharmacists to Aboriginal and Torres Strait Islander Australians.

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1. Introduction

Aboriginal and Torres Strait Islander peoples experience a much higher burden of chronic disease due to cardiovascular disease, diabetes, and other health problems, and yet have poorer access to needed medicines compared to other Australians.[1] Adverse health outcomes from these illnesses are preventable if prescribing quality is improved, and patients are better supported with medicines use, which is a key health equity issue. There is extensive global evidence that integrated pharmacists co-located within general practice clinics can enhance chronic disease management and quality use of medicines. [2]

The Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) to improve Chronic Disease Management (IPAC) Project was developed to explore if integrating a registered pharmacist as part of the primary health care (PHC) team leads to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples with chronic diseases.

Historically, a small number of ACCHSs across Australia have considered the need to improve chronic disease management and prescribing quality and sourced ad-hoc funding to support the role of an integrated pharmacist. However, these appointments remain few in number and there is no national support program for these roles.

The majority of integrated pharmacists participating in the IPAC Project had no prior experience working with ACCHSs and Aboriginal and Torres Strait Islander clients. Although induction training was specifically developed to ensure pharmacists had adequate cultural, clinical and technical skills, it was acknowledged that the integrated pharmacists would predominantly be working in physical isolation from their professional peers. Moreover, given the relative novelty or 'newness' of the role it was anticipated by the Project Team that substantial support would be needed in order for participating integrated pharmacists to integrate effectively within their respective ACCHSs, understand and conduct core roles, and enter data essential for project evaluation.

2. Methods

Throughout the IPAC Project implementation phase, support was provided to the integrated pharmacists by various means, including (but not limited to) phone and email support by PSA Coordinators and the wider Project Team, formal and informal mentoring, site visits, access to online resources, regular monthly teleconferences, an online discussion group and contact by closed-group social media. PSA's Project Coordinators, who had considerable combined experience conducting medication management reviews as well as undertaking review and implementation of program delivery to the Aboriginal Health Service sector, were primarily responsible for coordinating and managing the delivery of these support measures.

2.1 Phone and email support

Induction training for the integrated pharmacists included a session dedicated to communication processes, during which instructions and relevant contact details were given for use in the event of queries related to:

- Information technology (clinical information/software systems, pharmacists' electronic logbook, GRHANITE™ data extraction, online access to PSA's IPAC Project related resources)
- Clinical information
- Personal and annual leave requests
- Conflict resolution

Throughout the intervention phase of the project, integrated pharmacists were able to contact the project coordinators from PSA, NACCHO and JCU via phone or email during business hours, enabling prompt response to queries.

2.2 Site visits by PSA Project Coordinators

While the Project's protocol suggested that the initial site visit by PSA Coordinators would coincide with on-site induction training for integrated pharmacists at their respective ACCHSs, the decision to provide induction training by means of group workshops in Sydney, Melbourne and Brisbane meant that site visits would be more purposeful if conducted after the integrated pharmacists had commenced work. PSA Project Coordinators therefore aimed to conduct a site visit to all participating ACCHSs within the implementation period to assist with monitoring performance and most importantly to provide support to integrated pharmacists to help them achieve their role.

During site visits, Coordinators conducted a physical inspection of the pharmacist's work space to observe their access to a computer and private space for patient consultations, proximity to GPs and other allied health providers, proximity to the patient waiting room, access to professional references and use of IPAC Project promotional materials.

A large proportion of the site visit time was spent meeting with the integrated pharmacist to explore and discuss matters such as;

- Availability of an IPAC Project 'go to' person at the ACCHS – who is this? Has this changed? If so, how many changes to date and how has this impacted the project?
- Referral process - How are patients referred to the pharmacist?
- Consent process – How is patient consent obtained? Number of consented participants to date, possible reasons why some patients decline to consent, likelihood of targets being met.
- 'A day in the life' of the integrated pharmacist – How much time (on average) is spent both undertaking and logging data for patient recruitment/consent and core roles including HMRs, Non-HMRs, follow-up to HMRs & Non-HMRs, N-MARS, MAI/AOU, team meetings, drug utilisation review, preventive health activities, education & training, medicines information service, liaison with community pharmacy and transitional care?
- Performance review – comparison between electronic logbook data vs Pharmacist Activity Workplan, personal expectations, troubleshooting to identify areas needing revision of training, or additional support.

A meeting was scheduled in advance with the IPAC Project 'go to' person at each ACCHS to talk informally about their overall satisfaction with the integrated pharmacist, how the integrated pharmacist interacted with colleagues and patients, and the integrated pharmacist's input into clinical care and services for which MBS payments may be claimed. They were also asked to comment on their overall satisfaction with the project to date, their thoughts regarding continuity of the integrated pharmacist role after the conclusion of the project, and any suggested areas for improvement or additional support to be provided by PSA or an alternate body.

The PSA Coordinators were also available during the site visit to meet opportunistically with other ACCHS staff such as GPs, AHWs, nurses and clinic managers to seek informal feedback on their experiences with the project and integrated pharmacist to date.

2.3 Online resources repository

To assist the integrated pharmacists to conduct the core roles, PSA Coordinators compiled a contemporary online repository of resources related to medicines use and management of chronic disease in Aboriginal and Torres Strait Islander peoples, taking into account jurisdiction-specific differences in legislation and best-practice guidelines.

This online repository was available to all participating integrated pharmacists via the Pharmacist Resources tab of the dedicated IPAC Project Pharmacists Training portal on the PSA website.

The resources compiled and collated could be broadly categorised as:

- References and evidence-based guidelines
- IPAC Project information sheet and consent form
- Clinical information systems
- IPAC Project core roles (training presentations, forms, useful website links)
- Pharmacists working with Aboriginal people
- Specific information relating to relevant disease states
- Other useful resources
- Legislation related to the practice of pharmacy

(For further details of repository content see Appendix A – IPAC Project Pharmacist Resources List).

Pharmacists were also encouraged by PSA Coordinators to explore the availability of additional professional references and resources provided by their state-based government health library. In Victoria, for example, pharmacists working within ACCHSs could access the Clinicians Health Channel and its significant drug information databases, journals and guidelines. Another source of locally-relevant treatment guidelines accessible by the pharmacists was HealthPathways, a web-based information portal supporting clinicians to plan patient care through primary, community and secondary health care systems.

2.4 Facilitated teleconferences

In acknowledging that the integrated pharmacists were predominantly working in professional isolation during the project, the PSA project coordinators established monthly teleconference meetings via Zoom once all integrated pharmacists had commenced work at their respective ACCHSs. These 1-hour meetings were held regularly throughout the implementation phase and enabled dissemination of project-related information, priorities and progressive data summaries, as well as providing opportunities for the integrated pharmacists to share their experiences and seek advice from their colleagues. Integrated pharmacists were invited to contribute agenda items for the meetings and to propose topics for open discussion at the end of each meeting.

To take into account the different days of the week routinely worked by the integrated pharmacists and to optimise participation, each monthly teleconference was initially conducted with the same agenda on two separate days. Over the course of the implementation phase, pharmacist turnover and reallocation of some FTE between ACCHSs allowed for single monthly meetings to capture the vast majority of participants.

The PSA Coordinators circulated a summary of key points to all integrated pharmacists soon after each monthly teleconference, noting that some integrated pharmacists were unable to join the teleconferences due to work commitments such as team meetings or patient appointments.

2.5 Discussion forum

Using the dedicated IPAC Project Pharmacists portal accessible online by the integrated pharmacists via the PSA website, the PSA Coordinators created an online discussion forum in the early months of the implementation phase. This forum enabled the PSA Coordinators and integrated pharmacists alike to both create and contribute to discussion topics of relevance to the project and/or the Aboriginal and Torres Strait Islander health sector. The NACCHO Coordinators were also granted access to the forum to provide input as they had significant experience as pharmacists working in the Aboriginal Health Service sector.

The layout and visibility of discrete topics, or 'threads', made it possible for integrated pharmacists to easily refer back to previous discussions and to review uploaded documents.

2.6 Social media

Following completion of induction training, the PSA project coordinators created a closed WhatsApp® group specifically for use by themselves, the NACCHO project coordinators and the integrated pharmacists throughout the IPAC Project. The intent of connecting the integrated pharmacists and project coordinators using a social media platform was to provide a means for timely communication of information when needed, to enable rapid feedback to be sought from colleagues in the event of urgent queries, and also to enable the planning and coordination of opportunities to come together (eg conferences, workshops) for networking purposes.

The PSA Coordinators served as administrators of the closed WhatsApp® group, with messages secured with end-to-end encryption and unable to be accessed by third parties.

2.7 Mentor support

During the establishment phase of the project, feedback was sought from pharmacist members of the PSA/NACCHO ACCHO Pharmacist Leadership Group as well as other experienced Aboriginal Health Services pharmacists to explore availability of potential mentors who could be matched with the integrated pharmacists. Significant experience also existed within the Project Team itself, which could be called upon by the integrated pharmacists when needed. While it was not a requirement for the project coordinators employed by PSA and NACCHO to be registered pharmacists, these four positions were ultimately all filled by pharmacists with extensive combined experience working with Aboriginal and Torres Strait Islander clients, conducting medication management reviews and undertaking review and implementation of program delivery to the AHS sector.

The primary aim of the mentoring program was to facilitate communication between the IPAC Project integrated pharmacists and experienced Aboriginal Health Service pharmacists to share their experiences and receive guidance in the early stages of working within an ACCHS.

3. Results

The platforms used to support integrated pharmacists during the IPAC Project were acceptable and effective across a wide range of healthcare settings. Integrated pharmacists' utilisation of the various means of support available differed according to personal preference and ease of access from their respective ACCHSs. The perceived value of the support from PSA Coordinators received by the integrated pharmacists was evidenced by means of feedback received by the project's Qualitative Evaluation Team. Details of integrated pharmacist feedback are included in the project's Qualitative Evaluation Report to the PSA. [3]

An excerpt from the report stated;

> *"Another enabler for pharmacist integration was the support provided to them by the PSA Project Coordinators. Responses to the pharmacists' queries were valuable and timely and allowed the pharmacists to continue their work without delay. Pharmacists participated in a peer support network established by the PSA Project Coordinators using app technology, which enabled them to develop supportive relationships with other IPAC pharmacists in the same role".*

And a quote from an integrated pharmacist;

> *"Support and training from the PSA team was excellent. With provision of extensive resources, thorough training before the project started and facilitating networking with the other IPAC project pharmacists via the discussion forum, monthly conference calls and WhatsApp group, the PSA representatives gave me every opportunity to clarify, ask questions, seek guidance on any matter."* (Pharm15)[3]

Phone and email support

Regular communication by phone or email occurred between PSA Coordinators and integrated pharmacists. The integrated pharmacists contacted PSA Coordinators for support on at least a daily basis. For examples of clinical queries discussed, see Table 3.

Table 3 – Examples of clinical queries received by PSA Coordinators from integrated pharmacists

Queries received from IPAC integrated pharmacist	**Support offered by PSA Coordinator(s)**
Assistance sought for training opportunities to up-skill with respect to mental health & substance misuse issues in Aboriginal communities. This is a big focus at ___ACCHS, where (the integrated pharmacist) has been asked to participate in Social & Emotional Wellbeing team…	Directed integrated pharmacist to several resources including GuildEd Harm Minimisation online course for pharmacists, & HealthInfoNet review-of-illicit-drug-use-among-aboriginal-and-torres-strait-islander-people. Also directed to (local) PHN & Health Pathways for locally-specific information. Explored option of Aboriginal Mental Health First Aid course provided by MHFA Australia however this is only run face-to-face in WA; a copy of their Problem Drug Use Guidelines was forwarded to pharmacist XX.
Some guidance needed with metformin doses in reduced renal function, different references give different information…	Reinforced Australian Medicines Handbook, Therapeutic Guidelines, AUS-DI as Australian best-practice references, as well as offering relevant information from current edition of Renal Drug Handbook
Relayed by integrated pharmacist from a GP… Can Bydureon be prescribed with insulin?	Although Bydureon is indicated for use with insulin, the PBS schedule does not currently subsidise this combination (despite Byetta/insulin currently subsidised).
Second opinion sought regarding a patient with diabetes & Chronic Kidney Disease stage 2 but normotensive & no history of microalbuminura – to recommend an angiotensin converting enzyme inhibitor or not?? Guidelines differ…	Further guidance sought from experienced renal unit pharmacist working within same jurisdiction. Recommendation was to follow the KHA-CARI* guidelines, which would support the use of an angiotensin converting enzyme inhibitor in this situation… email & attached link to guidelines forwarded to integrated pharmacist
How can access be gained to Victorian Clinicians Health Channel?	Link to registration process emailed to all IPAC integrated pharmacists working in Victorian ACCHSs
Request for resources related to weight management in Aboriginal patients	Directed integrated pharmacist to the National Guide 3rd Ed (from page 18…), local Health Pathways & HealthInfoNet. Other feedback also coming via Discussion Forum from other pharmacists
Assistance sought with resources for up-skilling/training AHWs in the area of CKD	Links to Kidney Health Australia Indigenous Resources, National Guide 3rd Edition, & Chronic Conditions Manual chapters on Chronic Kidney Disease sent to integrated pharmacist via email, also encouraged integrated pharmacist to explore HealthInfoNet resources

Where to find latest asthma updates?	Referred integrated pharmacist to Asthma Handbook updates *https://www.asthmahandbook.org.au/figure/show/31* Also sent link which may help with creating education sessions for AHWs *https://www.asthmahandbook.org.au/populations/indigenous-people/management*
We had a discussion about PPIs today and one of the doctors said you can't take a PPI with thyroxine? How strong is the evidence?	It does not appear that proton pump inhibitors & thyroxine can't be used together, but rather that higher (perhaps about 35% higher) doses of thyroxine may be necessary for patients taking proton pump inhibitors in order to achieve target TSH levels as the proton pump inhibitor will affect gastric acidity & therefore dissolution of thyroxine tablets. article from the NEJM: *https://www.jwatch.org/na36643/2014/12/24/proton-pump-inhibitors-inhibit-absorption-levothyroxine* And it's supporting study: *J Clin Endocrinol Metab* 2014 Dec; 99:4481. (*http://dx.doi.org/10.1210/jc.2014-2684*) This Medscape article suggests monitoring TSH when a PPI is introduced, with potential to need to increase thyroxine dose by about 35% over several months… *https://www.medscape.com/viewarticle/742089* Interestingly some small studies have failed to demonstrate a clinically-significant interaction: *https://www.ncbi.nlm.nih.gov/pubmed/25372582*
Information sought regarding studies &/or opinions around use of fenofibrate to reduce progression to diabetic retinopathy	Referred integrated pharmacist to the FIELD study, & ACCORD-eye study, also an article in AFP Volume 44, No 6 2015 pages 367-370 entitled: 'The use of fenofibrate in the management of patients with diabetic retinopathy: an evidence-based review'
Do you happen to know if there is a good guideline for managing blood pressure in renal patients – especially once on dialysis?	Referred integrated pharmacist to the Kidney Health AustraliaCaring for Australasians with Renal Impairment (KHA-CARI Guidelines at *http://www.cari.org.au/* with direction to the Chronic Kidney Disease Guidelines tab up top… Also this article which may be of interest: *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4445132/* Or RACGP Kidney Disease Management in General Practice:

	https://www.racgp.org.au/clinical-resources/clinical-guidelines/guidelines-by-topic/view-all-guidelines-by-topic/chronic-disease/chronic-kidney-disease-management noting this tends to refer back to the KHA-CARI Guidelines…
Another opinion sought please, on combined use of empagliflozin + exenatide? The PBS note is a little confusing…	Initial opinion sought from an IPAC integrated pharmacist who is also a CDE, her response: 'We do see these combinations quite often as their modes of action work very synergistically together. There is a TGA approval for this combination but no PBS reimbursement as of yet'. Further clarification sought via email from *pbs@health.gov.au* with response received: In all of the listings the note is consistent that use of exenatide in combination with SGLT2 inhibitor is not PBS-subsidised, whether dual or triple therapy. Further details regarding the PBS listing for exenatide can be found online at *http://www.pbs.gov.au/medicine/item/10888C-3423E-3424F*.
I am trying to find resources regarding keeping medication refrigerated - do you know of any posters, flyers, or lists of medications that need to be kept in the fridge, storage conditions and if it is a legal requirement or accreditation requirement?	See Therapeutic Goods Administration website re storage of refrigerated medicines, refer to section 8…. *https://www.tga.gov.au/publication/australian-code-good-wholesaling-practice-medicines-schedules-2-3-4-8#cold* See also; *https://www.safetyandquality.gov.au/standards/nsqhs-standards/medication-safety-standard/medication-management-processes/action-414* The Strive for 5 guidelines have some good stickers & posters, but predominantly for vaccines… *https://www.health.gov.au/resources/publications/national-vaccine-storage-guidelines-strive-for-5*

* KHA-CARI – Kidney Health Australia Caring for Australasians with Renal Impairment

Site visits by PSA Project Coordinators

A total of 20 site visits across 16 ACCHSs were conducted by PSA Project Coordinators during the intervention period, predominantly between February and June 2019. One participating site was not visited by a PSA Coordinator due to resignation of the integrated pharmacist and subsequent recruitment of an IPAC integrated pharmacist already working at another participating ACCHS to take over this role. Another site was visited by a NACCHO Coordinator in place of a PSA Coordinator as the timing of this visit coincided with a scheduled support visit by the NACCHO Coordinator. The time needed to plan, schedule and undertake these visits was considerable however the benefits were significant in terms of providing project support, enhancing personal communication and fostering a sense of teamwork between project coordinators and integrated pharmacists.

During site visits, advice on a range of topics was given to integrated pharmacists to assist with optimising project delivery, including;

- Consideration of different strategies to optimise patient referral and consent to participate in the project
- Revision of all core roles, tailored to local context and acknowledging priority areas identified in individual Pharmacist Activity Workplan
- Identification of where certain day to day activities 'fit' into each of the core roles and can therefore be captured in the logbook accordingly
- Thorough consideration of time taken to conduct core role activities (some pharmacists were inadvertently under-reporting this) to ensure accuracy of this data capture in the logbook

Informal feedback received by PSA Coordinators from the integrated pharmacists following site visits confirmed that the visits were helpful to clarify core role activities and requirements for data capture, and provided a welcome opportunity for face to face contact with the PSA Coordinators. Some pharmacists reported that the site visits would have been more beneficial if they had been conducted earlier in the implementation phase. Reflections and observations made during site visits prompted the addition of agenda items for discussion during pharmacists' monthly teleconferences to enable dissemination of project-related strategies found to be useful and successful by some integrated pharmacists.

Information gathered from the site visits was shared by the PSA Coordinators with the Project Team to enhance understanding of the early enablers and challenges experienced by the integrated pharmacists, and the associated impacts on project implementation. This also helped to identify areas of need for additional support from NACCHO Coordinators to encourage further engagement from ACCHSs.

Recognition of the significant time reported by integrated pharmacists to undertake participant recruitment, core role activities and data capture helped to inform Project Team decisions related to realistic adjustment of the target for consented patient numbers across the project.

Facilitated teleconferences

Throughout the implementation phase, a total of eleven monthly teleconferences were held. Each meeting was facilitated by a PSA Coordinator and began with an Acknowledgement of Country, followed by an update on project progress related to issues such as participant consent numbers, data totals and targets, site visits and timelines. Agenda items for discussion during the monthly meetings were diverse in nature as shown in Table 4.

Table 4 - IPAC Project monthly teleconference topics

Project-specific topics	General topics
Local cultural induction – has it taken place?	HMR's – Medicare vs 6CPA rules and tracking claims data
Patient recruitment – challenges, successes & strategies to assist	Patient medicine lists
Consent – challenges, successes & strategies to assist	Medication review reports – ways to communicate with the GP
Mentoring Program – Update, frequency & methods of contact	MBS items – where can/does the pharmacist fit? Workflow processes to include pharmacist.
Promotional Materials – brochures & video	Upcoming pharmacy conferences and therapeutic updates for consideration
MAI/AOU* - targets & timelines	Impact of Health Care Homes Trial
Drug Use Evaluation – further discussion, sharing ideas	NAIDOC week – get involved
N-MARS** (Q1a consistency, who can conduct survey, who can enter keyword in CIS)	Best Practice software – tips & tricks
Case studies & patient testimonials - share	Aged Care packages – what is funded?
Recalling patients – how/when? Challenges & successes, project timelines	Biometric measures in Communicare & Best Practice
Stakeholder Liaison Plans - progress	HMRs – aim for progression to item 900 claims
JCU Qualitative Evaluation - scheduling	
Transitional Care – Pathology	
Logbook reports vs CC/BP list of JCU Consented patients – ensure these align	
Deceased patients – what to do?	
MAI reliability testing – intra/inter pharmacist	
N-MARS… repeat survey % progress	
JCU Consent Audits	

*MAI/AOU = Medication Appropriateness Index/Assessment of Underutilisation
**N-MARS = NACCHO Medication Adherence Readiness Scale

Discussion forum

Throughout the intervention phase, a total of 91 unique conversation threads were posted to the discussion forum, with 192 replies from integrated pharmacists and/or project coordinators. The nature of conversation threads could broadly be categorised as clinical, CIS, programs/services and project-specific. For examples see Table 5.

Table 5 - Discussion Forum (examples of topics)

General topic groups	Examples
Clinical updates and sharing of clinical resources of relevance	'Clinical yarning' article, azithromycin for bronchiectasis, cultural responsiveness framework, heart failure and fluid restrictions, duration of dual antiplatelet therapy for patients with non-ST elevation myocardial infarction, magnesium supplementation, antimicrobial stewardship programs, dose schedule of metformin/glibenclamide to optimise adherence, liquid iron shortage, suggestions for diabetes patient group education, Heart Foundation Booklet - Living well with Heart failure for Aboriginal and Torres Strait islander patients, puffer posters, B.Strong brief intervention training (Qld), 'Kidney Stories' resource available online, Indigenous Australian Dietary Guidelines (poster), use of renal prescribing guidelines, palatability of statins, 1-page diabetes medicines table, evidence for aspirin for prevention of bowel cancer
Clinical information systems	HMR editable template for Communicare, access to medication lists in Best Practice software, creating medication list templates
Programs and services	PPI changes to PBS, extemporaneous PBS scripts, Home Care packages, summary able of MBS potential pharmacist involvement, NACCHO HMR promotional poster for Aboriginal clients, NACCHO QUMAX flexible funding agreements, SafeScript (Vic)
Project-related matters	IPAC Project promotional materials, training presentations, updated participant briefs & core role assessment forms, revised consent forms, DUE examples, patient recalls and reminders, key points from monthly teleconferences, health worker education, tips for patient follow-up

Social media

In addition to the PSA and NACCHO project coordinators, a total of 18 integrated pharmacists accepted the invitation to join the IPAC Project Pharmacists' WhatsApp® group. A small proportion of pharmacists declined the invitation to join the social media group, having a personal preference for the other support options available within the project.

Throughout the implementation phase, members of the group posted 530 messages (including 45 photos, 14 website links and 2 documents), representing an average of 33 messages per month.

Conversation topics were again diverse and while initially intended to promote interpersonal connection between the integrated pharmacists, over time these were more likely to involve requests for timely feedback from colleagues to assist with current clinical issues of priority. Ease of access to the app via a mobile device, along with its responsiveness, were viewed by the integrated pharmacists as both convenient and very helpful when conducting their project activities.

Mentor support

The existence of significant expertise within the Project Team was acknowledged as the predominant source of informal mentor support available to the integrated pharmacists throughout the implementation phase. This was evidenced by significant and consistent utilisation of the various means by which the integrated pharmacists could communicate with the Project Team, including contact by phone or email, participation in monthly teleconference meetings, and use of the discussion forum and closed social media group.

While the intention was that each integrated pharmacist would be matched with an experienced mentor, in reality there were less mentors available than integrated pharmacists (mentees). As a proportion of the integrated pharmacists already had considerable experience working with Aboriginal or Torres Strait Islander clients, the PSA Coordinators liaised with each integrated pharmacist individually to ascertain whether they felt that they would benefit from the support of a mentor.

A number of the integrated pharmacists with significant prior experience in the AHS sector themselves expressed a willingness to support other integrated pharmacists with less experience. From these discussions, PSA and NACCHO Coordinators conducted preliminary matching of mentors with mentees, taking into account similarities in rurality of workplace.

Within the group of 24 pharmacists initially trained to participate in the project, preferences for mentor support were variable, as shown in Table 6.

Table 6 - IPAC Project mentor allocation summary

Pharmacists with formal PSA Mentor Program agreement	Pharmacists with informal (ad-hoc) mentor arrangement	Pharmacists who declined the offer of a mentor
11	3	10

Eleven pharmacists accepted formal mentor matching and proceeded to register and engage with PSA's Mentoring Program. This included mentee access to the Mentoring Education and Resources Hub (MERHub), an online portal of videos, e-Learning modules, fact sheets, conversation maps, tools and templates.

The mentors allocated to these pharmacists were similarly granted mentor access to the MERHub. . The mentoring program was designed to deliver 3-4 scheduled meetings of about 1 hour duration over a 6-month period.

A further three pharmacists preferred to be able to contact a mentor infrequently, on an informal or ad-hoc basis.

The remaining ten pharmacists declined the offer of support from a mentor, predominantly due to prior experience working with Aboriginal or Torres Strait Islander people, but also citing reasons such as:

- They were happy with availability and expertise of the Project Team members for support
- They were content with the proposed project support structure of monthly teleconferences, online discussion group and WhatsApp® social media connection
- They had another IPAC Project integrated pharmacist at the same ACCHS available to 'bounce ideas off'

All integrated pharmacists who accepted the offer of formal mentor support via PSA's Mentoring Program were invited to provide feedback on their experience. Of the eleven mentees registered with the program, 45% (n=5) provided feedback, which is routinely sought as a component of the PSA Mentoring Program at the end of the 6 month mentor/mentee agreement. Table 7 summarises all responses to selected survey questions.

Table 7 - Summary of PSA Mentoring Program mentee survey responses

Survey question	Responses	Additional comments
In my experience as a mentee I learnt:	Better communication skills	Knowledge about this area of pharmacy that I'm working in.
	More about how other people think	
	Important aspects of the pharmacy profession	
I will be able to use the learnings in my professional career:	Agree (60% of respondents)	Having someone to bounce ideas off made all the difference
	Strongly agree (40%)	
The mentoring timeframe was appropriate:	Agree (80%)	
	Strongly agree (20%)	
I will continue the relationship with my mentor:	Yes (80%)	
	No (20%)	
Our mentoring partnership worked well:	Agree (40%)	1. It is hard to fit scheduled meetings into our respective schedules, but the email communication worked well.
	Strongly agree (40%)	

	Disagree (20%)	2. It was good to have the prompt at 2 months to check we were on the right track. Maybe another prompt at 4 months would be good? 3. I didn't need to use the program much. Regular check in's by mentor may be an idea.

4. Discussion

Throughout the IPAC Project implementation phase, support was provided to the integrated pharmacists through various means, including (but not limited to) phone and email support by PSA Coordinators and the wider Project Team, site visits by PSA Coordinators, mentoring, access to an online repository of relevant resources, regular monthly teleconferences, access to an online discussion group and contact by closed-group social media.

While a proportion of this support related to project-specific matters, many queries and discussions were related to clinical issues, clinical information systems, programs and services relevant to the health of Aboriginal and Torres Strait Islander clients attending ACCHSs. Utilisation of the various platforms of support on offer was significant and consistent across the implementation phase, with some differences in the use of individual support measures observed between integrated pharmacists according to personal preference and ease of access.

At the conclusion of the implementation phase of the project, a workshop was scheduled by the PSA Coordinators in lieu of final site visits to participating ACCHSs. The workshop was held in Darwin, facilitated by the PSA Coordinators, and attended by the majority of integrated pharmacists as well as all members of the Project Operational Team. A small proportion of integrated pharmacists were unable to attend due to personal or annual leave arrangements. The aim of the workshop was to explore the many enablers and challenges experienced by the integrated pharmacists throughout the project, with discussions taking place in a group setting to encourage reflection and conversations between attendees. The feedback received from integrated pharmacists during the workshop highlighted the 'positive project culture' and support received from PSA (and availability of support from NACCHO and JCU) as significant enablers throughout the project. Furthermore the integrated pharmacists strongly valued the opportunity to collaborate in the workshop setting itself, stating that this added to their feelings of connectedness to other pharmacists who shared a passion for working in the Aboriginal Health Service sector.

Pharmacists reported that being able to communicate easily with their Coordinators and peers via either the PSA IPAC Discussion Forum or the less formal social media WhatsApp® closed group was invaluable as they could seek and/or share information from other integrated pharmacists in a timely manner. The availability of project-related training material, resources and references on the PSA IPAC Training portal was also found to be particularly useful.

The portal enabled pharmacists to double check project processes, explore links to websites and resources relevant to Aboriginal and Torres Strait Islander health, and acted as a central repository for forms related to consent, adherence assessments and medicines appropriateness index audit surveys.

Having regular monthly teleconference meetings, facilitated by PSA Coordinators to encourage a support network / community of practice and update the integrated pharmacists, helped with understanding of the successes and challenges experienced across the participating project sites, with integrated pharmacists adding that this also made them feel less 'isolated' as new health professionals in their respective health services.

Inclusion of a substantial program of support incorporating multi-modal strategies as demonstrated in the IPAC Project must be considered essential when planning broader expansion of integrated pharmacist services to ACCHSs across Australia in the future.

Support measures for the implementation of medicines-related programs have been considered and funded in the past, with one example being the Medication Management Review Facilitator Program accompanying implementation of the Home Medicines Review Program almost 20 years ago.
An evaluation of the MMR Program validated the effectiveness of the facilitator role in increasing program uptake.[4] This facilitator program had similarities to some earlier programs which involved employment of specialist resource staff to support particular initiatives in health care such as the National Prescribing Service (NPS) Facilitators and Enhanced Primary Care (EPC) Facilitators.

5. Conclusion

Substantive and considered program support for pharmacists integrated within ACCHSs is essential to enable effective delivery of medicines-related services through a coordinated and collaborative approach to improve the quality of care received by Aboriginal and Torres Strait Islander patients. Indeed there is a risk that integrating pharmacists into ACCHSs without adequate support may limit the uptake and effectiveness of an integrated pharmacist program.

Given the geographic spread of ACCHSs around Australia and the relative novelty of the integrated pharmacist role, it is expected that effective support will be required for integrated pharmacists to adapt to new healthcare activities and workflow and to overcome feelings of professional isolation.

Support for integrated pharmacists may be provided by various means as demonstrated in the IPAC Project, and should be multi-modal to take into account accessibility, ease of utilisation and responsiveness. Beyond the IPAC Project, provision of adequate training and support, along with the creation of a community of integrated for pharmacists working with Aboriginal and Torres Strait Islander peoples, will enable sharing of sector knowledge and expertise with the aim of increased uptake, up-skilling and retention of pharmacists working in the ACCHS sector.

6. **Recommendations**

1/ Establish a program to provide ongoing support to integrated pharmacists working (or intending to work) in the ACCHS sector	Pharmacist ACCHS Support Program role will: **1.1** Facilitate access to training pathways for pharmacists commencing work within ACCHS. **1.2** Provide a clinical mentoring service. **1.3** Coordinate a mentoring program for pharmacists commencing working in the AHS sector to connect with pharmacists with prior experience. **1.4** Maintain a contemporary online repository of resources related to medicines use and management of chronic disease in Aboriginal and Torres Strait Islander peoples. **1.5** Coordinate a "community of practice" utilising a range of tools to connect pharmacists in the AHS sector eg facilitated online discussion forum, social media, gathering at forums	• Enhanced support for pharmacists working (or intending to work) in the ACCHS sector, with resultant increase in available workforce of AHS pharmacists • Increased access to integrated pharmacist services by Aboriginal and Torres Strait Islander peoples with chronic disease • Increased retention of integrated pharmacists due to reduced feelings of professional isolation in the ACCHS workplace • Enhanced sharing of professional expertise between AHS pharmacists, with resultant up-skilling of integrated pharmacists working in the ACCHS sector
2/ Promote availability of relevant continuing professional development (CPD) for pharmacists working in the ACCHS sector	2.1 Provision of accredited CPD activities related to Aboriginal and Torres Strait Islander health care, for inclusion in pharmacists' annual CPD plans	• Continuous improvement in the quality of care provided by pharmacists to Aboriginal and Torres Strait Islander Australians.

References

1. Pharmaceutical Society of Australia. (2014). Guide to providing pharmacy services to Aboriginal and Torres Strait Islander people. Available at: *https://my.psa.org.au/articles/Standard/Providing-Pharmacy-Services-to-Aboriginal-and-Torres-Strait-Islander-People*

2. Tan E, S. K. (2014). Integration of pharmacists into general practice clinics in Australia: the views of general practitioners and pharmacists. Int J Pharm Pract, *22*(1), 28-37.

3. Preston R, Smith D, Drovandi A, Morris L, Page P, Swain L, Couzos S. Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) to improve Chronic Disease Management (IPAC) Project: Draft Qualitative Evaluation Report to the PSA. February 2020.

4. Urbis. Evaluation of the Home Medicines Review Program – Pharmacy Component. FINAL REPORT. Prepared for the Pharmacy Guild of Australia 2005.

Appendix

Appendix A – IPAC Project Pharmacist Resources List

IPAC Project Pharmacist Resources List

EVIDENCE BASED GUIDELINES

- National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people – 'The National Guide'
  https://www.racgp.org.au/download/Documents/Guidelines/National-guide-3rd-ed.pdf
- Remote Primary Health Care Manuals (including CARPA Standard Treatment Manual)
  https://www.remotephcmanuals.com.au/home.html
- Remote Health Atlas (Northern Territory)
  https://health.nt.gov.au/professionals/remote-health-atlas
- NT Immunisation Schedule 2018 (adult)
  https://nt.gov.au/wellbeing/healthy-living/immunisation/adult-vaccinations
- Primary Clinical Care Manual 9th Ed (Queensland Government)
  https://publications.qld.gov.au/dataset/primary-clinical-care-manual-9th-edition/resource/06f04fcb-6eb6-45eb-9770-c4a79a715b62
- Chronic Conditions Manual 1st Ed 2015 (Queensland Government)
  https://publications.qld.gov.au/dataset/chronic-conditions-manual
- The Australian Immunisation Handbook 10th Ed
  http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook10-home

IPAC PROJECT CONSENT

Individual patient consent for participation in IPAC project:

- Master Participant Consent form for IPAC (Vic & Qld sites)
- Master Participant Information brief for IPAC (Vic & Qld sites)
- Master NT Top End Participant Consent form for IPAC Project
- Master NT Top End Participant Information brief for IPAC Project
- Master NT CA Participant Brief for IPAC Project
- Master NT CA Consent form for IPAC Project

GP consent for participation in the IPAC project (for qualitative analysis only)

- Master Vic GP Participation brief (Vic & Qld sites)
- Master Vic GP Consent form for IPAC (Vic & Qld sites)
- Master NT Top End Participant Consent form for IPAC Project
- Master NT Top End Consent form for IPAC Project
- Master NT CA GP Participation brief (for NT sites)
- Master NT CA GP Consent form for IPAC (For NT sites)

CLINICAL INFORMATION SYSTEMS

- Communicare - IPAC Procedures
- Best Practice - IPAC Procedures
- Best Practice training webinar (link)
- My Health Record PSA Guidelines for Pharmacists http://www.psa.org.au/wp-content/uploads/My-Health-Record-Guidelines-for-Pharmacists.pdf

CORE ROLES

Core role 1 – Medication Management Reviews

- PSA Guidelines for pharmacists providing Home Medicines Review (HMR) services
- HMR flowchart
- Non-HMR criteria

Core role 2 – Team Based Collaboration

- Australian Cardiovascular Risk charts 2018
- MBS Fact Sheet
- MBS flowchart for Chronic Disease - Aboriginal and Torres Strait Islander Health Check (715)

Core role 3 – Medication Adherence Assessment and Support

- N-MARS Patient Survey form

Core role 4 – Medication Appropriateness Audit (MAI & AOU)

- MAI Patient Survey form
- MAI examples
- AOU Patient Survey form
- Therapeutic Guidelines – Suggested approach for glycaemic management in adults with Type 2 diabetes (algorithm)
- NT pneumococcal vaccination & re-vaccination schedule 2018

Core role 5 – Preventive Health care

- The National Guide Lifecycle Chart - Adult https://www.racgp.org.au/download/Documents/Guidelines/Adult-chart-National-guide-3rd-web-final.pdf
- RACGP 'Red book' – Guidelines for preventive activities in general practice 9th ed https://www.racgp.org.au/your-practice/guidelines/redbook/
- Australian Cardiovascular Risk charts 2018
- RACGP SNAP Guide https://www.racgp.org.au/your-practice/guidelines/snap/

Core role 6 – Drug Utilisation Review

- DUR report template

Core role 7 – Education and Training

- How to make an oral case presentation to healthcare colleagues https://www.pharmaceutical-journal.com/learning/learning-article/how-to-make-an-oral-case-presentation-to-healthcare-colleagues/20200876.article
- IPAC Project Education Session Evaluation form
- IPAC Project Education Session Evaluation Summary Report

Core role 8 – Medicines Information Service

- SHPA Medicines Information Services https://www.shpa.org.au/medicines-information-services
- PBS Schedule http://www.pbs.gov.au/pbs/home;jsessionid=11z8y3hxiba5q14bw10g4gbf2e

Core role 9 – Medicines Stakeholder Liaison

- Medicines Stakeholder Liaison – Purpose of Plan
- Medicines Stakeholder Liaison - Plan and Outcomes

Core role 10 – Transitional Care

- NPS learning module 'Get it Right – Taking a Best Possible Medication History' https://learn.nps.org.au/mod/page/view.php?id=5436

DISEASE STATE SPECIFIC INFORMATION

- Australian Indigenous HealthInfoNet https://healthinfonet.ecu.edu.au/
- Kidney Health Australia – Indigenous Resources http://kidney.org.au/your-kidneys/support/indigenous-resources
- Kidney Health Australia – Caring for Australasians with Renal Impairment (KHA-CARI) Guidelines http://www.cari.org.au/
- Kidney Health Australia - Chronic Kidney Disease Management Handbook http://kidney.org.au/health-professionals/prevent/chronic-kidney-disease-management-handbook
- Kidney Health Australia – download free smartphone app CKD GO!
- Diabetes Australia – Aboriginal and Torres Strait Islander people https://www.diabetesaustralia.com.au/aboriginal-and-torres-strait-islanders
- Stroke Foundation https://strokefoundation.org.au/
- The Heart Foundation – Aboriginal Health Resources for Health Professionals https://www.heartfoundation.org.au/for-professionals/aboriginal-health-resources

- Lung Foundation Australia – Indigenous Support https://lungfoundation.com.au/patient-support/indigenous/
- National Asthma Council Australia - Asthma in Aboriginal and Torres Strait Islander peoples http://www.asthmahandbook.org.au/populations/atsi-peoples

OTHER USEFUL RESOURCES

- PSA Career Pathway – Aboriginal and Torres Strait Islander Health Services Pharmacist http://www.psa.org.au/my-career-and-cpd-plans/career-pathways/aboriginal-health- pharmacist
- Aboriginal Interpreter Service available for the NT https://nt.gov.au/community/interpreting-and-translating-services/aboriginal-interpreter- service
- National Translating and Interpreting Service (TIS) - free for doctors and health services: https://www.tisnational.gov.au
- Aboriginal and Torres Strait Islander Health Performance Framework 2017 Report https://www.pmc.gov.au/sites/default/files/publications/indigenous/hpf-2017/tier3/315.html

LEGISLATION - practice of pharmacy

- Victoria http://www.psa.org.au/practice-support-and-tools/psa-information-framework/legislation- victoria
- Northern Territory http://www.psa.org.au/practice-support-and-tools/psa-information-framework/legislation- northern%20territory
- Queensland http://www.psa.org.au/practice-support-and-tools/psa-information-framework/legislation- queensland
- Pharmacy Board of Australia Guidelines http://www.pharmacyboard.gov.au/Codes-Guidelines.aspx
- Professional practice standards and guidelines published by the Pharmaceutical Society of Australia (PSA) http://www.psa.org.au/wp-content/uploads/Professional-Practice-Standards-V5-PDF-5.5mb.pdf

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NACCHO

National Aboriginal Community Controlled Health Organisation

NACCHO Report
IPAC Project ACCHS Support

May 2020

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NACCHO Report - IPAC Project ACCHS Support

May 2020

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In presenting this IPAC Project ACCHS Support Report, NACCHO wishes to acknowledge the contributions of Aboriginal and Torres Strait Islander peoples who participated in the project. We would like to thank the Aboriginal and Torres Strait Islander people for their cooperation and assistance as consented patients for the research information that was essential for this project. We wish to acknowledge and pay respect to Elders, both past and present and all generations of Aboriginal and Torres Strait Islander peoples now and into the future as the Traditional Owners of this land.

1. Executive summary

Background:

The burden of chronic disease is higher for Aboriginal and Torres Strait Islander people compared to other Australians. Moreover, access to medicines and pharmacist services for Aboriginal and Torres Strait Islander people is inequitably low, especially considering the greater need for such services owing to the higher burden of disease. The *Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) to improve Chronic disease management* (IPAC) Project[a] aims to integrate pharmacists into ACCHSs to deliver services to patients, staff and the ACCHS organisation to improve chronic disease outcomes. ACCHS organisational needs and priorities may be differentiated from other Australian primary care providers, for example by focussing on prevention, early intervention and comprehensive care and reducing barriers to access and racism.(1)

To fulfil the Project's aim, three partner organisations were involved including the Pharmaceutical Society of Australia (PSA), James Cook University (JCU) and National Community Controlled Health Organisations (NACCHO). Each partner organisation acted in a specific role to ensure the Project was designed, implemented and evaluated effectively. These roles reflected the organisations' distinct competencies and sector representation. The PSA was the lead organisation and contracted JCU and NACCHO to undertake specific Project activities based on objectives and aims outlined in the Project protocol and respective agreed service contracts.(2) PSA was also responsible for pharmacist recruitment, training and support, while JCU led the research component of the Project.

Aim:

NACCHO's primary aim as a Project partner was to provide input, representation and support for the ACCHS sector throughout the entire Project lifecycle.

NACCHO's Project objectives, which are expanded from the primary aim above and reflected in the Project protocol, are:

- To design the Project to be acceptable and effective for ACCHSs
- Oversee recruitment of ACCHSs into the Project
- Assist in collecting research information from ACCHSs
- Provide support for participating ACCHSs and receive ACCHSs' feedback
- Provide input into Project oversight and governance
- Provide input into other Project related activities where needed and appropriate

Methods:

Related to NACCHOs primary aim and its objectives, 6 key activities were developed in collaboration with the Project partners. The 6 key activities are described below:

a. Develop and manage an effective and acceptable process for Project ACCHS expressions of interest (EOI) and site recruitment
b. Manage and conduct ACCHS scheduled site visits; including conducting research, education and support activities whilst visiting ACCHSs
c. Manage and administer the IPAC Project Reference Group (PRG)
d. Manage Affiliates' Project activities
e. Commission, develop and contribute to Project resources and materials
f. Coordinate ACCHSs' feedback, communication and support

[a] The IPAC Project is known as "the Project" from here onward

Operationally, these 6 key activities were delivered by dedicated IPAC Project Coordinators, who were central to ensuring that NACCHO's primary aim and Project objectives were achieved.

Results:

NACCHO executed all activities as planned and was therefore able to meet its primary aim to provide input, representation and support for the ACCHS sector throughout the entire Project. NACCHO Coordinators were fundamental in managing and conducting the 6 key activities in a way that was acceptable, culturally safe and effective for ACCHSs. NACCHO Coordinators managed the EOI and ACCHS recruitment processes to recruit 20 ACCHSs into the Project (inclusive of clinic 24 sites), distributed across intended jurisdictions and remoteness. Coordinators visited each ACCHS at least 2 times, as planned, and conducted all planned on-site research and communication activities during these visits. NACCHO established and managed the IPAC Project Reference Group, which provided ongoing Aboriginal and Torres Strait Islander Project governance and feedback to the Project team throughout the Project. NACCHO also managed the Project activities and service delivery of state and territory Affiliates, who delivered tailored regional expertise and activities to suit their respective jurisdictions. NACCHO commissioned, developed or provided input into several key Project resources and documents including the ACCHS Pharmacist Needs Assessment, ACCHS Health Systems Assessment, Project presentations and Project promotion material for ACCHSs. Throughout the Project, Coordinators were able to provide ongoing, flexible support for ACCHSs. Feedback received from ACCHSs was consistently positive across Coordinator activities, which was corroborated by low site attrition. The Coordinators aided in research data collection Project oversight and governance when needed and acted expeditiously to address any issues that may have risked ongoing participation.

Discussion:

NACCHO fulfilling its primary aim and Project objectives throughout the entire Project life cycle validated the 6 key ACCHS support activities developed by partners and demonstrated that the Project Coordinators delivered services related to the 6 activities effectively in a way that was acceptable to ACCHSs. These operational activities augmented NACCHO's general governance-related objective to ensure Aboriginal and Torres Strait Islander representation and oversight at all levels of the Project.

Some limitations and challenges were identified in ACCHS support activities. These included maintaining effective communication and engagement with a small number of ACCHSs and Affiliates within the governance structures defined by the Project; and managing communication and delivery of Project activities between several stakeholders involved in supporting pharmacists and ACCHSs, including Affiliates, PSA and others.

Ultimately, the effectiveness of this model and the delivery of the key activities was supported empirically by extremely low patient attrition, low site attrition, positive results in the Project's Qualitative Evaluation Report and feedback from the PRG and individual ACCHSs and Affiliates throughout the Project.

ACCHSs found the Project intervention acceptable and effective. Such results strongly support implementation of a national program that integrates pharmacists into ACCHSs, adapted from the IPAC model. Furthermore, any such national program must incorporate ACCHS support modelled on support provided in the IPAC Project. This national integrated pharmacist program should be implemented immediately to help reduce the gross health and medicines-related inequities faced by Aboriginal and Torres Strait Islander people compared to other Australians.

2. Recommendations

The following recommendations are related to findings from this report and based on delivery of the 6 key activities and in consideration of NACCHO's participation in Project evaluation, implementation and governance.

1. The Australian Government Department of Health should immediately implement an ongoing national ACCHS-integrated pharmacist program adapted from the IPAC Project's model and incorporating the 4 overarching goals (accessibility, safety, equality and efficiency) of ACCHS pharmacists as identified by NACCHO, to address health and medicines related disparities between Aboriginal and Torres Strait Islander populations compared to other Australians.
2. The national ACCHS-integrated pharmacist program must include adequate support for both ACCHSs and pharmacists. This support for ACCHSs should be adapted from the 6 key activities delivered in the IPAC Project including dedicated program coordinator/s, an Aboriginal and Torres Strait Islander governance group, support for pharmacist recruitment and training, and culturally appropriate program resources.
3. Community-control and self-determination must remain central to the national program, to allow ACCHSs to employ pharmacist/s of their choice in a way that is adequately flexible and relevant to their specific needs.
4. Specific challenges related to remoteness must be considered in the national program. Pharmacists working in remote ACCHSs require a higher level of funding to account for additional implementation costs, as well as salary loading for travel and accommodation.
5. The national program must be patient-focussed, but also synergistic with other related pharmacy activities and medicines programs. Specifically, the program must be complementary to relevant community pharmacy and health programs and activities as demonstrated in the IPAC Project. This includes Home Medication Review, Quality Use of Medication MAXimised for Aboriginal people and Torres Strait Islanders (QUMAX), s100 Support Allowance, Workforce Incentive Payment and more.

3. Introduction, aims and objectives

The burden of chronic disease is higher for Aboriginal and Torres Strait Islander people compared to other Australians. Moreover, access to medicines and pharmacist services for Aboriginal and Torres Strait Islander people is inequitably low, especially considering the greater need for such services owing to the increased burden of disease. The *Integrating Pharmacists within ACCHSs to improve Chronic disease management* (IPAC) Project[b] aimed to integrate pharmacists into ACCHSs to deliver services to patients, staff and the ACCHS organisation to improve chronic disease outcomes.

NACCHO Project objectives and activities

To fulfil the Project's aim, three partner organisations were involved, including the Pharmaceutical Society of Australia (PSA), James Cook University (JCU) College of Medicine and Dentistry, and NACCHO. Each partner organisation undertook specific roles to ensure the Project was designed, implemented and evaluated effectively. The PSA was the lead organisation and contracted JCU and NACCHO to undertake specific duties. PSA was also responsible for pharmacist recruitment, training and support while JCU led the evaluation of the Project. NACCHO's primary aim as a Project partner was to provide input, representation and support for the ACCHS sector throughout the entire Project life cycle.

This document outlines NACCHO's key activities in achieving this aim. NACCHO acted to fulfil its primary aim through several activities developed with the Project partners. NACCHOs key activities outlined in this document relate to specific objectives which are based on the primary aim.

These objectives are:

- To provide input into Project design to be acceptable and effective for ACCHSs
- Oversee recruitment of ACCHSs into the Project
- Assist in collecting research information from ACCHS
- Provide support for participating ACCHSs and receive ACCHSs' feedback
- Provide input into Project oversight and governance
- Provide input into other Project related activities where needed and appropriate

In consultation with Project partners and through a Project Activity Workplan, NACCHO has acted on these objectives through undertaking several activities. These activities are outlined in the following document and summarised in the Summary section above.

NACCHO IPAC Project Coordinators

NACCHO employed two National IPAC Project Coordinators with a combined Full-Time Equivalent (FTE) of 1.0. The aim of the role was to manage and coordinate ACCHS-related Project activities and operations. The Project Coordinators were central to addressing objectives related to the NACCHO's Project aim. The Coordinators managed and coordinated the following 6 key Project activities:

a. ACCHS expressions of interest and site recruitment

The aim of the Project's site recruitment process was to identify and recruit the required number of ACCHSs that met Project site eligibility criteria, in a way that was effective and acceptable to the ACCHS sector.

b. Coordinator ACCHS site visits

The aim of the Project Coordinators' ACCHS site visits was to build rapport with ACCHSs, conduct service needs and health systems assessments and to provide resources and ongoing support.

[b] The IPAC Project is known as "the Project" from here onward

c. Project Reference Group

The Project Reference Group's (PRG) aim was to be the primary governance body that represented participating Aboriginal and Torres Strait Islander organisations, leaders and patients and to provide oversight and feedback to Project partners. Specifically, the PRG objectives and functions included:

- Provide Aboriginal and Torres Strait Islander oversight and input into the Project
- Report on IPAC cultural safety and effectiveness to ACCHSs and Aboriginal people at all levels
- Synthesize themes and provide recommendations to the Steering Committee to improve the effectiveness and appropriateness of the Project for ACCHSs and Aboriginal clients as needed, throughout the lifespan of the Project.
- Advise on Project risk mitigation strategies, as necessary.
- Endorse the nomination of three sites for site visits for the qualitative evaluation

d. State and territory Affiliate involvement

There are significant variations in ACCHS practice, legislation, geography and governance amongst states and territories in Australia. State and territory Affiliates of NACCHO have knowledge and networks to navigate and advise on Project issues at this level. Therefore, the Project engaged the assistance of the relevant Affiliates, coordinated by NACCHO. The primary aim of Affiliates in the Project was to provide knowledge, oversight and support for participating ACCHSs in their respective state or territory. Affiliates also provided jurisdictional input and subject matter expertise through the Project's evaluation processes and PRG.

e. Resources and materials

Within the Project protocol a need was identified for NACCHO input into key Project research resources, and administration of some of these resources to participating ACCHSs. Resources identified included the ACCHS's pharmacist Needs Assessment, Health System Assessment and others.

A need was also identified by Project partners for several Project promotional materials to be developed for use during Project establishment and implementation. Primary aims of these resources included:

1. Improve consistency and communication between NACCHO and ACCHSs
2. Promote the Project to patients and enhance patient and ACCHS participation

f. Ongoing communication, feedback and support for participating ACCHSs

The Project team proposed that to make the Project acceptable for participating ACCHS, it was necessary to have a support person or organisation to work consistently and responsively for each ACCHS to ensure the Project met their needs in a culturally responsive way, consistent with the NACCHO's primary aim to support ACCHS. This role was undertaken by the NACCHO Project Coordinators under the supervision and guidance of NACCHO.

4. Methods

NACCHO Project Coordinators

The Coordinators were employed to deliver services throughout the entire Project (see Appendix 1 for Coordinator Position Description). The role of the Project Coordinators is captured in their key duties below:

- Work with Project partners; the Pharmaceutical Society of Australia, James Cook University and NACCHO leadership to ensure effective and culturally safe project establishment, implementation, development and evaluation.
- Maintain engagement and coordinate communications with all participating ACCHSs and Affiliates, through:
    - Establishing and managing the IPAC Project Reference Group (PRG)
    - Visiting participating ACCHS sites, to conduct ACCHS needs and health systems assessments, provide induction presentations,
    - Other ongoing formal and informal communication and support, as required
- Coordinate the expressions of interest, invitation and enrolment of ACCHSs to participate in the Project
- Work with relevant state and territory Affiliates and NACCHO's participating Member ACCHSs to ensure that the Project is acceptable and meets Members' needs and expectations
- Consult with and assist Project Partners to develop resources and documents related to the Project's establishment, implementation and evaluation in collaboration with ACCHOs, Affiliates and consumers ensuring appropriate cultural protocols are followed.
- Provide support to ACCHSs in assessing and developing their pharmacy service needs, in collaboration with relevant Project partner representatives
- Report on activities to NACCHO executive and Project contractor – PSA

An overview of the role and activities of the NACCHO project coordinator is shown in the ACCHS Consultation and Information Flow Diagram from the project protocol (Appendix 2). The methods of delivery of specific Coordinator activities are explained below. These activities were overseen and supported by the NACCHO management, Executive and Board as necessary.

a. ACCHS expressions of interest and site recruitment

NACCHO conducted a two-phase Expression of Interest (EOI) site recruitment strategy for the IPAC Project which was managed by the NACCHO Project Coordinators. Phase 1 of the EOI process involved communication through two media releases, general emails to ACCHSs and stakeholders, and direct correspondence with individual sites across each of the participating jurisdictions. Input into EOI delivery and recruitment was garnered from the following stakeholders and informants: Affiliate representatives, QUMAX Coordinator, Evaluation team, PSA, NACCHO Communications and Members Services teams.

Health service inclusion criteria (Appendix 3) were used to select sites after reviewing the responses to the advertised EOI. The Project protocol outlined the proposed distribution of ACCHSs in urban, regional and remote locations across 3 jurisdictions, the Northern Territory, Queensland and Victoria. The proposed allocation of pharmacist hours for each of the 22 proposed sites was aggregated and equivalent to 0.57 Full time equivalent (FTE) pharmacists.

The proposed site distribution plan reflected the diversity in geographical location required for this Project and is shown in Figure 1.

Figure 1. Proposed site distribution plan from Project Protocol

	Urban	Regional	Remote	Total
Northern Territory		1	5	**6**
Queensland	3	3	2	**8**
Victoria	5	3	0	**8**
Total	**8**	**7**	**7**	**22**

The protocol specified that the IPAC Project Operational Team review the expressions of interest and decide if a temporary panel made up of Affiliate representatives was necessary to select the most suitable sites to participate in the Project.

NACCHO was responsible for preparing a report detailing the proposed allocation of FTE to each of the suggested list of 22 sites for endorsement by the Steering Committee.

Once services were endorsed by the Steering Committee, Phase 2 of the EOI process was conducted. Phase 2 involved further in-depth discussions between representatives from proposed sites and the NACCHO Coordinator/s, including their chronic disease patient numbers, existing services from a pharmacist and/or community pharmacy, practical considerations such as consulting room space within the ACCHS and available accommodation for pharmacists in remote sites, and expectations of what a pharmacist could add to the workplace.

After discussion with the Project team and Steering Committee, each ACCHS was formally invited to apply to participate in the project. Participation required a formal agreement between the ACCHS and PSA as the head contractor outlining the requirements of each party to the agreement, participation consent of the ACCHS in the IPAC Project and consent to install the GRHANITE™ software to enable extraction of deidentified patient specific data.

b. Coordinator ACCHS Site Visits

As part of the Project design, the NACCHO Coordinators' role was to undertake two site visits to each participating ACCHS. First, at the commencement of the Project (start of the Implementation phase) and again at the end of the implementation phase (the final site visit). The purpose of these visits was to:

- Conduct the IPAC ACCHS Health Systems Assessment (HSA).
- Conduct the IPAC ACCHS Needs Assessment during the first visit. (Appendix 4)
- Meet and provide information about the Project to ACCHS managers and staff, including provision of Project information, presentations to staff meetings, provision of the formal site participation brief (Appendix 9), ensure contracts and consent forms were complete. (Appendix 5)

Health Systems Assessment

The Health Systems Assessment (HSA) was a survey conducted to identify health system-related covariates. Each participating ACCHS was visited twice to enable capture of any changes in health services over the period of the project that may have confounded the measured results of the IPAC project.

- 1st HSA: At the time of, or just prior to the appointment of the pharmacist during the first site visit, to obtain baseline data
- 2nd HSA: Towards the end of the implementation phase at the final site visit during months 12-15, to identify any changes

The HSA sourced information about service size and function within the ACCHS, how many staff (and types) were employed within the ACCHS, the total service population, the total service budget, Aboriginal governance structures, health services on offer, Continuing Quality Improvement (CQI) processes, models of care such as outreach, if home medicines reviews were conducted and how, type of CIS used, recall systems in place, the features of existing communication with the hospital, and community pharmacy/s, medicines access information, use of point of care testing and regional services available such as specialist and allied health visits. The detail of the HSA is described in other reports (3).

Needs Assessment

The Needs Assessment aimed to elicit the type of support needed by the ACCHS so that the pharmacist may best be integrated within the service. The elements of the Needs Assessment were based on the Needs Assessment for pharmacists embedded into GP practices (4) and the 10 core roles of the IPAC pharmacist. Examples of suggested contributions by a pharmacist were provided and the ACCHS representatives estimated on a scale of 1 to 3, with 1 the most important, how important those functions were to the ACCHS. There were also opportunities to describe and plan how the role of the IPAC pharmacist would integrate with existing services from community pharmacies and consultant pharmacists. A more detailed description of the Needs Assessment is provided in the published protocol for the Project. (2)

From this Needs Assessment, a structured workplan was developed for the pharmacist/s in each individual service. This was provided to the health service, IPAC pharmacist, contracted community pharmacy where applicable, PSA and NACCHO Project team members. This plan was reviewed after 3 months for continuing applicability. The purpose of the work plan was to:

1. Clarify the specific role of the pharmacist within the health service according to identified need
2. Clarify the work requirements for the Project evaluation
3. Allow review of the performance of the pharmacist in meeting the needs of the health service and the aims of the Project
4. Identify learning needs of the integrated pharmacist

Project Information and Induction Presentation

The first site visit also allowed discussion of the ACCHSs preferred system for referring patients to the pharmacist and for seeking patient consent. The visit ensured that the pharmacist had approved access to the CIS, had a private space to consult with patients and was provided with a uniform, if available, to indicate the pharmacist was part of the team. Opportunities to ask questions about the Project were also provided to as many available ACCHSS staff as possible. The NACCHO coordinator also arranged a nominated ACCHS staff member to act as a 'go to' person for the IPAC pharmacist to assist in their orientation to the service.

An induction presentation (using PowerPoint software) was developed and presented to available staff at the first site visit. This is available at Appendix 6.

This presentation covered a variety of topics to guide further discussion with ACCHSs to assist with implementation such as:

- Background on why the Project was developed
- Information on the Project partners and ethics approvals
- Governance structure
- Evaluation methods
- Information on services the ACCHS would receive

- Information on “what a pharmacist can do for you”
- 10 core roles for IPAC pharmacists
- Information on consent process and establishment of the Project

c. Project Reference Group

The Project protocol specified the requirement for NACCHO to establish and manage the IPAC Project Reference Group (PRG), which reported to the NACCHO Board and the IPAC Steering Committee. Membership consisted of:

- Deputy CEO of NACCHO and Chair of Operations Team (Chair initially held by NACCHO Senior Member Services Officer)
- Representatives of the participating Aboriginal Community Controlled Health Services
- Representative of the Victorian Aboriginal Community Controlled Health Organisation
- Representative of the Queensland Aboriginal and Islander Health Council
- Representative of the Aboriginal Medical Services Alliance Northern Territory
- Director of Medicines Policy and Programs (NACCHO)
- NACCHO National Project Coordinators
- NACCHO-invited guests to participate or observe

Group meeting mode and frequency

The PRG communication and discussion was designed to be responsive to members’ needs and was planned to be conducted in several ways including:

- Approximately 3 monthly teleconferences hosted by NACCHO
- Forums at NACCHO national conferences 2018 and 2019
- Bi-monthly electronic newsletter
- Ad hoc correspondence with NACCHO Project Coordinators via phone or email

d. State and territory Affiliate activities

The three NACCHO Affiliates involved in the Project were:

- Victorian Aboriginal Community Controlled Health Organisation (VACCHO)
- Queensland Aboriginal and Islander Health Council (QAIHC)
- Aboriginal Medical Services Alliance Northern Territory (AMSANT)

Affiliates appointed a designated staff member (0.2-0.4 FTE) to liaise with the NACCHO Project team and with ACCHSs participating in the IPAC Project. Affiliates were able to choose how to allocate funds towards salary and associated staff costs, and travel as was appropriate, to meet their deliverables outlined in a workplan. A workplan template was provided to Affiliates based on roles specified in the Project protocol.

The Affiliate staff members developed a workplan according to the needs of their members, which was included in a formal agreement between Affiliates and NACCHO. The basis of these agreements was that Affiliates would have operational responsibilities within their jurisdiction and a role within the evaluation and governance of the Project. Affiliates were responsible for state-based service support to participating ACCHS; for providing input into Project implementation and establishment; and providing guidance to the Project as members of the evaluation team.

The Affiliates were provided the following roles to consider including in their agreed workplan, tailored to the needs of their respective jurisdiction:

1) Work with Partners to ensure that the Project is acceptable and culturally safe for ACCHS members at all stages
2) Provide input and collaborate with Partners during Project's establishment and implementation, including:
   a) Provide input into the Project expressions of interest (EOI) process
   b) Contribute to providing support to ACCHSs during EOI, and establishment and implementation phases as required, including site visits as needed
   c) Contribute to the identification and selection of suitable sites in consideration of site inclusion criteria in the Protocol
   d) Provide input to Partners to ensure that pharmacist training and service delivery meets ACCHS needs
   e) Contribute to the NACCHO and PSA led health service assessment and concurrent pharmacist recruitment as negotiated with participating ACCHSs
   f) Participate in regular communication between ACCHS, NACCHO and Partners to ensure that operational problems are identified and managed in a timely way
   g) Provide assistance and support to ACCHSs who are at risk of withdrawing from the Project
3) Actively participate in the Project Reference Group - meeting at least quarterly by teleconference or other web-based platforms of communication
4) Provide input into Project governance
5) Actively participate in governance groups outlined in the Protocol:
   a) Evaluation Team - meeting at least 3-monthly for teleconference, and face-face meetings required during the evaluation phase of the Project
   b) Project Reference Group
6) Provide input into evaluation of the Project
7) Contribute to Project-related advocacy and to policy work, to ensure that the findings from this research are used to support integration of pharmacists into Aboriginal primary health care.
8) Ensure that the Project's establishment and implementation are delivered between ACCHSs and jurisdiction consistently and aligned with the Protocol
9) Provide a workplan to NACCHO for the Project with a simple budget outlining the proposed costs and deliverables.

e. Resources and materials

NACCHO led the development of promotional materials, the Needs Assessment tool and Pharmacist Workplan template. NACCHO was also responsible for managing or providing input into the development of several Project resources and materials that were developed to be used throughout the administration of the Project either by participants or Partners. These included the ACCHS participations agreement document between ACCHSs and PSA, presentations for PSA training modules, Adherence tools, project documentation and the Health Systems Assessment (HSA).

Needs assessment tool

The Needs Assessment aimed to elicit the type of support needed by the ACCHS so that the practice pharmacist may best be integrated within the service. A Needs Assessment was required by the project protocol, and for consistency across ACCHSs, a tool for helping ACCHSs identify the needs of the

health services and their patients was developed by the NACCHO Project Coordinators. The Needs Assessment tool developed by NACCHO for the IPAC project is available at Appendix 4

Workplan template

A structured workplan template that could be adapted to the needs as identified on the Needs Assessment and which was consistent with the 10 core roles of the project was also developed. Although led by the NACCHO team, these were developed in consultation with the project team. A more detailed description of the workplan is provided in the Project protocol.

Health Systems Assessment

NACCHO worked with Partners to contribute to the development of the HSA to be delivered by NACCHO Project Coordinators during Project implementation. This involved considering the ONE21Seventy CQI tool and looking at health systems assessments used in the Kanyini Project and assessing them as not specific enough for the Project or not culturally appropriate. This led to the development of the IPAC HSA tool described in detail elsewhere. (1)

Promotional materials

A need was identified by partners to develop promotional materials to assist patient recruitment and increase acceptability of the Project. NACCHO led the development and distribution of these materials. These materials included:

1. A poster for display in ACCHS waiting rooms
2. A brochure to explain the project to patients and in particular to patients with low English literacy
3. Promotional videos to air on audio-visual systems in waiting rooms in participating ACCHSs, including on the Aboriginal Health Television (AHTV) network

f. ACCHSs ongoing communication, feedback and support

NACCHO established several methods to allow Project-related feedback from ACCHSs to the Project team. The methods identified any difficulties with the project so they could be addressed in a timely manner and in a culturally sensitive way. In particular, the methods were designed to capture feedback from ACCHSs about the conduct of the Project, research methods and future usefulness and opportunities to embed a pharmacist into ACCHS. Communication modes for ACCHSs included:

- Establishment of a Project Reference Group (PRG) that could advise on the appropriate conduct of the Project and the research requirements of the Project as it impacted on individual health services.
- Establishment of a relationship between a specific NACCHO Project Coordinator and a main ACCHS contact/s from each site (also known as the “go-to” person/people). The Project Coordinator allocated to each particular ACCHSs remained constant throughout the Project.
- Regular (at least monthly) communication between the NACCHO Project Coordinators and ACCHS contact person by phone or email, outside of PRG activities.
- Seeking of specific feedback by NACCHO Project officers from ACCHS managers and staff at the second site visit
- Feedback from Affiliates, obtained during their communications with participating ACCHSs

5. Results

Project Coordinators

The project coordinators achieved all planned activities as shown in the Consultation and Information Flow Diagram (Appendix 2) and described in the methods. NACCHO's primary aim as a Project partner to provide input, representation and support for the ACCHS sector throughout the entire Project was achieved.

NACCHO had at least one representative at all Operational Team discussions and Steering Committee meetings. NACCHO coordinators conducted the planned activities to ensure the Project was acceptable and effective for ACCHSs, to oversee recruitment of ACCHSs into the Project and to provide ongoing support for ACCHSs throughout the project. The role of ensuring continuity and acceptability of the project for ACCHSs through assisting in research data collection, providing Project oversight and governance and immediately addressing any issues that may have risked ongoing participation was very successful. This was demonstrated by most of the ACCHSs completing the project.

a. ACCHS expressions of interest and site recruitment

Expression of interest (EOI)

The EOI process was conducted between 20th March 2018 and 11th April 2018. After the first phase of the EOI had been executed, 33 responses in total were received. After excluding sites due to duplicate EOIs (2) and inability to meet inclusion criteria (1 from NSW, 5 with Medical Director software, 1 with PCIS software and 2 without a full-time GP), there were 24 sites. One ACCHS was allocated the status of 2 sites as it had locations in separate regional towns, using 2 standalone clinical information systems (CIS) and thus 2 separate CIS extraction software (GRHANITE^{TM}) licenses would be required.

A temporary panel as referenced in the Project protocol was not required. After considering the inclusion criteria and proposed site distribution, the number of sites who met the criteria was equal to the required number of sites required for the project.

In some cases, ACCHSs made suggested amendments to proposed pharmacist FTE allocation. For example, a reduction in FTE where the ACCHS felt they could only accommodate a pharmacist a certain number of days per week because of space allocations, or where the calculated FTE was more than 1 and the ACCHS was in a remote area with proven difficulties in recruiting staff, especially a full-time plus part-time pharmacist or 2 part-time pharmacists . Discussion and negotiation between the ACCHS and the NACCHO project Coordinator/s was required to ensure the needs of the ACCHS were accommodated where possible.

Studies suggest there are economies of scale in larger health services with the price per capita of services decreasing with larger numbers of patients (5), therefore it was identified that a model that distributes pharmacist time only by a per capita basis unfairly disadvantaged smaller health services. On consideration of the number of patients managed by the range of sites, it was proposed to allocate FTE according to a baseline allocation plus a formula based on patient numbers. Large multi-location sites were therefore eligible to receive more than 1 FTE pharmacist. NACCHO prepared a report detailing the proposed allocation of FTE to each of the 24 sites for endorsement by the Steering Committee.

Contacts from proposed sites were invited to discuss the Project with the NACCHO Coordinators in greater depth including their chronic disease patient numbers, existing services from a pharmacist and/or community pharmacy, practical considerations such as consulting room space within the ACCHS and

available accommodation for pharmacists in remote sites, and expectations of what a pharmacist could add to the workplace. NACCHO provided ongoing communication with ACCHSs regarding their eligibility.

ACCHS recruitment

A report was prepared for the Project Steering Committee's consideration in May 2018. Issues that were considered when finalising site selection included willingness to commit to installing the GRHANITE™ data extraction tool and ability to meet inclusion criteria. (Appendix 3)

The ACCHS inclusion criteria excluded ACCHSs which already employed an integrated non-dispensing practice pharmacist. Three health services identified an arrangement with a pharmacist that required further consideration in relation to that exclusion. On further investigation by NACCHO project officers, it was recommended to and supported by the Steering Committee, that the services could participate in the project as the pharmacists were employed primarily for a governance role. The particulars of the pharmacist activity prior involvement were captured in the HSA and are discussed elsewhere (3). The protocol proposed a mix of urban, rural and remote locations as defined by the Australian Statistical Geography Standard-Remoteness Area (ASGS-RA) (6). The sites selected were as close as possible to the proposed distribution as shown in Figure 2. Client numbers of the ACCHS were considered to ensure there was an adequate pool of active clients to recruit from during the project. These numbers were obtained verbally in interview with the main ACCHS contact and were then used to guide pharmacist FTE allocation.

Of the 24 ACCHSs initially invited to participate, two ACCHSs decided not to proceed and withdrew their EOI. Two other ACCHSs that had not responded to the initial EOI, but which had since contacted the NACCHO Project Coordinators expressing interest were then invited to apply. Both declined. The extra available pharmacist FTE caused by ACCHS withdrawal was then reallocated to two ACCHSs that had more than one physical location and these were considered dual "sites" for the purposes of pharmacist allocation, while remaining a single "participating ACCHS". One ACCHS had two sites in different towns, each with a standalone CIS and therefore a unique GRHANITE™ license. One ACCHS chose to withdraw from the project and the project was discontinued early at another ACCHS. Thus, the final site and ACCHS count by the end of the intervention was 22 sites over 18 different ACCHSs. This report refers in general to ACCHS as, for communication and support purposes, ACCHSs with more than one site were administered centrally and thus communication by NACCHO project coordinators could be done through common managers and go-to people.

PSA and NACCHO provided the Project contracts to ACCHS, who commenced the Project once the contracts had been signed and pharmacists had been recruited.

Site distribution

The final geographical distribution of urban, remote and regional ACCHSs recruited to the Project was acceptably aligned to the proposed distribution outlined in the Project protocol (Fig 1). This distribution was endorsed by the Steering Committee as achieving the aims outlined in the protocol and referenced in the agreement with the funding body. Figure 2 shows the revised IPAC site distribution plan at the start of the Project.

Compared to the original distribution table, the number of sites in Queensland was reduced by 1 because there were only 7 sites who expressed interest who were eligible. This was primarily due to the CIS-related inclusion criterion that excluded some Queensland ACCHS applicants. Although the number of sites in Victoria was allocated as planned, the total FTE for Victoria was reduced as most of the Victorian sites had smaller numbers of patients, as declared in the EOI process. The number of sites in NT was accordingly

increased by 1 and the total FTE increased which was to enable the project to accommodate the large numbers patients attending ACCHSs in the NT.

Figure 2 The Revised IPAC site distribution plan at start of the Project

	Urban	**Regional**	**Remote**	**Total**	FTE
Northern Territory		1	6	**7**	4.9
Queensland	3	2	2	**7**	4.4
Victoria	4	4	0	**8**	3.2
Total	**7**	**7**	**8**	**22**	12.5

When an adjustment was made from the proposed 0.57FTE per site, to a formula allocation based on patient load, with some consideration of expected difficulty to recruit in remote areas and other individual ACCHS requirements, the total FTE load across states as proposed initially and as proposed in this revision is shown below in Figure 3.

Figure 3 The revised FTE distribution by state compared with initial projections

	initial FTE proposed	revised FTE
NT	3.42	4.9
Qld	4.56	4.4
Vic	4.56	3.2
Total	12.54	12.5

Project progress - ACCHS retention and attrition

One ACCHS withdrew within 3 months for several cited reasons, one being the unexpected workload placed on other staff due to the pharmacist's recommendations and activities, in an already busy period where staff shortages were ongoing.

Another ACCHS chose to discontinue the intervention after 6 months of activity, when their pharmacist resigned for personal reasons. There were also very low patient numbers at the ACCHS which made re-recruitment unfeasible for the remaining project duration.

The majority of pharmacist FTE allocation from these two sites was redistributed to existing large participating ACCHSs that had multiple locations, which enabled services to meet the needs of a broad range of eligible patients. A total pharmacist FTE of 12.3 was maintained throughout the project. Figure 4 shows the final number of ACCHSs involved in the Project at the end of the intervention phase was 18.

Figure 4 ACCHS distribution at the end of the project

	Urban	Regional	Remote	**Total**	FTE
Northern Territory		1	4	**5**	4.6
Queensland	3	2	2	**7**	5.1
Victoria	2	4	0	**6**	2.6
Total	**5**	**7**	**6**	**18**	12.3

b. Coordinator ACCHS site visits

NACCHO Project Coordinators conducted at least two site visits for each ACCHS completing the Project as per the IPAC protocol. Two ACCHSs were visited a 3rd time to address operational issues identified through ongoing communication with the ACCHS and Project partners. Two other ACCHSs received an additional site visit when the NACCHO Project Coordinator was at the ACCHS location for other business enabling opportunistic support for the ACCHS and pharmacist to be provided in person rather than my phone or email, reinforcing the support from NACCHO.

First Site Visits

The first site visits were conducted to 20 participating ACCHSs between and 12th June 2018 and 13th September 2018. These were divided equally between the two NACCHO Project Coordinators with one Coordinator visiting Victorian and southern Queensland ACCHSs and the other coordinator visiting the Northern Territory and Northern Queensland ACCHSs. Visits took 1-2 days depending on travel schedules and needs of the ACCHS.

Feedback from local community pharmacies towards IPAC was observed to be very positive by NACCHO Project Coordinators. During initial site visits, the Project Coordinators met most of the relevant community pharmacists and were able to explain the Project's processes and aims. Subcontracting arrangements enabled the participation of community pharmacies to deliver the IPAC project by providing pharmacists to work in 5 ACCHSs. At each of these ACCHSs the community pharmacy had an existing relationship by providing s100 supply and s100 Support Services to the ACCHS. Some challenges with this arrangement were noted including initial uncertainty from ACCHSs regarding who would undertake management duties for the pharmacist (i.e. PSA or the pharmacy). These issues were largely overcome, with community pharmacy owners invited to participate in communication between the project partners related to service delivery by their sub-contracted pharmacists.

Conducting Needs Assessment

Needs Assessments were conducted by the NACCHO Coordinators at all ACCHSs in the Project at the same time as the above initial visits. Participants included managers and senior clinical staff. In eight ACCHSs, the site visits were conducted around the time of commencement of the pharmacist, or once they had been recruited but had not commenced. Thus, pharmacists were able to contribute extra discussion of the role of the pharmacist in terms of their own skills and experience. At other ACCHSs the Needs Assessments were conducted before recruitment of the pharmacist. After explaining the 10 core roles of the IPAC pharmacists and general discussions around what a pharmacist could do, ACCHSs were asked to prioritise individual ACCHS's preferences relating to pharmacists' duties. This formed the basis of the pharmacist's workplan.

The contribution of an existing service contract with a community pharmacy was captured in the Needs Assessment, with an extra column for the services that the ACCHS felt they regularly received. The community pharmacist also had an opportunity to describe the services provided under their s100 or QUMAX agreement in an extra section taken from the HSA but added to the Needs Assessment. The community pharmacists were asked to sign the needs analysis where possible to demonstrate their participation in the planning of services. The NACCHO Coordinators visited or consulted with a total of 18 community pharmacies at 15 locations to gather information on services provided for the Needs Assessment. Only one of six community pharmacies providing s100 support services opted to supply a copy of their s100 Support Allowance Agreement; confidentiality of a commercial arrangement was cited as the main reason for not providing these agreements. ACCHSs also declined to provide copies of the agreements without the other party's consent. Despite the project team not having copies of all the s100

Support Allowance agreements, 5 of the 6 remote ACCHSs had their IPAC pharmacist supplied by their s100 supplying pharmacy under a sub-contract agreement with PSA. The sixth ACCHS had an existing agreement for an onsite pharmacist service focused on supply/dispensing 2 days a week which continued throughout the IPAC project. This close collaboration with community pharmacies providing the Section 100 supply and support services assisted to ensure activities were not duplicated. It also ensured that the ACCHS continued to receive the support outlined via existing s100 workplans.

The Needs Assessment and workplan template forms are shown in Appendix 4

Pharmacist Workplans[c]

All pharmacists had workplans developed at the beginning of the Project. These were distributed to the ACCHS CEO and go-to person, the IPAC pharmacist and to the owner of community pharmacies which entered into a sub-contract with PSA to supply the pharmacist.

The workplans were reviewed approximately 3 months after the date of the initial workplan. This provided an opportunity for both pharmacists and ACCHSs to revise items in their workplan. At this point, it had become apparent to the Project team that the total Project target patient number was unachievably high, and this was an opportunity to revise the target number down. It was acknowledged this revised target remained challenging for some pharmacists to achieve in consideration of the pragmatic Project design and ACCHSs' specific needs and priorities. Other amendments were made to workplans on review, for example clarification of the numbers of previous HMR provided to the ACCHS. Reviewed plans were likewise distributed to ACCHS, pharmacists and relevant community pharmacy contractors.

Project Information and Induction Presentation

The induction presentation (using PowerPoint software) (Appendix 6) was delivered at a whole of service team meeting (six ACCHS) or opportunistically with members who were available (14 times). It was also made available to the IPAC pharmacists to use as needed in the event of staff turn-over at the ACCHS. It was delivered multiple times at four ACCHSs. At ACCHSs where the presentation was not delivered, information about the project was provided verbally using the site participation brief and a discussion of the 10 core roles.

Final Site Visits

The final site visits were conducted to 18 ACCHSs by the same NACCHO project coordinator that initially visited, between 6th September 2019 and 22nd October 2019. Follow up visits were not required for the two ACCHSs which did not complete the intervention, these were both small ACCHSs representing a total of 0.5 FTE pharmacists (4% of total FTE)

This site visit involved a repeat of the HSA to identify any confounding changes to health services, particularly as it may affect the parameters measured in the IPAC project. Eleven of eighteen (61%) of these HSAs were conducted at the end of the project with at least one of the same ACCHS representatives as participated in the initial HSA. Any large discrepancies in responses from the initial and repeat HSA were checked and verified.

The final visit also provided an opportunity for the project Coordinator to proactively seek feedback from ACCHSs representatives involved in the Project on the conduct of the Project as well as their experience of having a pharmacist as part of the team. Information was provided by the Project Coordinator about possible sources of ad-hoc funding to continue access to a pharmacist beyond the project. ACCHS

[c] for more information, refer to PSA reporting on pharmacist recruitment

managers and go-to people were very positive in most cases about the value of having a pharmacist and urged NACCHO to continue to support a national program with dedicated funding for pharmacists integrated into ACCHS. Most thought they would not be able to identify sufficient existing funds to support a pharmacist.

Coordinators experienced a turnover of some ACCHS' go-to people, with nine of the ACCHSs having a different go-to person at the end of the project compared to the beginning. In two cases, there were multiple changes of the key contact throughout the Project. Communication was noted to be challenging with some ACCHSs and occasionally NACCHO was not informed of a change in the go-to person. Coordinators endeavoured to use regular communication and considered and revised the most appropriate method of communication for the needs of each ACCHS.

c. Project Reference Group

The PRG generally fulfilled its aim to deliver Aboriginal and Torres Strait Islander oversight, communication and discussion in a way that was responsive to ACCHS' needs. The PRG also fulfilled the core of its stated functions including capturing themes and concerns from ACCHSs, which were taken to the Operational Team and the Steering Committee to improve the effectiveness and appropriateness of the Project. The PRG also advised generally on Project risk mitigation strategies as necessary and specifically endorsed the nomination of three appropriate ACCHSs for site-visits for the qualitative evaluation.

All ACCHSs and Affiliates were asked to nominate representatives to participate in the PRG. These staff included clinic managers, practice nurses, Aboriginal and Torres Strait Islander Health Workers and GPs. Teleconference groups were hosted by NACCHO approximately 3 monthly; forums were held at NACCHO national conferences in 2018 and 2019; electronic updates were circulated, but at lower frequency than planned, in response to Pharmacy Trial Program publication and communication requirements and ACCHS' needs; and innumerable instances of ad hoc correspondence occurred between NACCHO and PRG members via phone or email.

The first Project Reference Group (PRG) meeting was held on 8th June 2018 at which the Terms of Reference were ratified. Early feedback from PRG members was that they did not want regular meetings scheduled, communication and meetings were seen as only required as issues arose. Attendance at PRG meetings was also reflective of ACCHS' preferences to maintain direct contact with NACCHO Coordinators, rather than participate in formal meetings. IPAC Updates to ACCHSs were produced in September 2018, April 2019, and September 2019.

The first forum was facilitated at the National NACCHO conference in Brisbane on 1st November 2018 in which feedback was requested on the implementation of the IPAC Project in ACCHS. This was open to all conference participants. A follow up meeting by teleconference was held on 16th November 2018 to consider and add to the feedback from the conference forum. Both feedback sessions were recorded and summarised separately to the meeting minutes. General feedback through PRG was overwhelmingly supportive of the pharmacist's roles.

The PRG held a teleconference on 22nd February 2019 and discussed the qualitative evaluation plan, language used in surveys and planning for site visits. The three sites recommended from those who nominated for evaluation visits were discussed and the selection endorsed by the PRG.

Another PRG teleconference was held on 5th September 2019. ACCHSs expressed their desire to retain pharmacists after the IPAC project and NACCHO led the discussion of potential ongoing funding options.

The second Project Reference Group forum was conducted at the NACCHO annual conference on 6th November 2019. Again, response to the Project was positive and supportive of future funding to support integration of pharmacists within ACCHSs. At this meeting, there was a request for feedback of a summary of Project activity to individual ACCHS' results on a service-level. This was to enable ACCHSs to use this data for their CQI process. NACCHO prepared these reports using data collected up to the end of September (1 month before the final data close off). These reports were emailed to individual ACCHSs on 29th November 2019 and 9th December 2019, with a covering email suggesting they contact NACCHO if they required a final complete report to the end of October (or any other data).

d. State and territory Affiliates

Each Affiliate contributed in different ways based on the needs of members within their individual negotiated workplans. Affiliate officers also provide some Project oversight and planning, including providing input into the initial development of the Project protocol and HREC submissions. In general, Affiliate workplans were executed effectively. This was demonstrated through Affiliate reporting, Project Qualitative evaluation, feedback from participating ACCHSs and through the generally effective Project implementation overall. Affiliate logos were used on IPAC project documents and resources to show recognition and endorsement of the Project.

Affiliate representatives often acted in a contingency or problem-solving role. When specific unforeseeable issues arose during the Project, workplans allowed them to respond flexibly including ad hoc site visits or increased staff time to manage and troubleshoot acute problems. For example, VACCHO assisted in negotiating appropriate technology changes in ACCHSs to allow the GRHANITE™ data software to operate. Some Affiliates had more involvement at an operational level, depending on the needs of the services in their jurisdiction.

The Affiliates were requested to provide NACCHO with final reports on their involvement in the IPAC project.[d] Key activities and themes from reports and feedback received throughout the Project are summarised below.

Expressions of interest

Affiliates assisted in coordinating the Project EOI to respective member ACCHS as needed. This included working with the NACCHO Coordinator, having input into the EOI documents provided to ACCHSs and working with ACCHSs in completing and submitting the EOI. Affiliates also advised NACCHO Project Coordinators of ACCHSs that needed to be approached directly to ensure more complete reach of the call for EOI as a "second round" process. However, no further sites were able to be recruited from this second-round contact.

ACCHS support during Project implementation

Once sites were endorsed by the Project Steering Committee as outlined in the protocol, Affiliates liaised with individual ACCHSs when required regarding site agreement concerns or questions. Affiliates maintained regular contact with ACCHSs during the Project and ensured ACCHSs knew they could contact their Affiliate representative to discuss progress with the Project on site.

Attending site visits allowed Affiliate representatives to become more familiar with the Project. Where Affiliate representatives had existing relationships with ACCHSs, this improved the uptake and acceptability of the project. One ACCHS representative stated that they were not happy with the amount of data

[d] These have not been attached in full to avoid ACCHS level identification

proposed to be extracted by CIS extraction software (GRHANITE™) and would not have signed up to the project without the involvement of an Affiliate representative known to them from previous research.

Affiliates participated in regular communication between ACCHSs, NACCHO and Project partners to ensure that any operational problems for ACCHSs were identified and managed in a timely way. This included providing assistance and support to ACCHSs who were at risk of withdrawing from the Project.

Project Reference Group

Affiliate representatives participated productively in the Project Reference Group (PRG) managed by NACCHO. The role and activities of the PRG are described in their specific section of this report.

Evaluation Team

Affiliate representatives participated effectively in the Evaluation Team throughout the project. This was facilitated with three evaluation team meetings including one face to face meeting at the beginning of the Project to establish details of Project methodology within the parameters of the agreed Project protocol.

Individual Affiliate Engagement Summary

As well as the agreed functions that all Affiliate representatives participated in, there were unique activities that each Affiliate undertook to support their members.

Examples are provided below from reports received by NACCHO from Affiliate representatives to illustrate some key activities undertaken by Affiliates.

VACCHO:

- Discussions regarding funding for GRHANITE™ data extraction tool as additional IT costs occurred at ACCHSs where it needed to be hosted in a cloud environment. Costs were covered by the Project or by VACCHO on production of invoices.
- Accompanied NACCHO Project Coordinator on majority of initial IPAC site visits. After discussion and by mutual agreement, NACCHO conducted follow up visits without VACCHO participation due to strong NACCHO relationship with sites.
- The VACCHO officer had experience with Continuous Quality Improvement projects which assisted in the information gathering process for the Health System Assessment
- Discussion regarding pharmacist turn over at some ACCHSs
- Involvement with decision to complete intervention early at a Victorian ACCHS due to pharmacist resignation for personal reasons, and very low patient numbers at the ACCHS making re-recruitment not feasible for the remaining Project time.

AMSANT:

- Appointment of a pharmacist 0.2FTE to support the ACCHS participating in the Project in the NT including contact with pharmacists in negotiation with PSA project coordinators.
- Recurring update meetings were scheduled between NACCHO, PSA and AMSANT to discuss strategies to support all ACCHSs in the Project.
- Significant discussion and information about Health Care Homes and its impact on the IPAC Project
- Presentation by AMSANT to a member teleconference about the IPAC Project including follow up discussion

QAIHC:

- Assistance with identifying potential sites during the EOI process when proposed numbers of eligible Queensland sites were not reached after the first call for EOI.
- Involvement in selection of sites to be included in the Project qualitative evaluation
- Notification that no specific site level issues have been raised.
- Promotion of the project in QAIHC quarterly magazine.

e. Resources and materials

NACCHO Project Coordinators worked consistently with the Project team to contribute to the development of the Health Systems Assessment (HSA), Needs Assessment, workplan template, the application by pharmacists of the Medication Appropriate Index, the Adherence Assessment Tool and the education resources for pharmacists developed by PSA. The Needs Assessment tool was developed with assistance from the Project Operational Team and tabled at the Steering Committee on 13th July 2018. There was an amendment required to add a section to elicit information about existing s100 RAAHS[e] services from the pharmacist concerned. This was done and re-sent to the committee out of session. The Needs Assessment tool largely fulfilled its aim to elicit the type of support needed by the ACCHS so that the practice pharmacist may best be integrated within the service. ACCHSs effectively described and planned how the role of the IPAC pharmacist would integrate with existing services from community pharmacies and consultant pharmacists. Some ACCHS staff suggested the process itself was also important in their understanding of the role of a pharmacist.

Promotional materials

ACCHS Pharmacist Poster

A poster using two Aboriginal designs as well as specific medication graphics was commissioned from an Alice Spring artist to promote the IPAC pharmacist. These posters were a colourful design and were individualized with the pharmacist's photo. These were printed by NACCHO and distributed directly to ACCHSs by a major office supplies and logistics company. A sample of both posters are shown at Appendix 7.

Brochure

A brochure describing the Project was also designed to assist in explaining the Project when seeking consent from patients. This was distributed electronically for printing in the ACCHS if required. This allowed local adjustment to the brochure if required and to reduce freight and handling costs. A sample of this brochure is shown at Appendix 9).

Letterhead:

An IPAC letterhead for general Project purposes was developed incorporating a variation on the NACCHO ribbon and distributed to Project partners.

Film:

Pharmacists and staff at a participating ACCHS were filmed discussing the Project and its benefits. This content was coordinated by NACCHO, filmed and edited by JCU, then supplied to Tonic Health Media to play on the Aboriginal Health Television (AHTV) network across Australia. It ran for 7 months from March

[e] Section 100 Remote Area Aboriginal Health Service Measure of the National Health Act

to September 2019 inclusive. Initially there were only 3 participating ACCHSs equipped with the televisions, but this was extended as more ACCHSs could access this network. The short videos were also available on the NACCHO website.

Radio:

NACCHO coordinated a Radio National interview that aired on Life Matters on 22nd August 2019[f]. This involved one IPAC pharmacist and described the role of the IPAC pharmacist.

Several other materials and resources were developed by or with other external organisations to provide information and research translation for the Project. These included local radio broadcasts by individual IPAC pharmacists as part of the ACCHS health promotional activity and another series of films that were co-ordinated by NACCHO Project Coordinators and filmed and edited by JCU. Unfortunately, the stringent communication requirements enforced by the Pharmacy Trial Program (PTP) limited the research translation activities and engagement with the sector.

f. ACCHS' ongoing communication, feedback and support

The NACCHO Project Coordinators established working relationships with all nominated ACCHS contacts, including the go-to person/s. The 2 Project Coordinators liaised regularly with each of their allocated ACCHSs and remained the primary ACCHS contact throughout the entire Project.

In addition to the formal PRG meetings, regular communication between the NACCHO Project Coordinators and ACCHS go-to person by phone or email was maintained. This was generally around fortnightly or more frequently if there was an issue identified that the Coordinator could help address.

In some cases, communication was initiated by the IPAC pharmacist. The NACCHO Coordinators participated in each of the induction training workshops conducted by PSA Coordinators and met pharmacists recruited for the Project. In some cases, the Coordinator developed a relationship with the pharmacist on initial site visits. Thus, communication from the integrated pharmacists became an informal method of support for pharmacists, but also provided insight into issues that may have needed support for ACCHSs.

There were both formal and informal requests for feedback from ACCHSs. In general, comments at the PRG were extremely positive, with many ACCHSs providing examples of how the IPAC pharmacists had transformed medicines services in their workplace. Feedback from Affiliates was also generally positive, but also provided valuable insight into how things could be improved, such as enhancing support for remote areas, tailoring Project resources to local language and literacy (e.g. the Project consent form), reconsideration of patient recruitment numbers and ensuring adequate remuneration for future programs.

At the end of the Project, there was an almost unanimous preference from the ACCHS sector for continuation of a program akin to IPAC supporting an integrated pharmacist model in their health service.

ACCHS Feedback

The ACCHS feedback summarised below has been grouped into themes in the context of further research or implementation of an IPAC-related integrated pharmacist program more generally.

[f] See https://www.abc.net.au/radionational/programs/lifematters/tackling-aboriginal-chronic-disease-through-grass-roots-pharmacy/11435412

Positive support for having a pharmacist

Feedback through the PRG, informal communications with ACCHS staff and at the site visits conducted by NACCHO project Coordinators at the end of the project were generally positive. This was also supported by the qualitative evaluation report. (7)

Clients and community engagement indicated that the project has been seen to add value. Many ACCHSs reported that their pharmacist had become a valuable member of the health team in the ACCHS. When pharmacists wore the ACCHS' uniform it was seen to be highly beneficial in terms of patient and staff acceptance.

> *"The pharmacist has been amazing resource. Liaison with community pharmacy, hospital and other services. Assisting with onsite medication processes."* PRG, Nov 2018

> *"..pharmacists have case managed difficult patients, strengthened relationships with community pharmacies who now use the pharmacists as a conduit to GPs, contributed to procedures around medicines onsite, being there every day and wearing a uniform helped them become part of the team"* PRG, Nov 2019

Doctors expressed how valuable the pharmacists were in assisting them to manage patient medications. Other clinical and program staff also found them to be helpful and knowledgeable about medicines and ready to help patients work through various health providers, including community pharmacies, diabetes educators and renal units.

> *"All Drs [sic] are now enthusiastic about using pharmacists, only 2 Drs were previously referring for HMR"* PRG, Nov 2018

NACCHO observed that pharmacists were generally proactive in finding patients that may have needed help with their medicines, and ACCHS staff reported stories of patients who became advocates for the pharmacist services in the community after receiving education about their medicines and support that they had not had access to before.

> *"After a slow start, great to have extra input for people about their medicines and people very receptive even reminding staff it is time for their review"* PRG, Nov 2018

At the end of the Project, on the second site visits, the Project Coordinators provided information on potential sources of ongoing funding for an integrated pharmacist. All ACCHSs expressed a wish to continue employing an integrated pharmacist, depending on adequate funding and availability of an appropriate pharmacist. One ACCHS manager stated that she "didn't know how much we needed a pharmacist until we had one". There was overwhelming support for the extension of such a program.

Feedback from research Project implementation

Despite some initial concerns relating to the implementation of the project, the concerns were not insurmountable, as evidenced by the very low patient and site attrition observed. A number of managers and go-to people stated they were not sure of the role of the pharmacist at the beginning of the project.

The NACCHO project Coordinators endeavoured to address implementation and some research related concerns throughout the Project. For example, ACCHSs were asked to include pharmacists in staff meetings, to provide the pharmacist a uniform and to incorporate them fully into the ACCHS clinical team. Subsequently, feedback at the end of the project was more positive with most managers saying the pharmacists had done a great job, worked well as part of the team and that the ACCHS would be investigating how to maintain pharmacist services.

Because the Project did not include loadings or subsidy for remote service delivery, travel or accommodation, the Project Coordinators worked with PSA and assisted ACCHSs and pharmacists to ensure optimal service delivery and patient recruitment. In some cases, the pharmacist was required to travel between different locations within their ACCHS as part of their role, requiring access to a vehicle, accommodation at the alternate site and living away from home allowance. These issues were addressed through by a combination of resources. For example, ACCHSs' in-kind use of facilities, such as staff accommodation and vehicles, extra support from Project funds for accommodation for the pharmacist supplied by PSA or from direct or in-kind contributions by contracted community pharmacies. NACCHO Coordinators observed seven ACCHSs receiving additional support, beyond Project methods, to ensure they could participate effectively in the project.

Other implementation issues for ACCHSs observed by Coordinators related to the research component of the Project included GRHANITE^{TM} data extraction software operability, concerns with having double data entry (once in the CIS, and again in the pharmacists logbook), and the consent process from patients before providing services. These were generally understood as being related to research methodology, though they were a regular reason for communication with Project Coordinators as the Project was implemented. However, when an issue was identified by either party, ACCHSs were very responsive to resolving the issues and continuing participation in the Project.

The initial ease of implementation of the IPAC Project varied between the participating services. One Affiliate representative felt that "it seemed to depend significantly on the 'readiness' of the service for the IPAC Project and the pharmacist role. A lead in period enabling the pharmacist and services to familiarise themselves with the proposed model and role would have been beneficial". ACCHSs with an existing relationship with the pharmacist prior to the Project were observed to implement the project more rapidly and efficiently. However, even these ACCHSs could have benefited from a lead-in period.

6. Discussion

NACCHO fulfilled its primary aim to provide input, representation and support for the ACCHSs participating in the Project throughout the entire Project life cycle. NACCHO satisfied its Project objectives within this aim by successfully completing the 6 key Project activities, including developing and managing an effective and acceptable Project ACCHS expressions of interest and site recruitment process; managing and conducting ACCHS scheduled site visits, including conducting research, education and support activities; managing and administering the Project Reference Group (PRG); contracting and coordinating Affiliates; providing input and developing Project resources and materials; and providing communication and support for participating ACCHS. These operational activities augmented NACCHO's general governance-related objective to ensure Aboriginal and Torres Strait Islander representation and oversight at all levels of the Project. The effectiveness in delivery of the 6 key activities is corroborated through extremely low patient attrition, low site attrition, positive results in the Project's Qualitative Evaluation Report and feedback from the PRG and individual ACCHSs and Affiliates throughout the Project.

NACCHO Project Coordinators

The NACCHO Project Coordinators were central to successfully delivering the 6 key Project activities, which provided the necessary support for ACCHSs to participate in the IPAC project. Their ongoing engagement with all participating ACCHSs and Affiliates through the PRG, site visits and other ongoing formal and informal communication and support as required, allowed the Project to run in a culturally responsive and effective way. The effectiveness of their work illustrates the importance of consistent personnel and communication from Coordinators with experience working in the ACCHS sector. The Coordinators' clinical experience and technical understanding of the integrated pharmacist role augmented their effectiveness in this position.

The Coordinators' skills, qualifications and knowledge related to clinical pharmacy and the ACCHS sector allowed them to provide technically detailed communication and reporting both verbally and in writing to NACCHO executive and Project partners throughout the Project. The Coordinators' consistent and active participation in Project governance meetings and reporting also provided valuable direct operational insight and input the oversight of the Project.

a. Expressions of interest and site recruitment

The EOI and site recruitment process was demonstrably successful in identifying and recruiting a sufficient number and distribution of ACCHSs to fulfil the criteria in the Project's protocol. This was attributable to consultative and comprehensive methods and governance applied to these activities. The skills and experience of the NACCHO Project Coordinators and Affiliate representatives facilitated Project activities to be delivered in a culturally responsive and acceptable way. Support and sector knowledge from both other Project partner organisations further enhanced the effectiveness and acceptability of the EOI and site recruitment.

While the EOI and recruitment process was observed to be effective and acceptable to the ACCHS sector, some minor limitations in the process were identified by NACCHO. These limitations primarily related to the requirements of the funding body or research processes generally. For example, the ACCHS inclusion criterion for research software compatibility excluded several ACCHSs who expressed interest, who were otherwise eligible. Such issues are unlikely to be a factor for inclusion if the Project model were to be adapted into a national ongoing program.

The capacity to adapt the allocation of pharmacist time (i.e FTE per ACCHS) in the recruitment stage and then throughout the Project as needed to meet the needs of individual ACCHSs was valuable. The dynamic nature of support from Project partners and Coordinators exemplified by this allocation process was one reason for the sustainability of the intervention activity and workforce over the life of the Project. Aboriginal Community Controlled Health Services across Australia are not homogenous, and it is vital that they are assisted to tailor a pharmacist service to their own needs and that of their community.

The support of ACCHSs for recruiting and establishing pharmacists' activities, as well as the ongoing assistance throughout the project by NACCHO Project Coordinators was an important part of the success of the model and should be incorporated into any future proposal for expansion of the model to other ACCHS and Aboriginal Health Services.

b. ACCHS Site Visits

Through site visits, ACCHSs were supported to conduct Project research activities (e.g. conduct the Health Systems Assessment). The NACCHO Project Coordinators received feedback from participating ACCHSs that these visits were useful and appreciated.

The Project Coordinators found that site visits were a valuable opportunity to meet the appropriate staff at the ACCHS, understand the ACCHS' operations, determine what kind of support was most relevant and likely to be needed and to provide information to as many staff as feasible and necessary.

Coordinators noted the high importance and impact of direct face to face communication. The volume of information, quality and nature of face to face communication was not substitutable by any form of phone or online correspondence. The ability to build rapport and trust with key ACCHSs representatives during the site visits allowed the Project to be established and delivered effectively.

ACCHSs reported the site visits to be an opportunity to meet the Coordinator and discuss any possible specific barriers and concerns related to participation in the project. These dynamic interactions allowed ACCHSs to consider how their individual needs for pharmacist services could fit into the 10 core roles of the IPAC project. For example, ACCHS representatives and Coordinators frequently discussed how the IPAC pharmacist could support medicines governance for the ACCHS' specific needs and local environment and legislation. Further to this, ACCHSs expressed uncertainty regarding how IPAC pharmacists could use their pharmacist to assist in developing and documenting medicines management guidelines, imprest lists and policies and processes to meet accreditation standards. The Project Coordinator was able to demonstrate how this was applicable under the 10 core pharmacist roles of the Project with around 25% of workload proposed to support non-patient related activities and 75% to patient related activities.

Needs Assessment

After the partners developed the Needs Assessment template, Project Coordinators found the content and application of the template to be generally suitable and effective for ACCHSs. The inherent flexibility in conducting the assessment to adapt to each individual ACCHS's requirements and ability to revise over time was useful and consistent with ACCHS self-determination and the community participatory research model.

Coordinators and ACCHSs generally perceived the core requirement of the funding body that demanded 75% of pharmacist workload to be for patient-related activities was a barrier to effective and appropriate service delivery. Some ACCHSs identified the need for a greater percentage of allocation towards health service directed activity during the Assessment. This may have been due to strict definitions in the project

protocol of what was defined as patient related activity. NACCHO observed that in practice, many activities had a significant overlap in relating to a patient or to the service. The pharmacists also conducted some activities for patients who declined to give consent to participate in the project, in accordance with the pragmatic project design.

The criteria for the research and requirement to recruit specific volumes of patients was understandably not always consistent with ACCHSs' needs and preferences, but Coordinators were able to liaise with ACCHSs and Project partners to address such challenges as they arose. This was particularly important as target patient numbers were revised twice during the Project's implementation phase.

Most participating pharmacists were new to working in the ACCHS sector. Most ACCHSs had little or no experience with an integrated pharmacist role prior to the project. This meant that establishing their workflow and role in the ACCHS team took time and careful coordination. Pharmacists also cited challenges in the time it took to obtain informed consent for the research purposes and recording all activity in a data collection logbook. NACCHO Coordinators helped support pharmacists and ACCHSs in addressing these issues, which are unlikely to exist to the same extent in any similar national program or research.

NACCHO also observed the positive response and input from community pharmacy during the initial site visits, which supported the effective implementation and sustainability of the Project across ACCHS.

Final Visit

The final visit allowed Coordinators to conduct final research activities (i.e. HSA), to respond to feedback from both ACCHS representatives and pharmacists and to consider what planning may be needed for after the Project. Coordinators found these visits productive and noted positive feedback from most parties.

Coordinators were satisfied with the consistency in how the repeat HSA was conducted and verified, which provided the evaluation team with confidence of the reliability and validity of the health systems data. Furthermore, the consistency in NACCHO Coordinators for the entire Project allowed uniform and reliable data capture across ACCHSs for all Project activities. The turnover of ACCHSs go-to people was addressed dynamically by NACCHO Coordinators and therefore this did not manifestly affect the Project's communication and implementation. Staff turnover is sometimes referenced as a challenge for the rural and remote health sector.(8, 9) This highlights the importance of maintaining regular contact through dedicated coordinator positions to ensure programs are sustainable in these settings.

c. Project Reference Group

The Project Reference Group generally fulfilled its aim to capture feedback and oversight from ACCHS and Aboriginal and Torres Strait Islander representatives throughout the duration of the Project, especially when the format and approach of ACCHS support was adapted based on PRG feedback. The successful activities of the members of the PRG tended to be captured in personal communication. Consistent communication was maintained with all ACCHSs on an individual basis. The face to face meetings were considered valuable and especially well-attended at the first meeting at the NACCHO annual conference in 2018.

The practical challenges related to participation, structure and the format of communication were addressed by NACCHO in several ways but did persist in some ways throughout the Project. Early in the Project, ACCHS representatives requested ad hoc meetings at key times of the Project rather than regularly scheduled meetings, which NACCHO responded to. Interpreting the reasons for low participation in some meetings was challenging. ACCHS and Affiliate feedback did not find any specific criticism of the meeting format or methods. It could be considered that low participation in meetings indicated a satisfaction with

the Project's progress and feedback through Coordinators, and therefore there was no need to express concerns or challenges through a formal meeting. The pragmatic project design enabled IPAC to be compatible with existing operational activities of the ACCHSs. For a busy ACCHS representative participating in a project reference group, this participation may sometimes be considered a low priority, especially if they are confident that the Project is running acceptably. For future projects, involving Affiliates and potential sites earlier in the design of governance processes may help with establishment and format of a PRG or similar.

d. Affiliate Involvement

Though results from the involvement of the Affiliates were varied, their participation was considered to have had a positive impact on the implementation and acceptability of the Project across all jurisdictions. This was attributable to the flexibility of the Affiliates' workplans, their detailed knowledge of local issues and ACCHSs and ongoing dynamic communication with NACCHO; all of which allowed adaptable delivery of services throughout the Project depending on jurisdictional considerations and local needs of individual ACCHSs. Affiliates work with ACCHSs on more grass roots projects than NACCHO, such as Continuous Quality Improvement projects and local advocacy. This was ultimately useful to improve ACCHS engagement and sustainability of the Project. The professional relationships formed between Affiliate representatives and ACCHS staff in previous roles were also supportive for Project implementation. Affiliates had different levels of engagement with the project, this could be interpreted as less input being required in that state.

NACCHO and PSA project officers were all pharmacists and had significant experience and relationships developed from previous work with ACCHSs. This may have meant that less Affiliate involvement was required for the IPAC project than initially anticipated. One Affiliate report states:

> *"[Affiliate staff] had less ongoing regular contact with …ACCHS services once in [the] project than expected, most likely due to good relationship between NACCHO project officer and sites, and the feeling that duplication of communication by [Affiliate staff] would be an unnecessary burden on ACCHSs"*

If an integrated pharmacist program is to be implemented nationally, local level support from Affiliates could be considered. Affiliates may have a role in promoting such a program to individual ACCHSs and specifically the type of work pharmacists may deliver for ACCHSs. Affiliates could assist in receiving and collating feedback from ACCHSs to provide to a national program manager, such as NACCHO. Affiliates can support pharmacists to work in culturally appropriate ways, responsive to local and jurisdictional issues, and to have a good understanding of the way ACCHSs work in their respective states and territories. They could help navigate local healthcare systems and legislation to determine where the skills of pharmacists fit best amongst the diverse range of programs and services provided in ACCHS.

e. Resources

The production of Project resources, including tools such as the Needs Assessment and workplan template, was effective in developing a structured approach for the pharmacist services and for providing information and discussion on the role of the pharmacist at the beginning of the project. Therefore, these resources' benefits could be considered as two-fold in delivering both research outputs and ACCHSs strategic outputs. The adaptability of resources for ongoing use by ACCHSs and pharmacists was useful and aligned with community-based participatory research principles.

Robust discussion and collaborative development of resources involving perspectives from NACCHO, PSA and JCU was useful in ensuring the resources were well-considered, validated and suitable for use in the Project. Furthermore, the subject matter expertise from each of the Project partners was invaluable in the development of these resources.

Administration and delivery of resources by NACCHO Coordinators (e.g. the HSA) utilised the expertise and knowledge of practitioners with experience in the ACCHS sector. This was highly advantageous in ensuring that the resources had maximum value and were administered consistently and appropriately.

The consistently positive feedback from ACCHSs regarding the promotional materials was supported by findings in the Project Qualitative Evaluation Report (7). In particular, ACCHSs reported that the inclusion of the photo of the pharmacist on the poster displayed in the waiting area was useful for acceptance by patients of the pharmacist as part of the primary health care team. These results may be generalisable to other settings, such as where other novel health practitioners are beginning work at an ACCHS.

f. Communication, feedback and support for participating ACCHSs

The ongoing communication, feedback and support for ACCHSs throughout the Project was an integral component of NACCHO's role and was important in allowing NACCHO to achieve its primary aim. The flexibility and range of methods used were important to allow ACCHSs to communicate and receive support in a format and frequency that suited their organisation's needs. This was especially important considering the preference from some ACCHSs to not participate in all PRG meetings. Direct professional relationships with Coordinators, and sometimes Affiliates, was an important component of this support. Ultimately, the almost unanimous ACCHS support for an ongoing integrated pharmacist program validated the support methods and communication approach taken.

The ACCHS staff uncertainty regarding the role of the pharmacist was considered primarily due to the pharmacist role being novel for ACCHSs. Traditionally, the pharmacist's role had been perceived by some as limited to medicines supply, such as dispensing medication, which was specifically excluded from the IPAC pharmacists' roles. There was no lead-in time prior to commencement of the Project for pharmacists to build relationships before beginning to undertake recruitment of patients. This was compounded by the pharmacist employment arrangements, involving employment contracts with PSA and sometimes the community pharmacy under sub-contract with PSA. There was a perception from some ACCHSs that they may not have adequate influence on their pharmacist's activities because the pharmacist was not employed by the ACCHS. A model involving direct pharmacist employment by ACCHSs removes this concern.

Themes from ACCHS feedback provided to NACCHO and direct quotes illustrate the effectiveness of the Project in meeting ACCHSs' needs, including the competency and value of pharmacists and engagement from ACCHS staff. The acceptability of a culturally competent pharmacist and the ability to involve pharmacists with existing relationships to ACCHSs is an important aspect of community control and success of the project. The specific duties defined with the 10 core roles were adequately flexible and did not impede ACCHSs' ability to receive the type of pharmacist services that they had prioritised.

We propose that the challenges identified throughout the Project should be considered in the context of the requirements of the funding body and general research methods that must be applied to capture data and information. These challenges were especially relevant for the complex pharmacist employment arrangements and pharmacist data entry and extraction processes. Generally, ACCHSs and Affiliates were

accepting that research projects have inherent additional requirements beyond a healthcare program or subsidy measure. ACCHSs and pharmacists were generally accommodating of these challenges for this reason. However, we recommend that a future integrated pharmacist program should seek to streamline reporting arrangements for ACCHSs and pharmacist; remove all inclusion criteria and components that are related to research; and retain a community-controlled approach, including allowing ACCHSs to employ pharmacists of their choice directly. Funding for pharmacists should also consider remoteness and apply loading to facilitate equitable uptake and sustainability across Australia. A support program to ensure that implementation is executed optimally will assist with the 'readiness' of ACCHSs for pharmacist services and the execution of an impactful health program. NACCHO well placed to manage and oversee all elements of national integrated ACCHS pharmacist support program in a culturally acceptable manner under principles of community control.

g. Further considerations for an ongoing national program

After extensive sector consultation, including a national NACCHO Integrated Pharmacist Workshop in May 2019, NACCHO has developed 4 primary Goals of ACCHS pharmacists, which we propose are applied to future ACCHS pharmacist programs. These are:

- **Accessibility:** Facilitating medicines supply; supporting access to pharmacies, medicines services and medication
- **Safety:** Safe prescribing and identification of drug related problems; safe use and storage of medications for patients; safe transitions of care between hospital and community
- **Quality:** Quality prescribing and use of medications; enhancing chronic disease care
- **Efficiency:** Improving systems and processes within services; supporting accreditation, legal and guideline adherence

7. Conclusion

The establishment and implementation of the IPAC Project was successful in integrating pharmacists into ACCHSs. The IPAC pharmacists' activities and ACCHS engagement and participation were sustained effectively throughout the Project across a range of ACCHSs in heterogeneous settings, locations and levels of remoteness. Project reports have demonstrated positive results in quality of care outcomes for Aboriginal and Torres Strait Islander adults with chronic disease.

Some of this success is attributable to the effective ACCHS support and communication provided by NACCHO. Acceptability and effectiveness of NACCHO ACCHS support is clearly evidenced in several ways, including through the Project's Qualitative Evaluation report, the successful recruitment and retention of 22 sites, extremely low participant attrition and low site attrition, positive feedback from ACCHSs and Affiliates across a range of methods and uptake and effectiveness of Project resources and materials.

We recommend a national program that supports pharmacists integrated into ACCHSs. Furthermore, any such national program must incorporate ACCHS support modelled on support provided by NACCHO in the IPAC Project. Without appropriate ACCHS support for the relatively novel intervention, there is a significant risk of low uptake, poor sustainability and ineffective program delivery. This program should be implemented immediately to help reduce the gross health and medicines-related inequities faced by Aboriginal and Torres Strait Islander people compared to other Australians.

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9. Appendices

Appendix 1 – NACCHO IPAC Project Coordinator position description

NATIONAL ABORIGINAL COMMUNITY CONTROLLED HEALTH ORGANISATION (NACCHO)

Position Statement

National Project Coordinator – Integrating Pharmacists into Aboriginal Community Controlled Health Services Project

Background and position summary

The Pharmacy Project Program is delivered through the 6th Community Pharmacy Agreement to project new and expanded community pharmacy programs which seek to improve clinical outcomes for consumers and extend the role of pharmacists in the delivery of health services through community pharmacy. The 'Integrating Pharmacists into Aboriginal Community Controlled Health Services Project' (the 'Project') is funded through Tranche 2 of this program and is a joint Project between the Pharmaceutical Society of Australia, NACCHO and James Cook University. This Project will determine if including a practice pharmacist in the primary health care team within Aboriginal community controlled health organisations (ACCHOs) leads to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples. The National Project Coordinator will work with partners, Commonwealth Department of Health, relevant State and Territory Affiliates and around 22 of NACCHO's Member ACCHOs across Queensland, Northern Territory and Victoria. The position involves Project management, communication and oversight to ensure that NACCHO's responsibilities in administering the project are met.

Position title:

National Project Coordinator – Integrating Pharmacists into Aboriginal Community Controlled Health Services Project ("National Project Coordinator")

Salary

TBC – indication: ~*$100,000 pa including salary packaging, plus 15% superannuation*

Position type:

Fulltime (1.0 FTE), 2-year contract, could consider multiple part-time appointments

Apply by:

December 2017

Support:

NACCHO National Medicines Policy Manager (Mike Stephens) and NACCHO national secretariat support, Canberra, ACT

The person filling the position of National Project Coordinator agrees that behaviour needs to reflect the values of NACCHO

Position objective:

The National Project Coordinator will NACCHO's duties relating to the national 'Integrating Pharmacists into Aboriginal Community Controlled Health Services Project' and its arrangements for Aboriginal Community Controlled Health Organisations (ACCHOs) across Australia from Feb 2018 to Jan 2020.

Primary responsibilities

The primary responsibilities of the National Project Coordinator are to:

- Oversee NACCHO's contractual requirements of the Project
- Work with Project partners; the Pharmaceutical Society of Australia, James Cook University and NACCHO secretariat to ensure effective project establishment, implementation, development and evaluation.
- Work with relevant State and Territory Affiliates – AMSANT, QAIHC and VACCHO – and NACCHO's participating Member ACCHOs to ensure that the Project is acceptable and meets Members' needs and expectations
- Work with Affiliates to oversee and support ACCHO's Project deliverables and reporting
- Assist the Project team to support the community-based participatory research design.
- Support the Project evaluation by working with ACCHOs, Affiliates and Project partners to acquire appropriate levels of consent, agreements and other requirements
- Support the development and maintenance of communication and governance protocols

- Provide support to ACCHOs in assessing and developing their pharmacy service needs, in collaboration with relevant Project partner representatives
- Liaise with ACCHOs and Affiliates regarding the development of materials and/or resources for pharmacists, consumers and participating Aboriginal Community Controlled Health Services (ACCHO) as required
- Deliver reports regarding the Project to NACCHO executive, secretariat and Board, as required
- Support and liaise regarding data collection and monitoring during Project delivery
- Any other duties to facilitate the implementation and delivery of the Project.

Reporting requirements

The National Project Coordinator is to report to the following:
NACCHO National Medicines Policy Manager (Mike Stephens)
NACCHO Deputy CEO (Dawn Casey)

Selection Criteria - Qualifications

The following qualifications are required or desirable for this National Project Coordinator:

- Tertiary qualifications, preferably in health research and/or pharmacy (although not essential)
  -Bachelor of Pharmacy University of Sydney

Selection Criteria - Experience

Experience in the following areas would be advantageous for the National Project Coordinator:

- A demonstrated understanding of and support for the philosophy of Aboriginal community control in health and sensitivity to cultural issues and protocols in contemporary Aboriginal society
- Knowledge and experience in conducting research relating to Aboriginal health and community controlled health services, including Community-Based Participatory Research (CBPR)
- High level written and verbal communication skills
- High level liaison and negotiation skills and experience in communicating sensitively and effectively with Aboriginal people
- High level program and task management skills
- Proven ability, initiative and experience in leading team Projects, particularly in the health setting
- Demonstrated experience in working with ACCHOs or excellent knowledge of ACCHOs
- Demonstrated experience in working with state and territory Affiliates or excellent knowledge of Affiliates
- Excellent knowledge of the Australian health care system
- Knowledge of program evaluation in the health setting
- Sound IT, electronic health record systems, database and health systems understanding
- The ability to work closely with research partners, stakeholder groups and other health organisations

People of Aboriginal and Torres Strait Islander descent are encouraged to apply
We are looking for an outstanding candidate and will consider out-posting this position. Candidates from all over Australia are encouraged to apply.

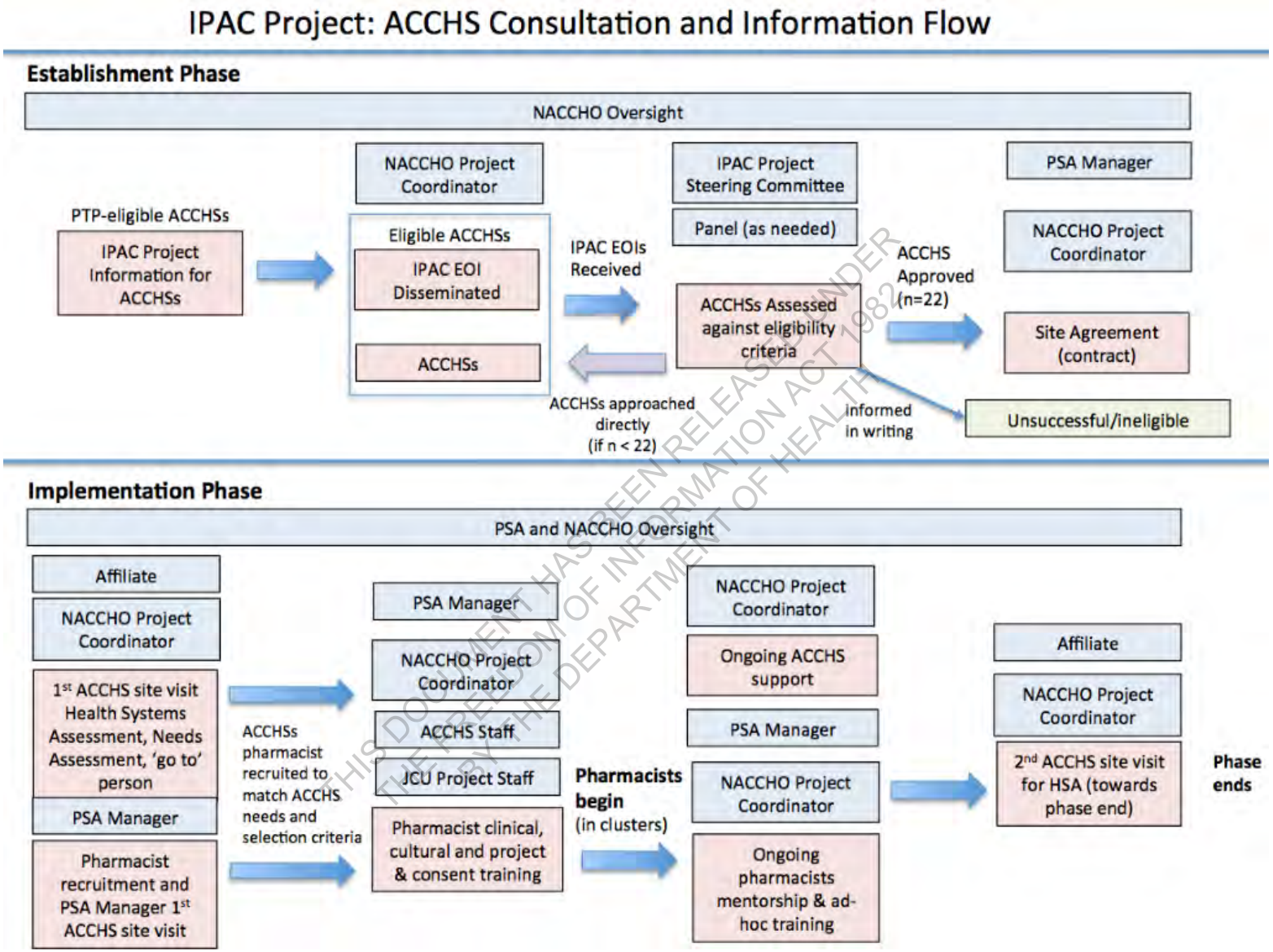
For further information please contact:

Mike Stephens, NACCHO National Medicines Policy Manager, Mike.Stephens@naccho.org.au
0408278204
OR
Dawn Casey, NACCHO Chief Operations Officer, Dawn.Casey@naccho.org.au,
02 6246 9345

About NACCHO

NACCHO is a national organisation representing the health aspirations of Aboriginal peoples through 142 ACCHOs. The Secretariat was established in February 1997 and has responsibility for the advocacy, coordination and development of health policies and programs under the direction of the NACCHO Board of Directors. To find out more information about NACCHO visit; http://www.naccho.org.au

Appendix 2[g]:



[g] NB: This model is presented as an extract from the project protocol. There was some variation to this model in that PSA conducted site visits after recruitment, training and commencement of pharmacists, rather than at the same time as the NACCHO project coordinator. The role and activities of the NACCHO project coordinators remained as per this flow chart.

Appendix 3 - Site inclusion criteria:

To be involved in IPAC services needed to meet the following conditions:

- The health service must be an "ACCHS". This means an Aboriginal Community Controlled Health Organisation funded by the Australian Government Department of Health for the provision of primary health care services to Aboriginal and Torres Strait Islander peoples.
- The ACCHS is located in Victoria, Queensland, and the Northern Territory.
- The ACCHS employs at least one (1) full-time- equivalent (FTE) general practitioner per clinic who is able to prescribe medicines to clients of that organisation.
- The ACCHS does not currently employ a non-dispensing practice pharmacist at the participating clinic.
- The ACCHS uses a clinical information system such as Communicare, Best Practice, and Medical Director.
- The ACCHS has participated in continuing quality improvement and reporting on the national Key Performance Indicators for at least 24 months through the use of electronic data extraction tools.
- The ACCHS is participating in the *Quality Assurance for Aboriginal and Torres Strait Islander Medical Services* (QAAMS) program, if it is conducting 'point of care' testing.
- The ACCHS agrees to download the GRHANITE data extraction tool into one computer within the practice, adhere to program business rules/protocol and guidelines, data provision requirements, and patient/service consent requirements for the evaluation of the program.
- The ACCHS can provide the practice pharmacist access to a private consulting room on the clinic premises that has access to the clinical information system used by the practice.
- The ACCHS can allocate a staff member who will act as a 'go to' person to assist the practice to obtain informed patient consent.
- The ACCHS is a member of NACCHO, and the relevant NACCHO State/Territory Affiliate.
- The ACCHS is an accredited practice in accordance with the RACGP Practice Standards.
- In non-remote locations, the ACCHS must be participating or eligible to participate in the PBS co-payment measure (practice incentive program).
- In remote locations, the ACCHS must be eligible to participate in the remote Section 100 arrangements for the supply of pharmaceutical benefits

INTEGRATING PHARMACISTS WITHIN ACCHS TO IMPROVE CHRONIC DISEASE MANAGEMENT

ACCHS Pharmacist Needs Assessment

This document has been developed as a tool to guide collaborative practice between a pharmacist and the multidisciplinary team colocated in the ACCHS. The purpose of the tool is to clearly articulate the role of the pharmacist to the primary health care team and provide a means for identifying and rating the importance of a particular service to the ACCHS. It also aims to provide the foundation for the service agreement between the health service and the pharmacist as well as a tool for ongoing evaluation.

This form should be read with the "**Role of the IPAC pharmacist**" document which explains the potential role of a non-dispensing pharmacist in an Aboriginal Health Service. This document should be provided with the pharmacist's completed self-assessments if possible, prior to the meeting to ensure ACCHS staff have time to reflect on their priorities.

The suggested process for conducting a Needs Assessment in the ACCHS is:

1. **Pharmacist** self-assesses against the items described as Confident (C) or not yet confident (NYC). If the pharmacist recruitment is not finalised by the date of completion of this process, leave the column blank.
2. **Meeting with key team members:** Identify the members of the interprofessional team who should be involved with developing the service agreement and arrange a suitable time to meet. This should include the pharmacist, if available, and the lead General Practitioner (GP). Consider inclusion of the Health Service Manager, other GPs currently employed in the practice, and other relevant Health Professionals. The NACCHO Project Coordinator can facilitate this meeting at their first site visit.
3. **Review needs of the service:** Each of the services available should be assessed with consideration given to the capacity of the pharmacist to deliver these services effectively to patients within the pharmacist's employment hours. Use the results of this assessment to work from services with the highest priority to the lowest to define the pharmacist's scope of practice. Additional services not already considered in this document may be added provided if it is within the scope of the 10 core roles of the IPAC Project. Activities should be allocated as around 75% patient directed services and 25% staff-related or liaison activities.
4. **Review Existing Agreements with Pharmacy: See attachment below.** NACCHO coordinator to contact Community Pharmacy where an S100 or QUMAX agreement is in place to confirm that the proposed services do not duplicate existing arrangements.
5. **Develop the Pharmacist work plan:** After discussion and completion, this document can be used to develop the **pharmacist's work plan**. This is transferred to the provided template and measurable outcomes developed. This process will be facilitated by the NACCHO Project Coordinator and a copy provided to both pharmacist and health service management. The original Needs Assessment should be retained for records. This document will then provide the basis for the service evaluation.

	Pharmacist self assessment Confident (C) /not yet confident (NYC)	**Practice Priority** Rate priority to AHS (1-3) 1 = essential 3= nice but not essential	**Agreed Yes/ No Comments ?**	**Community pharmacy comment:** Tick if provided
Patient directed services (75% of workload)				
HMR				Number per month?
Non-HMR				
Review patient files to identify people who may benefit from a HMR/non-HMR				
Identify patients recently discharged from hospital, collect discharge summary, review changes to medicines, advise GP and patient if follow up is required.				
Brief interview with patients before doctor's appointment, with/without AHW to get accurate medication history and provide preliminary counselling (and consent for IPAC)				N/A
Medication adherence assessment & support NMARS				
Follow up consultations with patients after HMR/non-HMR and GP management plan				N/A
Opportunistic counselling on prescribed medicines (new or complex meds or those requiring specific administration techniques)				N/A
Provide medication profile to patients on request or as part of follow up interview				
Provide culturally appropriate written medication information if required				
Participate in case conferences and team care arrangement				

	Pharmacist self assessment Confident (C) /not yet confident (NYC)	**Practice Priority** Rate priority to AHS (1-3) 1 = essential 3= nice but not essential	**Agreed Yes/ No Comments ?**	**Community pharmacy comment:** Tick if provided
Liaison with community pharmacy on patient specific matters according to privacy policy of the ACCHS				
Medication reconciliation – receive/provide documentation to relevant health care professionals eg hospital on admission RCF, community pharmacy,				
Participate in (or manage) chronic disease clinics				
Participation in preventive health programs with other staff				
Other:				
Staff directed services (25% of Workload)				
Develop structured education plan based on assessment of practice staff needs.				
Provision of education sessions in professional specific or interprofessional formats as identified in education plan.				
Ad hoc response to drug information queries by staff				
Provide drug utilisation reviews in response to practice specific issues.				
Orientation of new staff to medication management services				
Response to queries about access to medicines eg high cost drugs, SAS medicines.				

	Pharmacist self assessment Confident (C) /not yet confident (NYC)	**Practice Priority** Rate priority to AHS (1-3) 1 = essential 3= nice but not essential	**Agreed Yes/ No Comments ?**	**Community pharmacy comment:** Tick if provided
Support for training for Aboriginal staff as pharmacy assistants in ACCHS (formal or informal)				
Assist trainee health workers with medication education				
Liaison with other agencies re supply management issues eg RCF, community pharmacy				N/A
Liaise with community pharmacy re s100 or QUMAX work plan to ensure activities meet ACCHO's needs				
Communicate with community pharmacy re quality of services provided under s100 or QUMAX agreement.				
Other:				

Attachment to point 4: Review Existing Agreements with Pharmacy: To be completed by IPAC coordinator with community pharmacy representative for S100 sites or QUMAX sites with formal agreements. This will not be appropriate for sites engaging with multiple pharmacies. This initial information can be used at a later time to form part of a stakeholder liaison plan, especially if discrepancies between perceived services provided are identified.

Pharmacy name: Contact name:

S100 or QUMAX workplan: requested, provided, attached?

Services provided as per question 91 of the Health System Assessment

Service (tick if occurring)	ACCHO response	Pharmacy Response	Comment
Dose administration aids			
Dispensing of medicines			
Home medicines reviews			
Response to queries about medications			
Educational sessions to staff within the clinic			
Educational sessions to community groups/your patients			
Home delivery of medicines to patients			
Delivery of medicines to the clinic			
Quality control of medicines stock onsite			
Assistance with script collection			
Other. *Please specify. For Example:* **1. Non patient contact med reviews** **2. Medication and/or script audits** *3.* **Medschecks/diabetes medschecks**			

Further Comments:

Names of people participating in Needs Assessment:

……

……

Signed…… Date……
Manager, ACCHS

Signed…… Date……
NACCHO IPAC Project Officer

Signed…… Date……
IPAC pharmacist

Signed…… Date……
Representative of community Pharmacy (if subcontract)

INTEGRATING PHARMACISTS INTO ACCHS TO IMPROVE CHRONIC DISEASE MANAGEMENT (IPAC)

PHARMACIST WORK PLAN

Date completed: 1/11/18

The following work plan has been developed in consultation between the Project pharmacist- <> and the health service, with facilitation by NACCHO representative Alice Nugent. This plan was developed after an assessment of the needs of the health service, existing pharmacy support through S100 or QUMAX and with consideration of the skills of the pharmacist. The 10 core roles of the IPAC Project form the basis of this work plan. The specific needs of the Project evaluation has been incorporated into the work plan which may seem to be extra to the normal role of a pharmacist. It is recommended that an initial review be done 3 months into the Project and the plan revised as necessary. A report against the work plan will form part of the final evaluation. Key Actions need to be SMART.

S- Be Specific about what you want to achieve.

M- Ensure your result is Measurable. Have a clearly defined outcome and ensure this is measureable (KPIs).

A- Make sure it is Achievable.

R- Check that its Realistic, it must be possible taking account of time, ability and finances.

T- Make sure it is Time restricted, an achievable time frame, deadlines and milestones to check progress.

This plan will be developed with input from the pharmacist (or contracted community pharmacy) and the health service. Copies will be provided to the health service, pharmacist (or contracted community pharmacy), PSA and the NACCHO Project team members.

The purpose of the work plan are to:

a. Clarify the specific role of the pharmacist within the health service according to identified need.
b. Clarify the work requirements of the Project evaluation
c. Allow review of the performance of the pharmacist in meeting the needs of the health service and the goals of the Project.
d. Identify learning needs of the Project pharmacist

Key Action Steps	Timeline	Expected Outcome	Data Source and Evaluation Methodology	Resource needs	Comments
Define each action step on its own row. Define as many action steps as necessary by adding rows to the table.	*An expected completion date (month and year) must be defined for each action step.*	*An expected outcome must be defined for each action step.*	*An evaluative measure must be defined for each action step.*	Resources needed to enable actions and outcomes eg learning needs, equipment, software,	*Comments are optional.*
Core Role 1: Medication Management Reviews					
Provision of or facilitation of HMR	Throughout Project	Completed HMR including Item 900 claim	No of Item 900 claims - MBS	Contact with local HMR accredited pharmacists. Clinical mentoring as required	HMR high priority for funding. May need to be outside Project time to meet patient numbers.
Provision of non-HMR	Throughout Project	Completed non-HMR including GP follow up	No of non-HMR recorded - log book No of related MBS items by AHW	Clinical mentoring as required	
Core Role 2: Team-based collaboration					
Refinement of a process of obtaining patient consent	<Agreed process within 1 month start of pharmacist>	>80% of patients receiving services have provided consent for collection of data	No of enrolled patients - log book.	Consent forms & process	Development of a process for obtaining consent to be commenced by NACCHO Project Coordinator. However, review may be necessary if this is found to less than optimal
Enrolment of patients in	Average 4 new patients/day in	Participation consent	No of enrolled patients as %		

Key Action Steps	Timeline	Expected Outcome	Data Source and Evaluation Methodology	Resource needs	Comments
Project and obtaining informed consent	first half of Project Average 4 encounters/day by end of Project	obtained from [640/FTE=] patients for Project	of target - logbook		
Participation on team clinical meetings	Throughout Project	Pharmacists participates in all relevant clinical team meetings	No of case conferences attended - MBS No of non-claimable clinical team meetings attended – logbook	MBS claiming rules for these items numbers	
Core Role 3: Medication adherence assessment & support					
Conduct N-MARS on all patients at least twice during the Project	Phase 1: 9 months Phase 2: 15 month	All patients enrolled for Project evaluation have had at least 2 nMARS	No of nMARS recorded in Log Book. nMARS flagged in CIS		It is expect some patients will be lost to follow up, aim for No of patients with 3 nMARS to exceed No with 1.
Core Role 4: Medication appropriateness audit, and Assessment of Underutilisation					
Provide MAI and AOU assessment on [30 patients per FTE] pharmacist, twice during the Project and selected at random	Phase 1: 3 months Phase 2: 12-15 month	All randomized <*add target quantity for site*> patients have had 2 MAI and AOU assessments	No of randomised patients for whom 1 or 2 MAI and AOU have been recorded in Log Book MAI flagged in CIS	Access and familiarity with references in MAI and AOU	

Key Action Steps	Timeline	Expected Outcome	Data Source and Evaluation Methodology	Resource needs	Comments
Core Role 5: Preventative health care					
Participate in concurrent preventive health programs offered by the AHS with other staff	Throughout Project	Significant and relevant contribution to the ACCHS's preventive health programs	No of activities participated in and recorded in log book (in Education & training)	Education materials, education in public health principles	
Core Role 6: Drug Utilisation Review					
Provide at least 1 drug utilisation review in response to practice specific issues.	15 months	At least one DUR performed, documented and fed back to staff	No of DUR Details of DUR from log book	Education on the design & implementation of DUR	
Core Role 7: Education and training					
Develop a structured education plan based on assessment of practice staff needs and revised as necessary	Plan:3 months Review: 7 months	Education plan developed	Review of education plan – pdf in logbook	Access to existing programs NPS, GP synergy, AHW training etc, Knowledge and assessment of other programs service and staff are already doing	
Provide group education sessions	Throughout Project	Education plan achieved	No of activities for staff education; PDF of education materials and evaluations - log book	Training in group education	

Key Action Steps	Timeline	Expected Outcome	Data Source and Evaluation Methodology	Resource needs	Comments
Mentor training for Aboriginal 'Medicines Workers' involved in onsite supply	Throughout Project	Medicines workers more confident and competent in medicines supply activities	Certificate of achievement Qualitative feedback from clinic staff	Contact with available trainers; copies of educational material	Only relevant where onsite supply of meds
Core Role 8: Medicines information service					
Ad hoc response to drug information queries by staff	Throughout Project	Staff obtain a timely response to all drug information queries	No and type of staff drug info queries - log book	Access to online literature database AMH, TG, complementary medicines reference, contact with other drug info services such as Mothersafe phoneline	
Core Role 9: Medicines stakeholder liaison					
Liaise with stakeholders and document plan for ongoing interaction. Priority should be based on need.	In first 3 months for regular stakeholders, then as required	Stakeholder plan has been developed that meets the needs of both parties	Liaison Plan and Outcomes documents - logbook		
Liaise with community pharmacy re dispensing and supply services	As required	Service from community pharmacy meets the needs of the health service	No of service related contacts with pharmacy and outcome of contact - log book	Knowledge of s100/QUMAX business rules. Awareness of ACHHS work plan	
Core Role 10: Transitional care					

Communicate with other agencies re clinical or supply management issues eg RCF, hospital, community pharmacy	Throughout Project	Continuity of Care to and from other agencies is facilitated	No of patient-related interagency contacts - log book		

Signed…… Date……
Date…….

Manager, ACCHS

Signed……
NACCHO IPAC Project Officer

Signed…… Date…….

IPAC pharmacist applicable)

Signed…… Date…….

Contracted community pharmacist (if

Appendix 5: Master site consent form

MASTER SITE CONSENT FORM

Name of Project: *Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Project*

Name of Aboriginal Community Controlled Health Organisation: insert name of ACCHS

Project Leaders: Ms Dawn Casey, Mr Mike Stephens (NACCHO), Associate Professor Sophia Couzos (JCU), Ms Shelley Crowther (PSA)

Evaluation Organisation: Evaluation Team led by the College of Medicine and Dentistry, JCU.

Project Sponsor: James Cook University (JCU)

I, ……can confirm that the

(insert name of Aboriginal Community Controlled Health Service) gives its consent to the above project, subject to the following conditions:

We have the right to withdraw our consent and cease any further involvement in this Project at any time without any penalty and without giving any reasons.

The purpose of the Project, as outlined in the attached Site Participation Brief has been explained, and we have had the opportunity to ask questions about the project. We have received satisfactory answers to our questions and have been given adequate time to consider the appropriateness of the project.

The Project Partners will need to obtain additional consent if there are any changes to the overall design of this Project.

The Practice Pharmacist, who will work within our service, will receive off-site and on-site training by a visiting facilitator from the PSA in consultation with NACCHO. This will be conducted in consultation with your nominated staff, and your Affiliate.

The Practice Pharmacist will be able use our clinical information system and access the information contained within it to allow them to undertake their clinical duties, and to support the data collection required for this Project including completing their Pharmacist Log Book.

Our ACCHS will receive at least two on-site support visits to assist our service to integrate the Practice Pharmacist into our health service team, and to collect data about our health service.

We agree to allow data to be extracted from our clinical information system using the GRHANITE™ Data Extraction Tool, for the purpose of evaluating this Project. This will occur only for individual participants who have consented for this to occur and be de-identified.

Our ACCHS will assist the Practice Pharmacist to set up appropriate systems within our ACCHS to obtain the written consent of individual participants in this Project. This includes nominating a dedicated 'go to' ACCHS staff member to assist in obtaining consent.

Data collected from our ACCHS, in its raw and unanalysed form, is owned by our ACCHS. It will be stored and managed by the Data Custodian at the College of Medicine and Dentistry (JCU) and adhere to all ethical requirements.

Any results from this Project that are published by the Project Partners will acknowledge the ACCHSs ownership of this data.

Any information that identifies this ACCHS or the Aboriginal and Torres Strait Islander community that it serves will not be used nor published without the written permission of the Board or CEO of this ACCHS.

This Project will not proceed until all required negotiation has occurred to the satisfaction of this ACCHS. This will include a legal Agreement with the PSA, described in the attached Site Participation Brief.

The ethical provisions relating to the health of Aboriginal and Torres Strait Islander peoples, as set out in NHMRC publications, will be complied with and this Project will not proceed until the St Vincent's Hospital Melbourne Human Research Ethics Committee has endorsed the Project.

We understand that if we have any complaints or questions concerning this Project we can contact any of the key contacts mentioned in the Site Participation Brief. This includes the St Vincent's Hospital Melbourne Human Research Ethics Committee with contact details as follows: Executive Office of Research, St Vincent's Hospital Melbourne, Tel: 03 9231 2394, or email: research.ethics@svhm.org.au

We understand we will receive a signed copy of this document and the Site Participation Brief to keep.

Signed on behalf of (insert name of ACCHS)

Signature ……

Position in the organisation (Board Chair or CEO) ……

Date ……

Witnessed by …… *Date* ……..

As the Contractor (PSA) and in this Project and on behalf of the Project Partners, I acknowledge the conditions set out above:

Name: ……

Signature…… *Date* ……

The Project Partners, and Project Operational Team for the *Integrating Pharmacists within ACCHSs to improve Chronic Disease Management Project (IPAC)* include: The National Aboriginal Community Controlled Health Organisation (NACCHO); Pharmaceutical Society of Australia, and the College of Medicine and Dentistry, James Cook University. *Evaluation Team* members include the Project Partners, and the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); Queensland Aboriginal and Islander Health Council (QAIHC); and the Aboriginal Medical Services Alliance in the NT (AMSANT). The Project Reference Group includes representatives of NACCHO, Affiliates and ACCHSs.

Witnessed by …… *Date* ……..

Appendix 6: Presentation prepared for ACCHS information at first site visit

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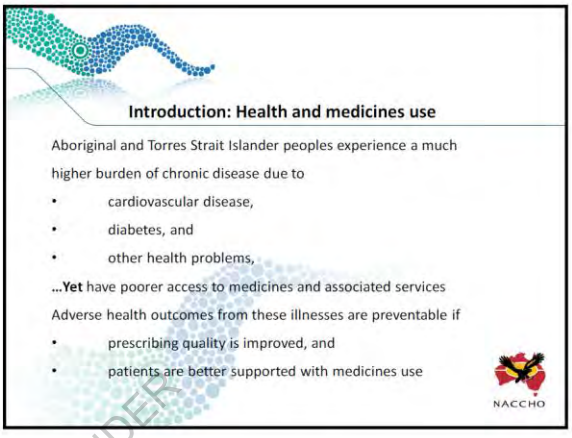

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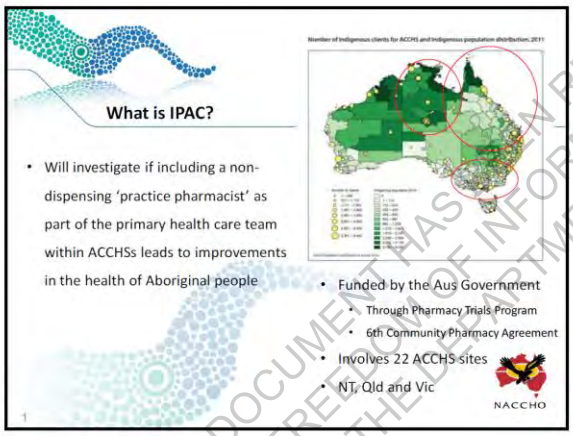

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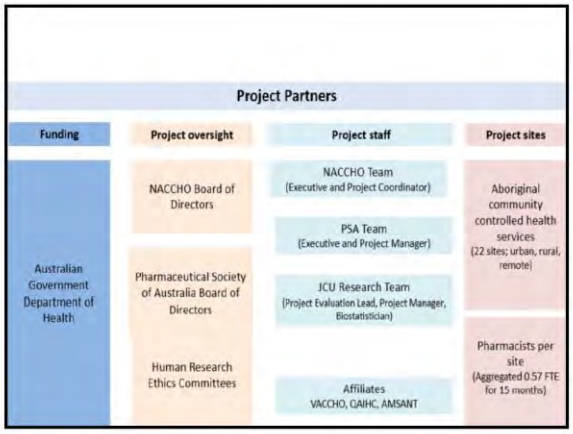

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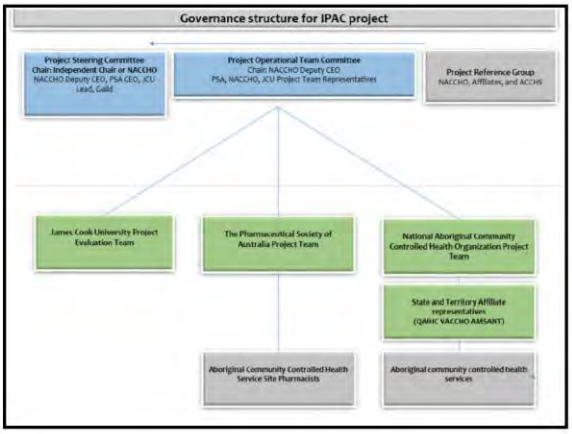

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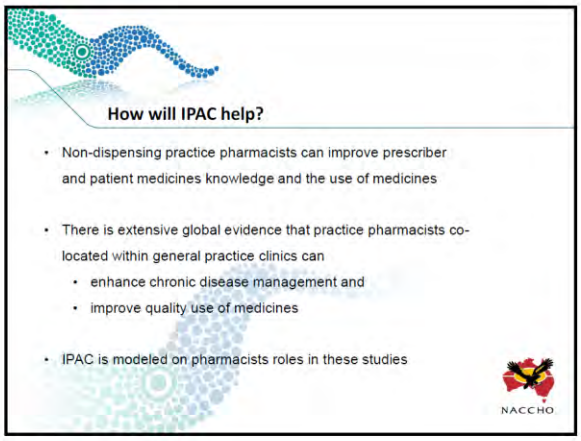

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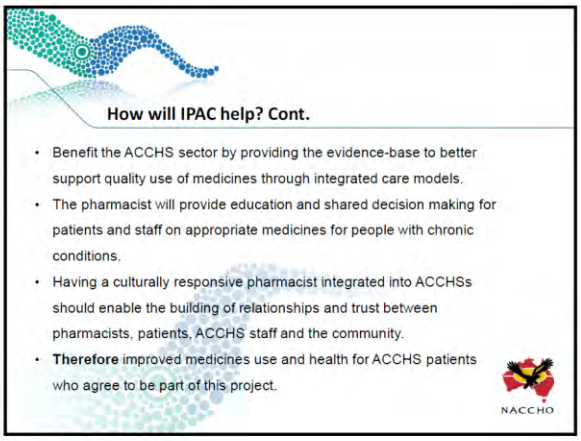

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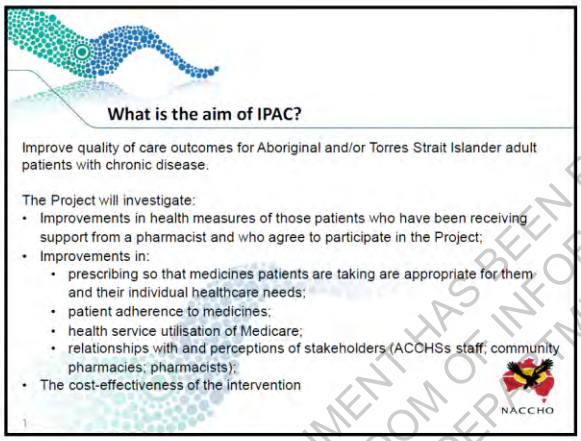

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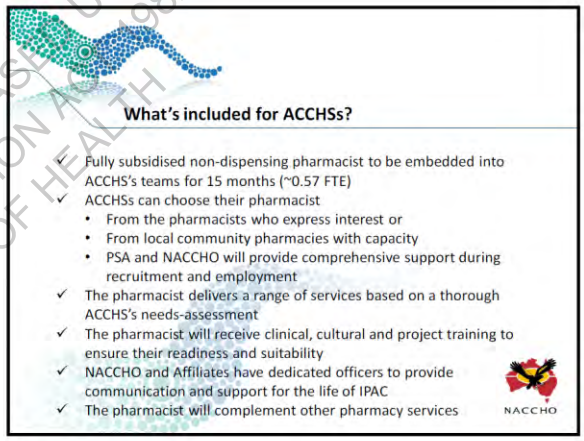

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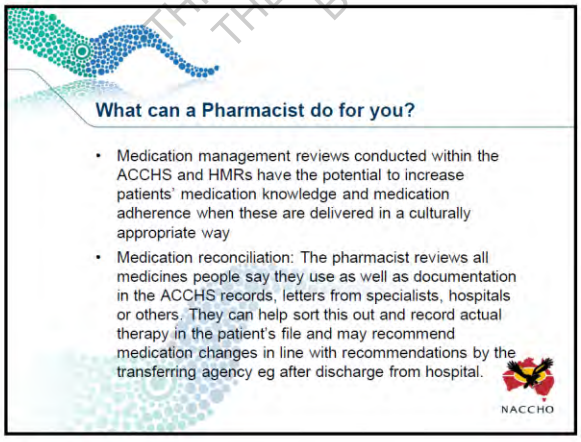

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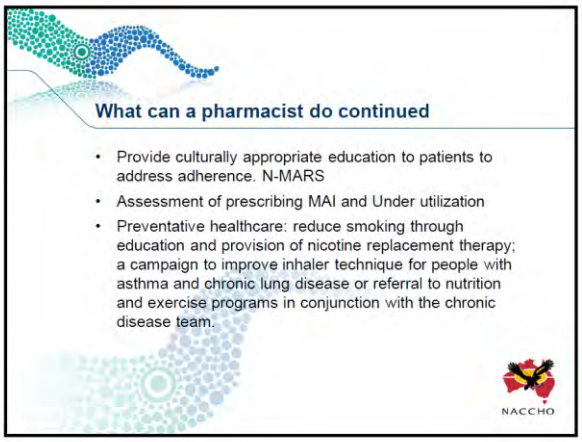

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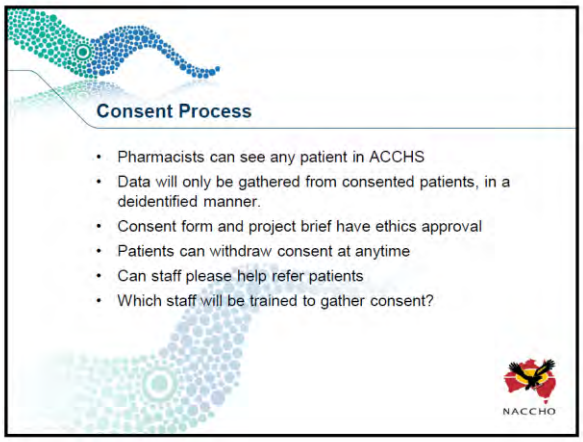

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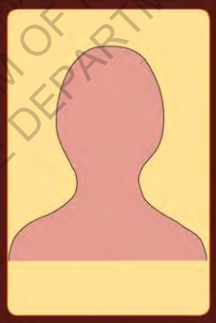
Appendix 7: Example of the 2 designs of IPAC pharmacist poster

Ask to make an appointment with our PHARMACIST:



Name

Our clinic is supporting the pharmacist in a project.
You will need to sign that you want to take part. Privacy and confidentiality are ensured.

Pharmaceutical Society of Australia | James Cook University Australia | National Aboriginal Community Controlled Health Organisation www.naccho.org.au | AMSANT | VACCHO | QAIHC | Australian Government

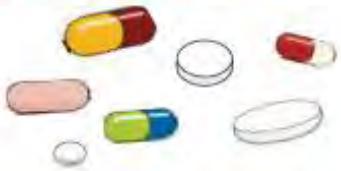
IPAC is funded by the Australian Government Department of Health under the Sixth Community Pharmacy Agreement

Appendix 8: IPAC Brochure

Do you want to know more about your medicines?

What are they for?

Do they go together?

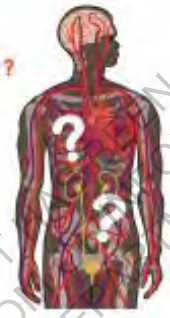


Do you think you take too many medicines?

Do your medicines make you feel sick?

Could you be having side effects?

What will happen if you don't take them?



Are these brands all the same?

When you talk with the pharmacist about your medicines, your clinic will make sure that it is done in a safe way.

The pharmacist is working as part of the IPAC project. You will be asked to sign a consent form to say its ok for the story about your health and your medicines to be used in the project.

Many people's stories will be collected but we will not know their names.

A report will be written about whether having a pharmacist working in the clinic has helped people understand their medicines better.
You don't have to sign a consent to talk with a pharmacist. If you do sign, you can change your mind later.

When you consent to this project, the pharmacist will work with you and the clinic staff so that you are OK with your medicines.

Appendix 9: Master site participation brief

MASTER SITE PARTICIPATION BRIEF

Title	*Integrating Pharmacists within Aboriginal Community Controlled Health Service (ACCHSs) to improve Chronic Disease Management Project (IPAC)*
Short Title	*Putting Pharmacists into ACCHSs*
Project Sponsor	*James Cook University*
Coordinating Investigators	*Associate Professor Sophia Couzos (JCU), Ms Shelley Crowther (PSA), Mr Mike Stephens (NACCHO), Ms Dawn Casey (NACCHO)*
Evaluation Team	*Prof Rhondda Jones (JCU), Dr Emily Callander (JCU), Dr Erik Biros (JCU), Dr Deborah Smith (JCU), Prof Bev Glass (JCU), Dr Robyn Preston (JCU), Ms Priscilla Page (JCU), Mr Donald Whaleboat (JCU), Assoc Prof Michelle Bellingen (JCU), Ms Nicole Bates (JCU), Dr Nadia Lusis (VACCHO), Dr Elizabeth Moore (AMSANT), Mr Roderick Wright (QAIHC), Dr Katie Panaretto, Dr Douglas Boyle (UniMelb).*
Location	*Wathaurong Aboriginal Co-operative Health Service*

What is the IPAC Project?

IPAC stands for *'Integrating Pharmacists within Aboriginal Community Controlled Health Service (ACCHSs) to improve Chronic Disease Management'* Project. This project will explore if including a registered non-dispensing practice pharmacist as part of the primary health care team within Aboriginal community controlled health services (ACCHSs) leads to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples. The project will explore improvements in prescribing by doctors, if patients are more likely to take their medicines, and if indicators of their health are improving over time, by measuring these factors before and after the pharmacist is appointed. Practice pharmacists will work with the doctors and other health staff in each ACCHS for a period of 15 months per service, in Vic, Qld and the NT.

Practice pharmacists will provide relevant healthcare activities within their scope of practice to patients. They will also provide education and training to existing staff within the services (as appropriate), improve relations with community pharmacies to overcome barriers that patients may face in accessing

medicines, and assist in managing medications at transitions of care (such as discharge from hospital). This project will also explore the cost-effectiveness of pharmacist integration within ACCHSs.

How did this Project come about?

The Project was developed at the request of the National Aboriginal Community Controlled Health Organisation (NACCHO, representing ACCHSs across Australia) and the Pharmaceutical Society of Australia (PSA, representing pharmacists). The Project is a tripartite partnership between NACCHO, PSA and James Cook University (JCU). Participants include Affiliates of NACCHO in Vic, Qld, and the NT, up to 22 ACCHSs in these jurisdictions, practice pharmacists, and patients who will receive healthcare support from a pharmacist.

Community-based participatory research principles and methods are used to make sure there is appropriate Aboriginal governance over this Project.

Why is this Project important?

Aboriginal and Torres Strait Islander peoples experience a much higher burden of chronic disease due to cardiovascular, diabetes, and other health problems, and yet have poorer access to needed medicines.[iii] Adverse health outcomes from these illnesses are preventable if prescribing quality is improved, and patients are better supported with medicines use, which is a key health equity issue.

This project is necessary, as non-dispensing pharmacists are not currently funded consistently or reliably to work within primary health care settings in the public health sector in Australia. Reasons for this are mainly related to funding access as Australian pharmacists are located almost exclusively within community pharmacies and hospitals. Despite this, several ACCHSs across Australia have sourced adhoc funding to employ pharmacists in non-dispensing roles. This project is modelled on these pharmacists' roles and on international research evidence. There is extensive global evidence that practice pharmacists co-located within general practice clinics can enhance chronic disease management and quality use of medicines.[iii]

The NACCHO and the PSA have promoted the need for this project for many years. The project will help the Australian Government make decisions about future funding and the role practice pharmacists may play as members of primary health care teams within ACCHSs and potentially other settings in Australia.

What is the aim of this project?

This project aims to improve quality of care outcomes for Aboriginal and/or Torres Strait Islander adult patients with chronic disease by integrating a practice pharmacist within the primary health care team of ACCHSs. This means the Project will investigate:

- Improvements in health measures of those patients who have been receiving support from a pharmacist and who agree to participate in the Project;
- Improvements in:
    - prescribing so that medicines patients are taking are appropriate for them and their individual healthcare needs;
    - patient adherence to medicines;
    - health service utilisation of Medicare;
    - relationships with and perceptions of stakeholders (ACCHSs staff; community pharmacies; pharmacists);
- The cost-effectiveness of the intervention, which will investigate the costs of the pharmacist service and measures of effectiveness such as increased Medicare utilisation (as a marker of increased patient access to healthcare services towards equity).

Does this project have ethics approval?

Ethics approval has been received from a Victorian Human Research Ethics Committee (HREC). This is the St Vincent's Pubic Hospital HREC in Melbourne. This HREC participates in National Mutual Acceptance of ethics. This means that the review of this committee in Victoria may be acceptable to other HRECs. Acknowledgement from JCU has also been received. This Project will also seek ethics review from two other HRECs in the Northern Territory. These are the:

- Menzies School of Health Research HREC
- Central Australian HREC

As this project is to be run in Qld, Victoria and the NT, ethics review is required from all these jurisdictions.

How is the Project funded?

The Australian Government under the Pharmacy Trials Program of the 6th Community Pharmacy Agreement has funded the project for 29 months.

Governance

The Project Partners and the Project Operational Team Committee

This project is a partnership between the PSA, NACCHO, and JCU (College of Medicine and Dentistry), guided by a Memorandum of Understanding that outlines communication and governance processes.

The PSA, as the lead agency, is responsible for managing the Head Agreement with the Department of Health, and service agreements with partners and ACCHSs, and will coordinate the appointment of practice pharmacists, their recruitment, selection, placement, and training. The NACCHO will provide Aboriginal governance leadership for the project and coordinate all communication with ACCHSs, Affiliates and the NACCHO Board. JCU will undertake the project evaluation, having developed the research methodology based around a pragmatic, community-based participatory research model.

The Project Operational Team Committee is made up of the project partners and is Chaired by the Deputy CEO of NACCHO, Ms Dawn Casey.

Steering Committee

The Operational Team Committee will report to this group as this is made up of representatives of the Project partners, the Department of Health, the Pharmacy Guild of Australia and external experts.

Members of the Evaluation Team

The Project Partners are members of the evaluation team as are other Aboriginal community representative bodies. These are the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); the Queensland Aboriginal and Islander Health Council (QAIHC), and the Aboriginal Medical Services Alliance in the NT (AMSANT). These organisations are NACCHO Affiliates and will be responsible for state-based service support to registered ACCHSs, and provide guidance to the project as members of the evaluation team.

Project Reference Group

State and Territory Affiliates of NACCHO (QAIHC, VACCHO and AMSANT) will be members of the Project Reference Group. Participating ACCHSs will also be invited to be members of the Project Reference Group managed by NACCHO. The Chair of the Project Reference Group will be a nominated member of the NACCHO Board of Directors. This group will meet by teleconference or web-based platforms.

Aboriginal governance and leadership

The way in which these groups communicate and link with each other is shown in Figure 1 and 2. The Project respects and acknowledges Aboriginal governance principles, and ACCHS sector leadership and involvement.

Figure 1. Governance and partnership structure of the IPAC project

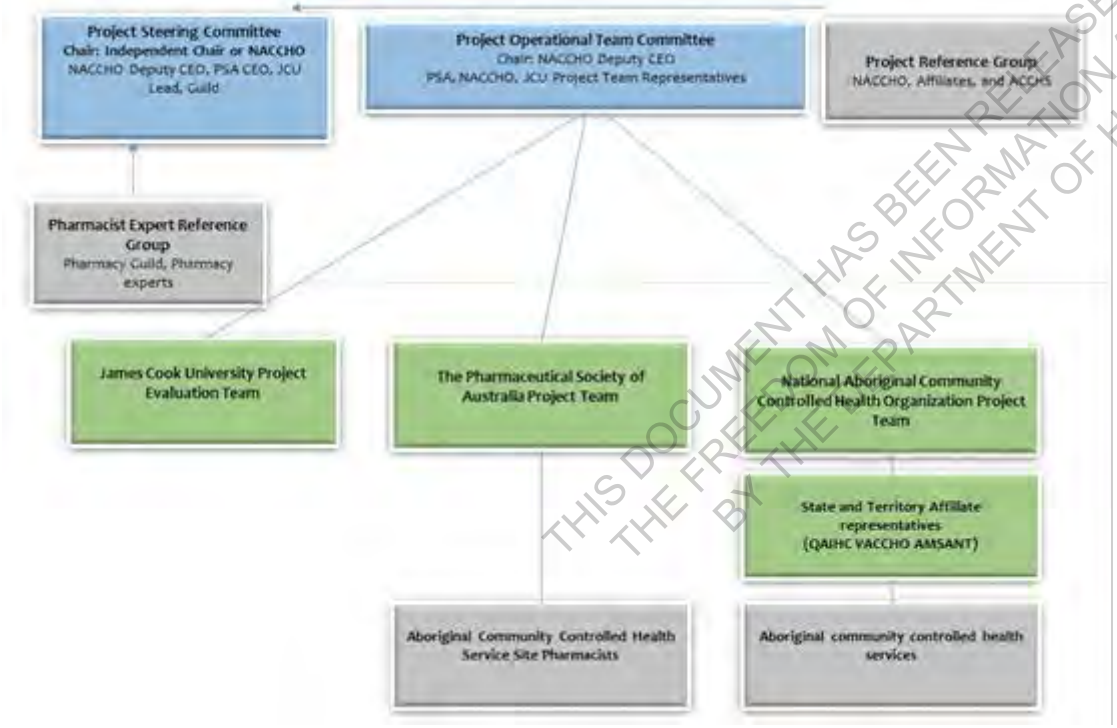
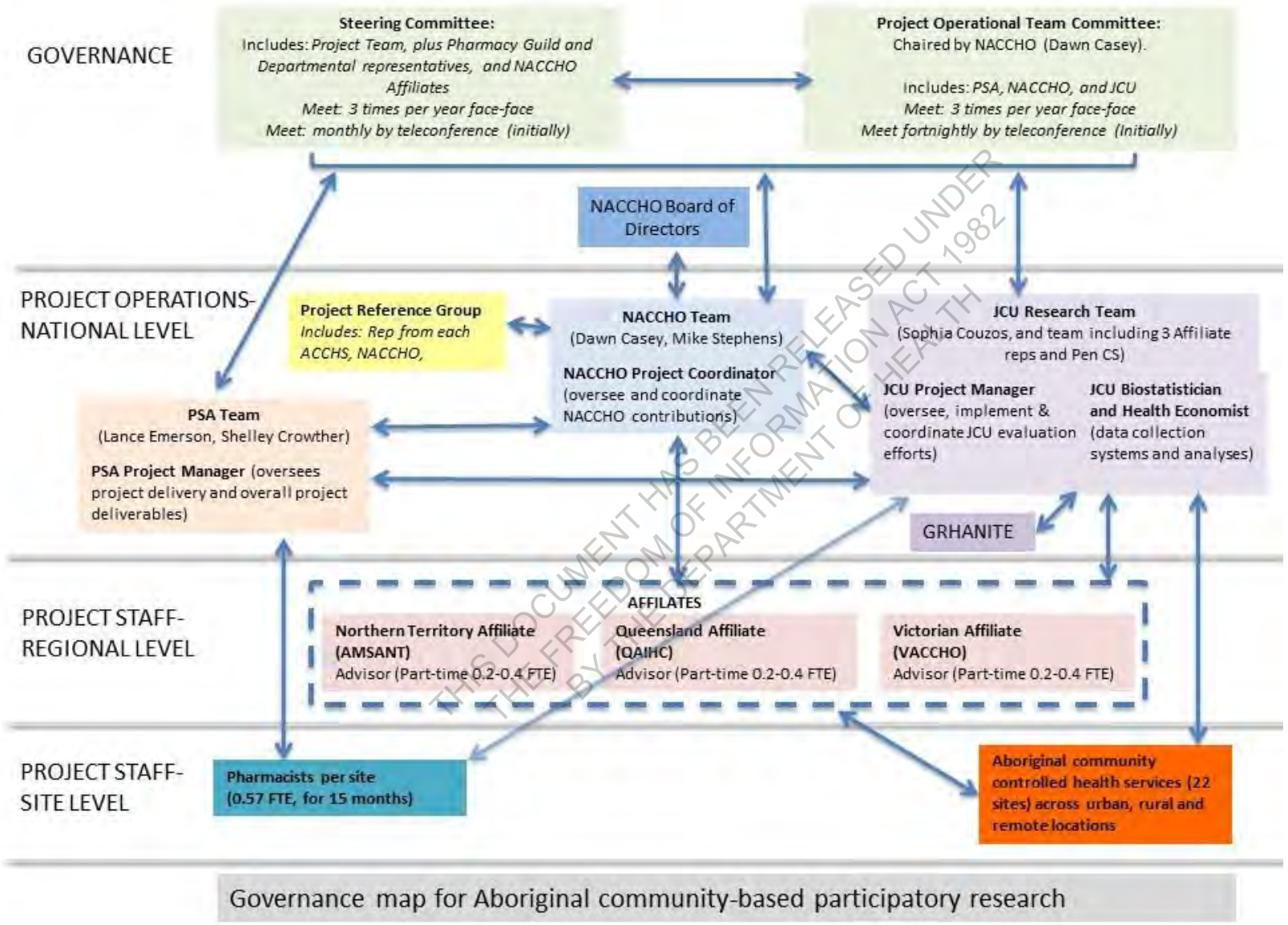


Figure 2. Governance map for the IPAC project.



Governance map for Aboriginal community-based participatory research

What is the design of this project?

The project partners are committed to undertaking the Project to ensure clear benefits to ACCHSs, and to ensure acceptability and sustainability of the intervention within ACCHSs.

The project is a pre and post study where the pharmacist intervention will be added to standard primary health care practice within ACCHSs. Information will be collected from the time the pharmacist starts until they finish, and this will be compared with information from 12 months before the pharmacist started.

The parts of the project

There are three project phases over a 29 month project duration: Phase 1: Establishment (4 months); Phase 2: Implementation/intervention (19 months); Phase 3: Analysis and Reporting (6 months). The project is scheduled by be completed by April 2020. ACCHSs will be invited in stages (tranches) and will therefore be staggered. This is so that the project can give time to each service to get them ready for the project.

The selection of project sites

The project is inviting ACCHSs in geographically diverse settings in Vic, Qld, and NT. Up to 22 ACCHSs will be able to participate. ACCHSs need to meet certain eligibility criteria to participate as project sites.

The eligibility criteria for ACCHSs is:

- The ACCHS employs at least one (1) full-time- equivalent (FTE) general practitioner per clinic who is able to prescribe medicines to clients of that organisation.
- The ACCHS does not currently employ a non-dispensing practice pharmacist at the participating clinic.
- The ACCHS uses a clinical information system such as Communicare, Best Practice, and Medical Director.
- The ACCHS has participated in continuing quality improvement and reporting on the national Key Performance Indicators for at least 24 months through the use of electronic data extraction tools.
- The ACCHS is participating in the *Quality Assurance for Aboriginal and Torres Strait Islander Medical Services* (QAAMS) program, if it is conducting 'point of care' testing.
- The ACCHS agrees to download the GRHANITE data extraction tool into one computer within the practice, adhere to program business rules/protocol and guidelines, data provision requirements, and patient/service consent requirements for the evaluation of the program.
- The ACCHS can provide the practice pharmacist access to a private consulting room on the clinic premises that has access to the clinical information system used by the practice.
- The ACCHS can allocate a staff member who will act as a 'go to' person to assist the practice to obtain informed patient consent.
- The ACCHS is a member of NACCHO, and the relevant NACCHO State/Territory Affiliate.
- The ACCHS is an accredited practice in accordance with the RACGP Practice Standards.
- In non-remote locations, the ACCHS must be participating or eligible to participate in the PBS co-payment measure (practice incentive program).
- In remote locations, the ACCHS must be eligible to participate in the remote Section 100 arrangements for the supply of pharmaceutical benefits

These criteria have been developed with Affiliate input to suit most ACCHSs in Qld, Vic, and the NT, and to make the project as 'real life' as possible. It is important that ACCHSs have clinical information systems (CIS) that the pharmacist can use like other health staff. Only the listed clinical information systems can work with the GRHANITE™ tool to collect information. (GRHANITE is explained later in this document).

The project will recognise the diversity of Aboriginal peoples and Torres Strait Islanders and models of care across Australia, and will select ACCHSs in urban, regional and remote areas. This is so that the project can understand the many ways that ACCHSs may utilise the pharmacist in their clinic.

How will ACCHSs be invited to take part?

ACCHSs will be invited to participate in the project by NACCHO and Affiliates through an 'expression of interest' process. The 'expression of interest' process will explain to ACCHS the process that will be used for site selection.

The Operational Team Committee, Chaired by the NACCHO Deputy CEO will review the expressions of interest and decide if a temporary Panel made up of Affiliate representatives is necessary to select the most suitable sites to participate in the project. As the recruitment process for sites will be staggered, this process will be repeated.

When NACCHO receives an expression of interest from an ACCHS, and the ACCHS is agreed to being a suitable site, the NACCHO Project Coordinator will contact the ACCHS and explain the project further to provide instructions on the process required to establish the site participation.

Formal participation of ACCHSs

After this consultation, a Site Agreement, Site Consent form, and Site Participation Brief *(this document)* will be provided to the ACCHS. Once this is signed and agreed, the project officers will arrange for practice pharmacist recruitment and placement within the ACCHS.

A visit to the ACCHS will be arranged to undertake a 'Needs Assessment' and a 'Health Systems Assessment' just before, or at the time that the practice pharmacist commences (these are explained later in this document).

How will each ACCHS benefit from this project?

Each service will be offered a practice pharmacist (aggregated 0.57 FTE across 22 sites each for 15 months duration) under a service agreement with the PSA. This will enhance the medicines-related workforce capacity of the ACCHS. Practice pharmacists are registered to work within their scope of practice and will have a non-dispensing role. The appointments will include salary, training, and the provision of supportive resources.

In the short-term, Medicare claims for medications-related, preventive care and chronic disease care may increase. The practice pharmacist will support other staff with quality prescribing and medicines use. The relationship with community pharmacies in the local area may improve if pharmacies' are helped to provide more appropriate services to the local community. Relationships between the ACCHS, local hospitals and other care providers may improve with communication between care providers when it pertains to the medicines that patients are taking.

These short-term benefits have potential for long-term gains for the sector as a whole. The project will provide the Australian Government with the evidence-base (biomedical, process, and economic evaluations) for the development of national health policies to potentially support on-going resourcing for practice pharmacists integrated within ACCHSs.

What is the role of the Affiliates in this Project?

NACCHO is a project partner and will maintain Aboriginal governance over this project. Affiliates are also participants in this project. They will be providing support to ACCHSs through funded project officer positions (0.2-0.4 FTE). The ACCHS will be notified of the name and contact details of the Affiliate staff to contact if and when the service needs to.

What is the pharmacist's role in the ACCHS?

The pharmacist employed within the ACCHS will deliver medication advice and education to patients and staff. They will work to improve patient medication adherence, improve prescribing, tailor medications to best suit the patient in collaboration with the prescriber, and assist with/oversee medication management processes. They may provide health promotion, disease prevention, and assist patients with chronic disease self- management and more judicious use of medicines.

The pharmacist will be required to respond to medication enquiries from patients and health professionals such as general practitioners and Aboriginal and Torres Strait Islander Health Workers/Practitioners, conduct staff education, review prescribing, mentor new prescribers, participate in case conferences, liaise across health sectors, undertake medication management reviews, and evaluate drug utilisation to ensure optimal therapy. As part of their collaborative work, an important element of the practice pharmacist's role is liaison with local community pharmacists to ensure continuity of care, and assist in medication management with transitions of care (such as when the patient is discharged from hospital).

Overall, there are 10 core roles targeting *patients*, and *health professionals and health systems*. These roles are all non-dispensing, for which practice pharmacists are registered to deliver. This is summarised in Table 1.

Whilst the project has developed these core roles for evaluation purposes, each participating ACCHS has the flexibility to utilise the services of the pharmacist according to service and client priorities. Practice pharmacists will be supported to adapt to cultural ways of delivering primary health care within each service. The project will aim to document the diversity in pharmacist core roles and in the patient journey. This will be possible through qualitative evaluation, but also through pre-post Health Systems Assessments (this is explained later in this document). The practice pharmacist will be supported to adapt to their role as directed by the staff and CEO.

Most of the practice pharmacist's activity must be devoted to providing supportive clinical care to patients who are participants in this project.

Table 1. Summary of practice pharmacists core roles

SUMMARY OF PRACTICE PHARMACISTS CORE ROLES

Core Role #	Theme	Core activity
1 (a)	**Medication Management Reviews**	Pharmacist reviews the medication the patient is taking. The pharmacist initiates and facilitates a medication management review- which may be a Home Medicines Review (HMR) or a non-HMR (medication management review not conducted in the patient's home)
1 (b)		Pharmacist reviews the patient who had a HMR after 12 months and a Non-HMR after 3-6 months.
1 (c)		Pharmacist ensures the MMR is claimed by the practice when completed (as a DMMR item 900 or RMMR item 903)
2	**Team-based collaboration**	Pharmacist participates in clinic activities that support team-based chronic disease care plans, and cardiovascular (CV) risk assessment
3 (a)	**Medication adherence assessment & support**	Pharmacist assesses the medication adherence of the patient being seen
3 (b)		Pharmacist improves the patient's experience with their medicines

4	**Medication appropriateness audit**	Pharmacist assesses 'medication appropriateness and underutilisation of medicines' as an audit of a sample of patients with chronic disease.
5	**Preventative health care**	Pharmacist provides preventive interventions to patients
6	**Drug Utilisation Review**	Pharmacist conducts a DUR to audit and improve a priority issue at the service
7	**Education and training**	Pharmacist conducts education sessions at the service
8	**Medicines information service**	Pharmacist provides medicines related information to staff within the service and responds to clinician medicines enquiries.
9	**Medicines stakeholder liaison**	Pharmacist develops a written stakeholder liaison plan supporting engagement with community pharmacies.
10	**Transitional care**	Pharmacist facilitates care coordination with relevant hospitals; residential aged care facilities, etc.

Pharmacist's qualifications

Pharmacist's who will be able to work in ACCHSs will be required to have:

- current registration with the Australian Health Practitioners Regulation Agency (AHPRA) as a pharmacist;
- more than 2 years post-registration experience;
- medication review accreditation such as from the Australia Association of Consultant Pharmacy (AACP) or Society of Hospital Pharmacists of Australia (SHPA) or working towards accreditation;
- post-graduate clinical qualifications or demonstrated clinical experience (e.g. hospital or HMRs).

The need for post-graduate qualifications or accreditation will be dependent on ACCHSs preference regarding the applicant and an adequate supply of accredited and experienced pharmacist applicants.

The PSA confirms that the proposed activities are consistent with the existing scope of practice of pharmacists as defined by the PSA Competency Standards endorsed by the Australian Health Practitioner Registration Agency.

Training the pharmacist at the ACCHS

The PSA will deliver the training to practice pharmacists in partnership with NACCHO. Some of the training will be off-site (before the pharmacist starts) and some will be on-site (at the start of their placement in the ACCHS). The NACCHO Coordinator and PSA training facilitator will arrange a training time with the practice pharmacist and with the nominated ACCHS, so that on-site training can best suit the ACCHS.

To follow up training, pharmacists will also have access to structured pharmacist mentor program that will link them with a dedicated mentor pharmacist with experience in the ACCH sector and to the other practice pharmacists within the project.

What patients' are eligible to be participants in this project?

If the patient is aged 18 years of age and over and has the following conditions, then they are eligible to be a participant in this project:

- Cardiovascular disease (coronary heart disease, stroke, hypertension, dyslipidaemia and any other CV disease)
- Type 2 diabetes mellitus,

- Chronic kidney disease,
- Other chronic conditions that mean a patient is at high risk of developing medication-related problems (e.g. polypharmacy).

These conditions are selected because *most* of the mortality gap for Aboriginal and Torres Strait Islanders is due to these chronic diseases. Optimizing medicines for people with these conditions can make an important impact on their health.

The consent of the patient will be required to participate in this project. Most of the patients attending ACCHSs are of Aboriginal and Torres Strait Islander origin (81%).[iv] Therefore, we expect most of the patients involved in this project will be of Aboriginal and Torres Strait Islander origin.

Patients who are regular patients of the service should be prioritised as pharmacists will make sure they follow-up these patients over time.

If a patient consents to be a participant, how may they benefit from this project?

These participants will have immediate access to an on-site pharmacist at no charge. The Pharmacist will check their medicines and make sure they are right for them. Some recommendations may require the prescriber to change medicines or their dose, or cease a medication, or start a necessary medication.

The pharmacist will help resolve problems the participant may have with taking medicines, storing them, and will assess for adverse effects. Participants will be offered medication review in the clinic, or at home, or a place that best suits them. Just like the doctors and other staff, the pharmacist will record the encounter and recommendations in the CIS so that the doctor and health team can read them and make any agreed prescribing changes. The pharmacist also has more time to spend on supporting participants with medications than the doctor has.

The Pharmacist will see participants again to provide them with ongoing support. The pharmacist may follow-up with other members of the primary healthcare team, including with community pharmacy, and depending on the participants needs, with the hospital for discharge medications. This intensive support may help to improve the health of the participant.

There are no other expectations on participants in this project. Personal details of participants are not collected at all, and the data being extracted for the project is completely de-identified. A *Participant Consent Form* and *Participant Information Brief* is available for the ACCHS and practice pharmacist to seek patient consent. Patient participation in this project is voluntary. If consent is not given, this will not affect the patient's routine treatment, or their relationship the clinic, and the patient will still be able to be referred to the Pharmacist.

If a patient consents to be a participant, how may this benefit the ACCHS?

If patients agree to be participants, this enables the ACCHS to collect information for the purpose of the project. The participation of the patient will assist the ACCHS to collect information to determine the clinical and cost-effectiveness of the practice pharmacist, and will support the clinic activity overall (with Medicare and staff education). The information will inform on whether the health of participants improves over time, compared to their health before they received the services of the pharmacist. The ACCHS may receive a site-specific report if they wish. If patient consent is not given, information cannot be extracted from the CIS for this project. Patient consent is therefore vital to assess the value of the practice pharmacist within ACCHSs.

How will patients be referred to the pharmacist in the ACCHS?

The staff within the ACCHS will need to be briefed about this project and the role of the practice pharmacist. The project will also seek the consent of general practitioners in the clinic and provide them with an *information brief*. This *Site Participation Brief* can assist the ACCHS with informing other staff.

Patients attending the ACCHSs doctor, health worker or other healthcare provider will be invited to talk to a practice pharmacist. These staff can refer the patient to the practice pharmacist. NACCHO and the PSA will prepare some simple promotional material to help health staff with this referral, so that patients who are most in need and meet the inclusion criteria are offered the services of the pharmacist.

The practice pharmacist or a designated staff member will tell the patient about this Project (and provide the patient with the *participant information brief*) and ask them if they want to take part. They will then be asked to *sign a participant consent form*. They may see the Pharmacist straight away or an appointment may need to be made for a later time.

The practice pharmacists (with assistance from trained ACCHS staff) may also directly approach patients attending the clinic who meet the individual participant criteria. The process for participant recruitment will be flexible according to the preferred process recommended by the ACCHS. This can be arranged during the first site visit to the ACCHS (see later in this document).

How will our ACCHS seek patient consent?

A suggested process for seeking individual patient consent has been developed in consultation with NACCHO Affiliates on the Evaluation Team. The process respects the systems that ACCHSs may wish and choose to adopt.

The practice pharmacist will be trained to seek the participant's consent. Training for seeking participant consent will also be provided to other staff who may be designated by the ACCHS to seek the participant's consent for cultural appropriateness reasons.

The participants consent form will then be signed and dated by the patient, a witness, and the designated staff member seeking patient consent. The consent form will be stored in a locked briefcase by the practice pharmacist until posted by registered post. It may be transmitted electronically to JCU after scanning.

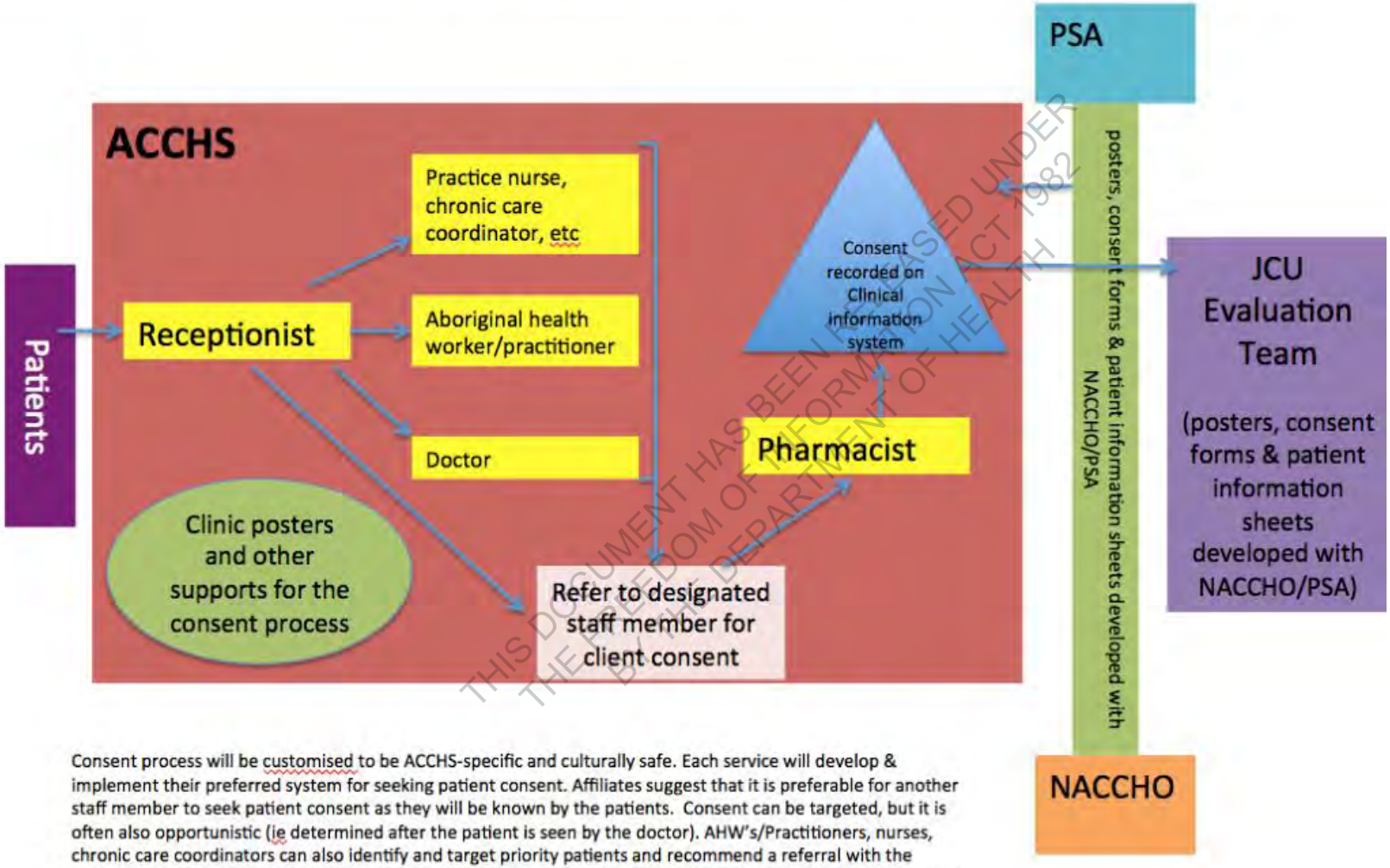
A written copy of the verbal information will be provided to the patient, including advice on how they may ask questions or make complaints about the project.

Consent will then be recorded on the clinical information system (CIS) by the practice pharmacist and GRHANITE will extract information only from consented patients. This suggested process is summarised in Figure 4.

Figure 4. A suggested process to seek patient consent.

DRAFT SCHEMA FOR **PATIENT CONSENT**-PTP TRIAL

JCU, PTP Tranche 2 Trial



Consent process will be customised to be ACCHS-specific and culturally safe. Each service will develop & implement their preferred system for seeking patient consent. Affiliates suggest that it is preferable for another staff member to seek patient consent as they will be known by the patients. Consent can be targeted, but it is often also opportunistic (ie determined after the patient is seen by the doctor). AHW's/Practitioners, nurses, chronic care coordinators can also identify and target priority patients and recommend a referral with the consent process referred to the designated staff member. Refusal to give consent should not preclude a patient from receiving pharmacist services. Patients who give consent will be noted on the clinical information system. This schema is a draft guide.

How will participants be followed-up?

Practice Pharmacists will aim to follow-up participants using the usual clinic processes. Pharmacists will work with the existing staff in the ACCHS to follow-up participants in the same way used for all patients. Participants will need to be reviewed according to clinical needs and Medicare rules, and may include 3-monthly, 6-monthly or an annual review or more frequent review by the pharmacist.

The pharmacist will need to use the CIS within the ACCHS to record follow-up clinical details like other healthcare staff. The pharmacist will also record follow-up details in the pharmacist log-book as is appropriate for the type of review being conducted (such as medication appropriateness index measurements).

How many patients will ACCHS be asking to participate?

It is estimated that the practice pharmacist and the ACCHS may seek consent from about 350 people to be part of this Project and to see the Pharmacist over 15 months. This may vary considerably from service to service.

It is important for the ACCHS to encourage patients to be referred to the pharmacist early in the project. This is so that enough time is available to follow-up patients during the 15 months the pharmacist is employed in the project.

Are there any risks or benefits to patients from taking part?

The Pharmacist is a qualified and registered health professional who will be trained to work in this ACCHS. The risks to patients are no different to seeing a Pharmacist in a Pharmacy, except that patients will be seeing Pharmacists in this clinic. The Pharmacists will not be prescribing or dispensing medicines as they would in a Pharmacy. They will be working with the primary health care team in the ACCHS.

How will information for the project be collected?

The project has been designed to be acceptable and feasible to ACCHSs and practice pharmacists, by making most of the data collection a 'by-product' of service delivery. There are three main types of information that will be collected with the help of ACCHSs. Information will be collected from clinical information systems (CIS), pharmacist log-books (managed by the pharmacist), and from site visits to ACCHSs.

1. Deidentified information about patients who have consented (participants) will be collected from services clinical information systems (CIS), using an electronic data extraction tool known as **GRHANITE™**. ACCHSs will be supported to have the GRHANITE data extraction software installed in one personal computer in the clinic. This software will be installed in one workstation to minimise practice impact. When GRHANITE runs, it does so at a scheduled time and queries data from the practice database server. This is the only time GRHANITE communicates with the practice server. GRHANITE will extract weekly data from the CIS to the secure JCU repository. The ACCHS does not need to do anything to maintain that this program is working.
2. Practice pharmacists will also collect information about what they do through an **electronic log-book**. This system will be an online secure database requiring practice pharmacist secure log-in. It will be used by practice pharmacists to record deidentified daily activity. Each electronic log-book entry will be able to be interrogated by the JCU data custodian. The daily-recorded activity will refer to 6 core pharmacists roles. The electronic interface will be user-friendly to minimise the reporting burden of practice pharmacists.

3. **Health systems assessment, qualitative data, and cost-effectiveness analysis** data will be collected during visits to the ACCHS. Mainly the NACCHO Project Coordinator, will undertake visits to the ACCHS. A qualitative researcher will visit only three ACCHSs if they are invited by the service. The costs related to the employment of pharmacists will be sourced mainly from the PSA.

How does GRHANITE work and how secure is it?

GRHANITE™ strictly conforms to extract only data that is approved. It provides ethical and secure mechanisms for the provision of data from the CIS. If an individual gives their permission to be involved in a project, GRHANITE can read this consent information if it is recorded in the clinical notes. Patients who have not consented will not have their data interrogated, even if deidentified. This is an 'opt-in' consent process. Patient names, dates of birth, address or other identifying information are not extracted.

The data extraction from the CIS within the ACCHS will only extract deidentified data and then transmit it securely to the secure repository at JCU. The exported data is encrypted, and can only be decrypted at its final destination. This ensures transmission security. Data is deidentified as patients are assigned a unique patient ID. It is not possible for the project partners to reidentify any patient.

GRHANITE software will not operate if copied or moved from one computer to another. All installations require a unique authorising license. It is a nationally recognised tool as over 1000 health services across Australia have used/are using this for quality improvement and for research activity.

JCU will be the repository body responsible for the protection of data from loss, misuse and unauthorised access. A data custodian will be appointed (the biostatistician investigator). JCU will comply with the Code for the Responsible Conduct of Research (JCU) [This Code has been adapted from the Australian Code for the Responsible Conduct of Research ["the National Code"], developed jointly by the National Health and Medical Research Council, Australian Research Council and Universities Australia, and published in 2007.[v]

What type of information will be collected by GRHANITE?

The information will be deidentified and only from consented patients (participants). The information will refer to periods 12 months before, and the periods after the pharmacist first provided support to the participants. This is summarised in Table 2.

Table 2. Deidentified patient information that will be extracted from clinical information systems (CIS) in the ACCHS

Measure	Detail
Patient characteristics	age, year of birth, sex, height and weight (for BMI), condition (diabetes, hypertension, dyslipidaemia, CHD, PAD, CVA, CKD, plus other disease *(in patients who fit the inclusion criteria with polypharmacy)*, smoking status (history details: start/stop year), postcode, CTG status, ethnicity, Aboriginal and Torres Strait Islander status, DVA status, pension/concessional status, year of death.
Encounter/contact indices & other demographic measures	contacts with staff (different job roles), episodes of care (date of visit, reason for visit, duration, visit type), patient status/record status (active), created and updated dates and user who created and updated the record; consented patients; patients ID/MRN/UR number/chart No/record No

Biometric indices	Diastolic and systolic BP, HbA1c, lipids (HDL, LDL, TG's, and TC), CV absolute risk assessment (levels and risk), ACR, e-GFR,
Prescribing indices	All medications (including PBS drug code); all information contained within prescriptions (route, strength, formulation, quantity); date of the script being generated, including ceased/delete date; deleted flag (if any) and reason for delete or ceased; created and updated dates, and user (job role) who created and updated the record. This information is for both current medications and past medications.
Dispensing indices	All medications (including PBS drug code); all information contained within prescriptions (route, strength, formulation, quantity); date of the medicine being supplied and dispensed; user (job role) who created and updated the record. This information is for both current medications and past medications.
Measures of health service utilisation:	
Medicare Benefits Schedule indices	900 (DMMR or HMR), 903 (residential aged care DMMR or HMR), 721 (GPMP), 732 (GPMP review 3 months later), 715 (Health Check); record status, created and updated dates, and user (job role) who created and updated the record, item billing amount.
Non-HMR data (out-of home interviews)	non-HMR flagged in CIS will link this to the above variables *(to be recorded by the pharmacist)*.
Measures of medication adherence	• Electronic measures of medication adherence *(to be calculated by the evaluators)* • Medication Adherence *(to be recorded by the pharmacist)*

ACR= albumin-creatinine ratio; BP= blood pressure; CIS= clinical information systems; CKD= chronic kidney disease; CTG= Close The Gap; CV= cardiovascular; CVA= cerebrovascular disease; DET= data extraction tool (GRHANITE); DMMR= Domiciliary Medication Management Review; DVA: Dept of Veterans Affairs; e-GFR= electronic glomerular filtration rate; GPMP= General Practice Management Plan; HDL= high density lipoprotein; HMR= Home Medications Review; LDL= low density lipoprotein; MAI= Medication Appropriateness Index; PAD= peripheral artery disease; TC= total cholesterol; TG= triglyceride

What type of information will be collected by the pharmacist in the log-book?

The pharmacist will record their daily activity in the log-book. This will include information about education sessions they provided to staff, adhoc advice provided and any evidence this led to an outcome, the development of any resources for patients or the ACCHS, whether the pharmacist developed a plan to liaise with community pharmacy (and details of that plan), and the number of medicines reconciliations from stakeholders like hospitals.
In particular, the pharmacists log-book will enable practice pharmacists to record the results of medication assessments for each of 30 participants. Of the participants seen by a practice pharmacist, 30 participants per site will have their medications intensively appraised as part of the medication management review.
No personal information about participants is contained in the logbook. The participant does not need to be present for the medication assessment as it is an audit of the participants medications held in the CIS.
The pharmacist will only record the unique 'patient ID' to enable
matching of the medication assessment audit of 30 participants to the participant data extracted through GRHANITE.
The practice pharmacist will communicate the findings of the medication assessment for the participant to the prescribing team within the ACCHS so that appropriate clinical action is taken. Practice pharmacists will ensure that the assessment takes account of additional clinical information such as an assessment of the participant's absolute cardiovascular risk when assessing their medications.
Practice Pharmacists will follow-up participants as per usual clinic processes. These follow-up mechanisms may vary from service to service (see above).

What type of information will be collected during the site visits?

Every participating ACCHS site will be visited at least twice during the project.
1. The 'needs assessment' visit (see '*what will happen during the first visit'*).
2. To conduct a 'health systems assessment' (HSA):
    - at the time of, or just prior to the appointment of the pharmacist, and
    - repeated towards the end of the implementation phase (month 12-15).

The NACCHO Project Coordinator will conduct visits and assessment with assistance from Affiliate staff. The needs assessment and health systems assessment will be conducted at the first visit.
The '*needs assessment'* will collect information about what the ACCHS may need to support the practice pharmacist to work in that clinic. This will be used to help the pharmacist to get started.
The *'health systems assessment'* will source information about the ACCHS. Each ACCHS is different in many ways. The project needs to understand how many staff (and types) are employed within the ACCHS, the total service population, the total service budget, Aboriginal governance structures, health services on offer, quality improvement processes, models of care such as outreach, if home medicines reviews are conducted and how, type of CIS used, recall systems in place, the adequacy of existing communication with the hospital, and community pharmacy/ies, medicines access information, use of point of care testing, regional services available such as specialist and allied health visits, and how the ACCHS will implement and define the core roles of practice pharmacists.
A meeting with key informant staff in a focus group setting will be needed to undertake the health systems assessment. This information will be collated in a summary report for the ACCHS to use for any quality assurance activity.

What type of information will be collected for qualitative analysis?

Three ACCHSs will be invited to participate in a qualitative evaluation of the Project in mid-late 2019. ACCHSs will be asked if they will support focus group discussions with certain patients, Aboriginal health workers/practitioners, and with the pharmacist on site. These meetings will be fully catered and will be conducted in ways to minimize clinic disruption. ACCHSs will be contacted closer to that time to explain what that might involve.

What will happen during the first visit to the ACCHS?

The 'needs assessment' visit to the ACCHS will elicit the type of support needed by the ACCHS so that the practice pharmacist may best be integrated within the service. The visit will also assist the ACCHS to establish their preferred system to seek patient consent, and ensure the pharmacist can use the CIS, has a space to consult with patients, and the CIS is set to accept the 'job-role' for the pharmacist (this is necessary for the GRHANITE data extraction). A 'health systems assessment' may also be undertaken at this visit (see above).

The NACCHO Project Coordinator will make contact at this visit with the nominated ACCHS staff member who will act as a 'go to' person. Together with the nominated 'go to' person/s and relevant ACCHS staff, a project consent pathway and process that is responsive to the local ACCHS' model of care will be planned. A second 'go to' person may also need to be identified by the ACCHS and Coordinator as contingency for leave, resignation or movement between clinics or roles.

The NACCHO Project Coordinator will ensure that the service has adequate promotional material and strategies to engage both ACCHS staff and clients.

Who owns the GRHANITE information?

The raw (unanalysed) data collected from the GRHANITE data extraction is owned by the ACCHS even though it will be used, analysed and stored safely by JCU. Details regarding this is included in the service agreement with the ACCHS for this project.

Intellectual Property

Details regarding Intellectual Property of the Project will be included in the Service Agreement with the PSA.

Use of information collected by the Project

The information collected from this project will be used to prepare reports to the Australian Government on 'quality of care' outcomes (the project objective) that arise from integrating a practice pharmacist within ACCHSs. The reports will assess change in the:

- quality of prescribing,
- quality of medicines support through indicators of health service utilization,
- quality of the patient, service and stakeholder experience, and
- ultimately an effect of these improvements on biometric indices as a measure of health outcome.

The reports will also assess the cost-effectiveness of the practice pharmacist within ACCHSs.

The data analysis will also be able to provide ACCHSs and Affiliates with local level and aggregated data. Most analyses at this level would not be meaningful because the number of participants will be too small. However, the information will be aggregated at a national level for the NACCHO, Affiliates, ACCHSs, and the PSA, as well as the Australian Government. This will inform the development of health policy about practice pharmacists and the role they can play supporting Aboriginal and Torres Strait Islander peoples with chronic disease in Australian primary health care settings.

Health systems assessment summaries will also be able to be provided to ACCHSs for their use.

Security of information collected by the Project

As the leading research organisation, JCU (the repository body) will be responsible for the protection of data from loss, misuse and unauthorised access. The Data Custodian (Biostatistician: Erik Biros) will be responsible for this role.
Further, the Project Operational Team Committee, Chaired by the Deputy CEO of NACCHO, will be consulted in all matters brought to its attention with regard to concerns about data security.

How will the collected information be transported to JCU?

Completed Site Consent Forms will be collected by the NACCHO Project Coordinator, scanned and sent electronically to the data custodian. Participant consent forms will scanned by the practice pharmacist and electronically transmitted to the data custodian. The forms will be stored electronically in a secure computer under the management of the data custodian on the property of College of Medicine and Dentistry, James Cook University.
Information extracted using GRHANITE and from the Pharmacist log-book will be transmitted electronically and stored on password-protected internal server on JCU premises. Data accessed during the analysis phase will be stored in JCU-supported database applications only.
Health Systems Assessment (HSA) and Needs Assessment information collected from site visits, will be collected on paper-based forms, (or in electronic format) collected by the NACCHO Project Coordinator and will be transported in a locked briefcase, scanned and stored in electronic format in a secure computer under the management of the data custodian.

Where and for how long is the information going to be kept?

Data will be kept for a minimum period of 7 years from the end of the year of publication of the last refereed publication or other form of public release to an audience external to JCU.
Electronic data will be stored on password-secured databases only. Any paper-based documents will be scanned and stored electronically, and the paper documents stored in a locked cabinet in a secure room at JCU. The data custodian (Biostatistician- Erik Biros) will be responsible for data storage consistent with the JCU *Code for the Responsible Conduct of Research.*
After the minimum period of storage, the data may be considered for disposal if there is a written request to the Evaluation Lead, from both the NACCHO and the PSA for the disposal of the data. As the raw unanalyzed data extracted by GRHANITE is owned by the ACCHSs, JCU will seek instruction from NACCHO and each ACCHS as to the ongoing use or destruction of this data. The Evaluation Lead will authorize the data custodian to delete the data if this is instructed by NACCHO, in accordance with the JCU *Code.*

Who will be able to access this information?

Data will be accessible only to members of the Evaluation Team who will have a role in handling this information. From time to time, one member of the evaluation team (the University of Melbourne HaBIC Research Information Technology Unit) may need access to the data-landing server at JCU to provide technical support services.
ACCHSs may request access to de-identified information from their service. These requests can be made to the Project Operational Team Committee or its members, or directly through the NACCHO Affiliate or Project Officers involved in this project. The request must also include documentation of intended data use and must align with project objectives (the individual consent provided by each participant). Requests to access the data that *does not align* with the project objectives will need HREC approval. Similarly, Affiliates may request access to data at their jurisdictional level. This request must be in writing and align with the project objectives.

External requests from other organizations and research agencies not participating in this project to access data from this project will need to be submitted to the Project Operational Team Committee. NACCHO will recommend that external agencies seek approval from Affiliates and from participating ACCHSs relevant to the request. Approval will not be granted for the release of data if it is not approved by NACCHO. There may be a need to seek approval from the Department of Health if this is a condition in the Head Agreement for this project. All external requests will need to have HREC approval prior to the release of this data.

What can we do if we have concerns about data security, research misconduct or complaints?

ACCHSs can report any breaches in data security or research misconduct or complaints to:

- project partners/staff,
- Affiliates,
- NACCHO directly, and/or
- Designated HREC representative.

Reports received by project staff will be forwarded to the Operational Team Committee and the Deputy CEO of NACCHO.

What is the role of ACCHSs in this project?

The ACCHS will host the practice pharmacist who will be providing health services to the patients in the community. The pharmacist will effectively be an employee of the PSA, who will provide all employment support. This will minimise the administrative burden on the ACCHS so that the pharmacist and ACCHS can focus on effective service delivery from the start. NACCHO and respective Affiliates will have the capacity to liaise closely with PSA, ACCHS and the pharmacist to ensure that the pharmacist's roles are understood clearly by both parties.

The Head Agreement between the PSA and the Department of Health will influence the service agreement between the PSA and the ACCHS. The Service Agreement with the ACCHS will document the terms of participation including: Health Service Responsibilities and Financial Arrangements.

ACCHSs will be provided with a *Site Consent Form* that will need to be signed if the ACCHS agrees to be a participant in this project.

The NACCHO Project Coordinator will be available to ACCHSs to assist in understanding and delivering on their roles within the project. They may also work with their Affiliate representative to assist ACCHSs.

The following is a summary of the ACCHSs role as a participant in this project that will be negotiated with each ACCHS to be most appropriate for that service.

The role of the ACCHS is:

- To nominate a 'go to' person to be a point of contact for the project staff.
- To support the practice pharmacist to use the CIS within the practice, and access the patient's clinical records in order to support patient care and make medicines-related recommendations to other health staff.
- To enable the CIS to recognise the practice pharmacist in their 'job role'. (The ACCHS will be assisted with this. This is so that the information can be collected about the work the pharmacist has done).
- To support the pharmacist to access a private consulting room to meet with patients.
- To support the practice pharmacist to have time to record their work and findings in the pharmacist log-book.
- To assist the practice pharmacist to work with other members of the health care team by sharing information about the project with other members of the team.

- To assist the pharmacist to prepare a workplan that best suits the model of care of the ACCHS.
- To host information for patients attending the practice by using posters and other health promotion material to promote patients to be participants in this project.
- To develop a participant consent process that is approved by the ACCHS involving the practice pharmacist and/or other staff in the ACCHS.
- To support site visits and support a focus group with relevant staff for 'health systems assessment' and 'needs assessment'.
- To support site visits and support focus groups with relevant staff for the qualitative evaluation if the ACCHS wishes to volunteer as a case study site (further information about this will be provided to ACCHS to make a decision in 2019).
- Any other matters that are relevant to the work of the practice pharmacist that the ACCHS may wish to consider. (Examples include mechanisms for home medicines review, or use of point of care testing, etc).

What support will ACCHSs receive in this project?

Each ACCHS that participates in the project will receive:

- The services of an on-site registered practice pharmacist for a 15-month duration.
- Administration of pharmacist employment and contract to be provided by PSA.
- The opportunity to select their preferred practice pharmacist.
- A 'Needs Assessment' site visit to ascertain any specific needs of ACCHS.
- A facilitated 'training' on-site visit to support and prepare the practice pharmacist within the primary healthcare team.
- Resources to support the practice pharmacist, such as medication management guides.
- A supportive mentor for the practice pharmacist (that will be managed by NACCHO and the PSA).
- Installation of the GRHANITE data extraction tool in the CIS and licence for its use for 15 months.
- Two site visits to explore Health Systems Assessment (one of these will be at the same time as the needs assessment visit).
- A Health Systems Assessment Report for ACCHS use for CQI.
- Involvement of a nominated staff member to be a member of the Project Reference Group in the project.
- Support from a nominated Affiliate officer involved in this project.
- Support from the NACCHO Project Coordinator during site visits and contact by email and phone.
- An opportunity to review project findings and provide feedback through ACCHS membership of the Project Reference Group.
- Customised reports specific to the participating ACCHS (if requested and if the data analysis is meaningful due to limitations with small participant numbers).

Each Affiliate that participates in the project will receive:

- Remuneration to participate in the project. This can be used to employ a part-time project officer (or to back-fill existing staff).
- Involvement of nominated staff as members of the Evaluation Team in the project.
- An opportunity to review project findings and provide feedback (through membership of the evaluation team and Project reference group).
- Customised reports specific to the jurisdiction (if requested).

How will ACCHSs find out the results of the Project?

ACCHSs will receive information about the Project through NACCHO communication mechanisms. The Project will finish at ACCHSs in late 2019. The ACCHSs will know the results in 2020. Other ways in which ACCHSs will be informed include:

- Through the Project Reference Group which will be provided with updates on progress with the project and extracts of reports arising from the project.
- Summary results to individual ACCHSs (pertaining to their own data) may be provided upon request to the Operational Team Committee, although these may not be meaningful due to small participant numbers and the inability to undertake data analysis.
- Extracts of reports arising from this project will be summarized in plain language and disseminated according to usual NACCHO communication mechanisms, such as email, the NACCHO News, and NACCHO website, including communication with any relevant special interest groups supported by NACCHO.
- Presentations detailing progress and results will be communicated at NACCHO and/or Affiliate Conferences and Annual Meetings.

The findings of the project will also be reported for publication in articles and journals relevant to this project. There may also be presentations at conferences.

Reports will also be provided to the Australian Government, Department of Health, and through communication mechanisms used by the Pharmaceutical Society of Australia. NACCHO (as a project partner) will check this information before it is released.

Can ACCHSs decide to withdraw from this project?

ACCHSs and Affiliates that are participants reserve the right to withdraw their participation in the project in accordance with their service agreements. If an ACCHS site withdraws, the ACCHS will be asked to provide a written reason for the withdrawal to the PSA (for the contract) and the Project Operational Team Committee. The ACCHS will be asked whether they agree to the continued use of the data collected in this Project prior to their withdrawal of Site Consent. The withdrawal of the Site from the project will mean the withdrawal of the site support specified in the service agreement (and explained above). The withdrawal of the Site will be reported to all relevant HRECs when the Project's annual report is due.

Who can the ACCHS contact for more information or to make a complaint?

The ACCHS can contact the NACCHO Project Lead: Mike Stephens, Tel: 02 6246 9300; Email: mike.stephens@naccho.org.au. Other Project staff to contact include: Shelley Crowther from the Pharmaceutical Society of Australia: Tel: 03 9389 4004; Email: Shelley.Crowther@psa.org.au. You can also contact the NACCHO Deputy Chief Executive Officer: Ms Dawn Casey at dawn.casey@naccho.org.au.

The Human Research Ethics Committees will continue to provide oversight as the project progresses. You can contact the Ethics Committee with any concerns about the safety and fairness of the Project at: Executive Office of Research, St Vincent's Hospital Melbourne, Tel: 03 9231 2394, or email: research.ethics@svhm.org.au

Thank you on behalf of the IPAC Project Team.

The ***IPAC Project*** is the *Integrating Pharmacists within ACCHSs to improve Chronic Disease Management Project (IPAC).* The Project Partners and Project Operational Team Committee for the ***IPAC Project*** include: The National Aboriginal Community Controlled Health Organisation (NACCHO); Pharmaceutical Society of Australia, and the College of Medicine and Dentistry, James Cook University. ***Evaluation Team*** members include the Project Partners, and the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); Queensland Aboriginal and Islander Health Council (QAIHC); and the Aboriginal Medical Services Alliance in the NT (AMSANT). The Project Reference Group includes representatives of NACCHO, Affiliates and ACCHSs.

APPENDIX 23: LIST OF PEOPLE INVOLVED IN THE DEVELOPMENT OF THIS ASSESSMENT REPORT

Names	Position
Associate Professor Sophia Couzos Evaluation Lead	General Practice and Rural Medicine, College of Medicine and Dentistry James Cook University, Douglas Parade, Townsville, Qld, 4811. Tel: 07 47816062 Mobile: s47F Email: Sophia.couzos@jcu.edu.au
Dr Deborah Smith Project Manager/Researcher	College of Medicine and Dentistry James Cook University, Douglas Parade, Townsville, Qld, 4811. Tel: s47F Email: deb.smith@jcu.edu.au
Dr Erik Biros Biostatistician	College of Medicine and Dentistry James Cook University, Douglas Parade, Townsville, Qld, 4811. Tel: s47F Email: erik.biros@jcu.edu.au
Dr Delia Hendrie Health Economist	School of Public Health Curtin University Tel: s47F Email:D.V.Hendrie@curtin.edu.au
Ms Hannah Loller Project Manager for PSA	Pharmaceutical Society of Australia, Ltd Level 1, 25 Geils Crt, Deakin, ACT, 2600. Tel: s47F Email: Hannah.Loller@psa.org.au
Ms Megan Tremlett Project Manager for PSA	Pharmaceutical Society of Australia, Ltd Level 1, 25 Geils Crt, Deakin, ACT, 2600. Tel: s47F Email: Megan.Tremlett@psa.org.au
Mr Mike Stephens Director, Medicines Policy and Programs (NACCHO)	National Aboriginal Community Controlled Health Organisation Level 3, 2 Constitution Ave, Canberra, ACT 2601 Tel: s47F Email: mike.stephens@naccho.org.au
Ms Alice Nugent Project Coordinator for NACCHO	National Aboriginal Community Controlled Health Organisation Level 3, 2 Constitution Ave, Canberra, ACT 2601 Tel: s47F Email: Alice.Nugent@naccho.org.au
Ms Fran Vaughan Project Coordinator for NACCHO	National Aboriginal Community Controlled Health Organisation Level 3, 2 Constitution Ave, Canberra, ACT 2601 Tel: s47F Email: Fran.vaughan@naccho.org.au

College of Medicine and Dentistry, James Cook University on behalf of the
National Aboriginal Community Controlled Health Organisation, and the
Pharmaceutical Society of Australia (IPAC Project Partners).
Douglas Parade, Townsville, Qld, 4812.
Tel: 07 47816062; Email: sophia.couzos@jcu.edu.au

MASTER PARTICIPANT INFORMATION BRIEF

INFORMATION SHEET
(THIS IS FOR YOU TO KEEP)

Title	*Integrating Pharmacists within Aboriginal Community Controlled Health Service (ACCHSs) to improve Chronic Disease Management Project (IPAC)*
Short Title	*Putting Pharmacists into ACCHSs*
Project Sponsor	*James Cook University*
Coordinating Investigators	*Associate Professor Sophia Couzos (JCU), Ms Deb Bowden (PSA), Mr Mike Stephens (NACCHO), Ms Dawn Casey (NACCHO)*
Evaluation Team	s47F *Dr Erik Biros (JCU), Dr Deborah Smith (JCU),* s47F
Location	

What is the IPAC Project?
Our Aboriginal Community Controlled Health Service [ACCHS] has put a Pharmacist in this clinic for 15 months as part of the IPAC Project. The Pharmacist will help people by talking with them about their medicines and health. In this project they will not give out medicines. They will be part of the clinic like other staff.

This Project will help the Government to know if ACCHSs should be given money for a pharmacist to stay on in the clinic like other staff.

Do I have to take part? How will it work?
You are invited to take part in this project. If you don't want to, you can say no. This will not affect your health care at this clinic. A doctor, nurse, or health worker will ask some people coming to this clinic if they want to see the Pharmacist to help them with their medicines. A staff member will tell you about this Project and ask if you want to take part. You will then be asked to sign a consent form. You may see the Pharmacist straight away or make an appointment for a later time.

The Pharmacist will ask you about your medicines and your health. This is to find out how to make it easier for you to take the right medicines. The pharmacist will work with the doctor and other staff about your medicines, and will see you again to help you as much as possible. You can still see the Pharmacist even if you say no. If you decide to take part and later change your mind, you can withdraw from the project at any time. You can tell the Pharmacist or a staff member in the ACCHS that you no longer wish to take part.

Who is running the Project?
Aboriginal leaders in many organisations have all supported this Project. This ACCHS has said how this Project will run in this clinic.

Ethics approval has been received from the St Vincent's Hospital Melbourne Human Research Ethics Committee and this means that the project has been checked as safe and fair for people living in this part of Australia. This and other committees will watch over this Project. Aboriginal leaders and peoples from ACCHSs involved in this Project are also watching over this Project.

College of Medicine and Dentistry, James Cook University on behalf of the
National Aboriginal Community Controlled Health Organisation, and the
Pharmaceutical Society of Australia (IPAC Project Partners).
Douglas Parade, Townsville, Qld, 4812.
Tel: 07 47816062; Email: sophia.couzos@jcu.edu.au

Who can be in this Project?

People coming to this ACCHS for a good while can be part of it if they are over 18 years of age, and if they have a health condition like diabetes, heart disease or other disease that means they need to take a lot of medicines. To be part, you must be able to show that you understand and agree that information about your health will be collected when seeing the Pharmacist.

What does taking part in this Project involve?

If you agree to take part, you will be seen by the Pharmacist in the clinic who will check your medicines and make sure they are the right ones for you. They will ask if you would like a full check of your medicines in the clinic, or at home, or a place that is best for you. The Pharmacist will listen to you and help you to get what you need

You can see the Pharmacist as many times as you like, whenever you like, and to ask for help about anything to do with your medicines. The Pharmacist will check how you are going, and may ask to see you in again. You will not need to pay any money for this service.

How will information be collected?

The information we need will already be in your clinic health record. It will just be copied from the record and include information from 12 months before you saw the pharmacist and information after you saw the pharmacist. No information about your name, date of birth, Medicare number, or any other personal information, or who you are, will be copied from your records. Your information will just be given a number and not a name. Information will be collected about your health, prescriptions, clinic visits, and Medicare information. Some information about people like their gender, age, Aboriginality, being a pensioner, and if they smoke will also be collected. The information that is collected will only be used for this project.

Are there any risks or benefits to me from taking part?

The Pharmacist is a qualified and registered health professional who has also been trained to work in this ACCHS. The risks are the same as if you saw a Pharmacist in a Pharmacy, except that you will be seeing them in this clinic.

Who can I talk to for more information or to make a complaint?

If you would like to know the results of this project or if you have any worries you can talk to staff at ACCHS. If you have any other worries, or need more information or would like to make a complaint, you can contact the NACCHO Project Lead: Mike Stephens, Tel: s47F ; Email: mike.stephens@naccho.org.au. Other Project staff to contact include: Deb Bowden from the Pharmaceutical Society of Australia: Tel: 02 6283 4740; Email: Deb.Bowden@psa.org.au. You can also contact the NACCHO Deputy Chief Executive Officer: Ms Dawn Casey at dawn.casey@naccho.org.au.

You can contact the Ethics Committee with any concerns about the safety and fairness of the Project at: Executive Office of Research, St Vincent's Hospital Melbourne, Tel: 03 9231 2394, or email: research.ethics@svhm.org.au:

Thank you on behalf of the IPAC Project Team.

The ***IPAC Project*** is the *Integrating Pharmacists within ACCHSs to improve Chronic Disease Management Project (IPAC).* The Project Partners and Project Operational Team for the ***IPAC Project*** include: The National Aboriginal Community Controlled Health Organisation (NACCHO); Pharmaceutical Society of Australia, and the College of Medicine and Dentistry, James Cook University. ***Evaluation Team*** members include the Project Partners, and the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); Queensland Aboriginal and Islander Health Council (QAIHC); and the Aboriginal Medical Services Alliance in the NT (AMSANT). The Project Reference Group includes representatives of NACCHO, Affiliates and ACCHSs.

College of Medicine and Dentistry, James Cook University on behalf of the **National Aboriginal Community Controlled Health Organisation, and the Pharmaceutical Society of Australia** (IPAC Project Partners).
Douglas Parade, Townsville, Qld, 4812.
Tel: 07 47816062; Email: sophia.couzos@jcu.edu.au

MASTER PARTICIPANT CONSENT FORM

The IPAC Project has put a qualified Pharmacist into the clinic of this Aboriginal Community Controlled Health Service for 15 months. The pharmacist will help people with their medicines and health. The project is looking to see if the health of people seeing the pharmacist gets better over time.

1. _____ has explained the IPAC project to me including:

   - ☐ The purpose of the Project
   - ☐ Who is funding the Project
   - ☐ What participation in this Project involves
   - ☐ What the risks and benefits of participation are
   - ☐ How some information about my health will be collected, and how I will not be able to be identified
   - ☐ How this information will be stored and protected
   - ☐ Who owns the information collected in this Project
   - ☐ How this information will be used
   - ☐ That I can choose not to participate, or stop participating, at any stage (and how) without affecting my current or future health care
   - ☐ How to contact the Project leader to ask questions about the Project
   - ☐ How to contact the Ethics Committee to make a complaint about the ethical conduct of the Project.

2. I have been given a Participant Information Sheet describing all the above points, or someone has read it to me in a language I can understand.
3. I understand all the above points and have been able to ask questions about anything that is unclear.
4. I agree to receive care for my health from the pharmacist in this clinic.
5. I understand I do not have to pay money for this service.
6. I agree that my information collected by this Project can be used for the purposes described.
7. I freely give my consent for participation in the IPAC Project.
8. I understand that I will be given a signed copy of this document to keep.

_____	_____	_____
(Participant)	(Signature of Participant)	(Date)
_____	_____	_____
(Witness)	(Signature of Witness)	(Date)
_____	_____	_____
(Team member)	(Signature of Team member)	(Date)

The ***IPAC Project*** is the *Integrating Pharmacists within ACCHSs to improve Chronic Disease Management Project (IPAC).* The Project Partners and Project Team Steering Committee for the ***IPAC Project*** include: The National Aboriginal Community Controlled Health Organisation (NACCHO); Pharmaceutical Society of Australia, and the College of Medicine and Dentistry, James Cook University. *Evaluation Team* members include the Project Partners, and the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); Queensland Aboriginal and Islander Health Council (QAIHC); and the Aboriginal Medical Services Alliance in the NT (AMSANT). The Project Reference Group includes representatives of NACCHO, Affiliates and ACCHSs.

College of Medicine and Dentistry, James Cook University on behalf of the **National Aboriginal Community Controlled Health Organisation, and the Pharmaceutical Society of Australia (**IPAC Project Partners).
Douglas Parade, Townsville, Qld, 4812.
Tel: 07 47816062; Email: sophia.couzos@jcu.edu.au

MASTER SITE PARTICIPATION BRIEF

Title	*Integrating Pharmacists within Aboriginal Community Controlled Health Service (ACCHSs) to improve Chronic Disease Management Project (IPAC)*
Short Title	*Putting Pharmacists into ACCHSs*
Project Sponsor	*James Cook University*
Coordinating Investigators	*Associate Professor Sophia Couzos (JCU), Ms Deb Bowden (PSA), Mr Mike Stephens (NACCHO), Ms Dawn Casey (NACCHO)* s47F *Dr Erik Biros (JCU), Dr Deborah Smith (JCU),*s47F
Evaluation Team	
Location	*[Name of ACCHS]*

What is the IPAC Project?

IPAC stands for *'Integrating Pharmacists within Aboriginal Community Controlled Health Service (ACCHSs) to improve Chronic Disease Management'* Project.

This project will explore if including a registered non-dispensing practice pharmacist as part of the primary health care team within Aboriginal community controlled health services (ACCHSs) leads to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples. The project will explore improvements in prescribing by doctors, if patients are more likely to take their medicines, and if indicators of their health are improving over time, by measuring these factors before and after the pharmacist is appointed. Practice pharmacists will work with the doctors and other health staff in each ACCHS for a period of 15 months per service, in Vic, Qld and the NT.

Practice pharmacists will provide relevant healthcare activities within their scope of practice to patients. They will also provide education and training to existing staff within the services (as appropriate), improve relations with community pharmacies to overcome barriers that patients may face in accessing medicines, and assist in managing medications at transitions of care (such as discharge from hospital). This project will also explore the cost-effectiveness of pharmacist integration within ACCHSs.

How did this Project come about?

The Project was developed at the request of the National Aboriginal Community Controlled Health Organisation (NACCHO, representing ACCHSs across Australia) and the Pharmaceutical Society of Australia (PSA, representing pharmacists). The Project is a tripartite partnership between NACCHO, PSA and James Cook University (JCU). Participants include Affiliates of NACCHO in Vic, Qld, and the NT, up to 22 ACCHSs in these jurisdictions, practice pharmacists, and patients who will receive healthcare support from a pharmacist.

Community-based participatory research principles and methods are used to make sure there is appropriate Aboriginal governance over this Project.

Why is this Project important?

Aboriginal and Torres Strait Islander peoples experience a much higher burden of chronic disease due to cardiovascular, diabetes, and other health problems, and yet have poorer access to needed medicines.[1,2] Adverse health outcomes from these illnesses are preventable

if prescribing quality is improved, and patients are better supported with medicines use, which is a key health equity issue.

Non-dispensing pharmacists are not currently funded consistently or reliably to work within primary health care settings in the public health sector in Australia. Despite this, several ACCHSs across Australia have innovatively sourced funds and/or developed partnerships with community pharmacy's to source pharmacists in non-dispensing roles. This project is modelled on these pharmacists' roles and on international research evidence. There is extensive global evidence that practice pharmacists co-located within general practice clinics can enhance chronic disease management and quality use of medicines.[3]

The NACCHO and the PSA have promoted the need for this project for many years. The project will help the Australian Government make decisions about future funding and the role practice pharmacists may play as members of primary health care teams within ACCHSs and potentially other settings in Australia.

What is the aim of this project?

This project aims to improve quality of care outcomes for Aboriginal and/or Torres Strait Islander adult patients with chronic disease by integrating a practice pharmacist within the primary health care team of ACCHSs. This means the Project will investigate:

- Improvements in health measures of those patients who have been receiving support from a pharmacist and who agree to participate in the Project;
- Improvements in:
    - prescribing so that medicines patients are taking are appropriate for them and their individual healthcare needs;
    - patient adherence to medicines;
    - health service utilisation of Medicare;
    - relationships with and perceptions of stakeholders (ACCHSs staff; community pharmacies; pharmacists);
- The cost-effectiveness of the intervention, which will investigate the costs of the pharmacist service and measures of effectiveness such as increased Medicare utilisation (as a marker of increased patient access to healthcare services towards equity).

Does this project have ethics approval?

Ethics approval has been received from a Victorian Human Research Ethics Committee (HREC). This is the St Vincent's Pubic Hospital HREC in Melbourne. This HREC participates in National Mutual Acceptance of ethics. This means that the review of this committee in Victoria may be acceptable to other HRECs. Acknowledgement from JCU has also been received. This Project will also seek ethics review from two other HRECs in the Northern Territory. These are the:

- Menzies School of Health Research HREC
- Central Australian HREC

As this project is to be run in Qld, Victoria and the NT, ethics review is required from all these jurisdictions.

How is the Project funded?

The Australian Government under the Pharmacy Trials Program of the 6th Community Pharmacy Agreement has funded the project for 29 months.

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Governance

The Project Partners and the Project Operational Team

This project is a partnership between the PSA, NACCHO, and JCU (College of Medicine and Dentistry), guided by a Memorandum of Understanding that outlines communication and governance processes.

The PSA, as the lead agency, is responsible for managing the Head Agreement with the Department of Health, and service agreements with partners and ACCHSs, and will coordinate the appointment of practice pharmacists, their recruitment, selection, placement, and training. The NACCHO will provide Aboriginal governance leadership for the project and coordinate all communication with ACCHSs, Affiliates and the NACCHO Board. JCU will undertake the project evaluation, having developed the research methodology based around a pragmatic, community-based participatory research model.

The Project Operational Team is made up of the project partners and is Chaired by the Deputy CEO of NACCHO, Ms Dawn Casey.

Steering Committee

The Operational Team will report to this group as this is made up of representatives of the Project partners, the Department of Health, the Pharmacy Guild of Australia and external experts.

Members of the Evaluation Team

The Project Partners are members of the evaluation team as are other Aboriginal community representative bodies. These are the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); the Queensland Aboriginal and Islander Health Council (QAIHC), and the Aboriginal Medical Services Alliance in the NT (AMSANT). These organisations are NACCHO Affiliates and will be responsible for state-based service support to registered ACCHSs, and provide guidance to the project as members of the evaluation team.

Project Reference Group

State and Territory Affiliates of NACCHO (QAIHC, VACCHO and AMSANT) will be members of the Project Reference Group. Participating ACCHSs will also be invited to be members of the Project Reference Group managed by NACCHO. The Chair of the Project Reference Group will be a nominated member of the NACCHO Board of Directors. This group will meet by teleconference or web-based platforms.

Aboriginal governance and leadership

The way in which these groups communicate and link with each other is shown in Figure 1 and 2. The Project respects and acknowledges Aboriginal governance principles, and ACCHS sector leadership and involvement.

Figure 1. Governance and partnership structure of the IPAC project

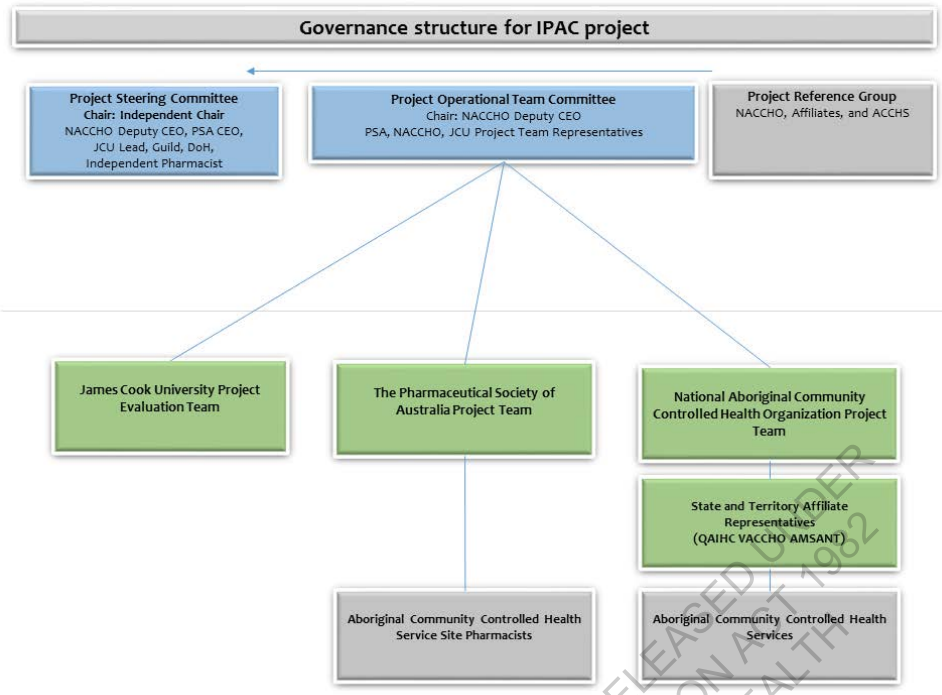
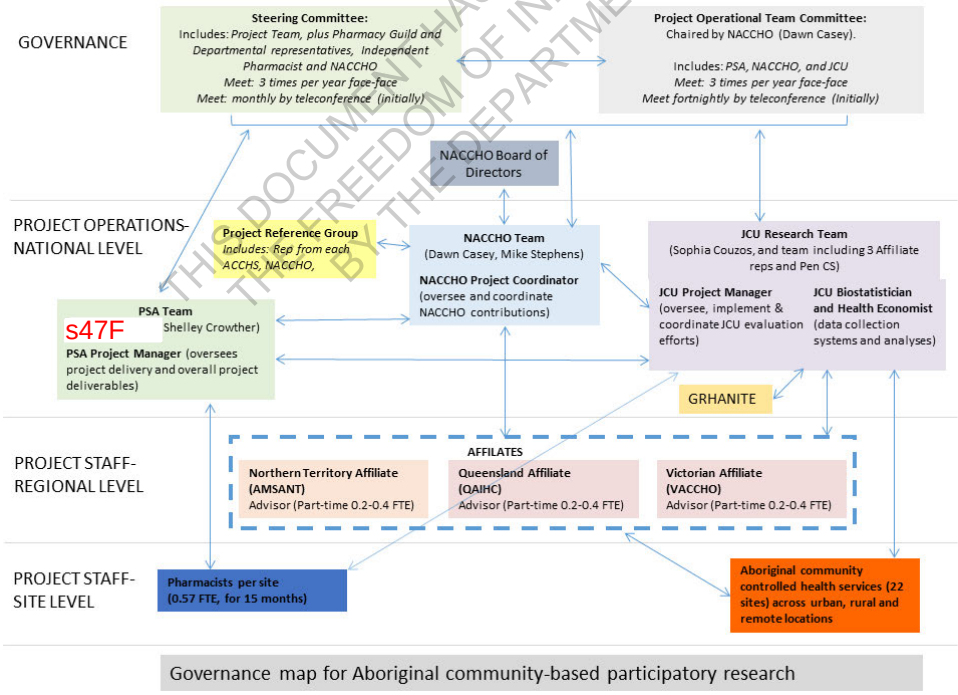


Figure 2. Governance map for the IPAC project.



What is the design of this project?

The project partners are committed to undertaking the Project to ensure clear benefits to ACCHSs, and to ensure acceptability and sustainability of the intervention within ACCHSs.

The project is a pre and post study where the pharmacist intervention will be added to standard primary health care practice within ACCHSs. Information will be collected from the

time the pharmacist starts until they finish, and this will be compared with information from 12 months before the pharmacist started.

The parts of the project

There are three project phases over a 29 month project duration: Phase 1: Establishment (4 months); Phase 2: Implementation/intervention (19 months); Phase 3: Analysis and Reporting (6 months). The project is scheduled by be completed by April 2020. ACCHSs will be invited in stages (tranches) and will therefore be staggered. This is so that the project can give time to each service to get them ready for the project.

The selection of project sites

The project is inviting ACCHSs in geographically diverse settings in Vic, Qld, and NT. Up to 22 ACCHSs will be able to participate. ACCHSs need to meet certain eligibility criteria to participate as project sites.

The eligibility criteria for ACCHSs is:

- The ACCHS employs at least one (1) full-time- equivalent (FTE) general practitioner per clinic who is able to prescribe medicines to clients of that organisation.
- The ACCHS does not currently employ a non-dispensing practice pharmacist at the participating clinic.
- The ACCHS uses a clinical information system such as Communicare, Best Practice, and Medical Director.
- The ACCHS has participated in continuing quality improvement and reporting on the national Key Performance Indicators for at least 24 months through the use of electronic data extraction tools.
- The ACCHS is participating in the *Quality Assurance for Aboriginal and Torres Strait Islander Medical Services* (QAAMS) program, if it is conducting 'point of care' testing.
- The ACCHS agrees to download the GRHANITE data extraction tool into one computer within the practice, adhere to program business rules/protocol and guidelines, data provision requirements, and patient/service consent requirements for the evaluation of the program.
- The ACCHS can provide the practice pharmacist access to a private consulting room on the clinic premises that has access to the clinical information system used by the practice.
- The ACCHS can allocate a staff member who will act as a 'go to' person to assist the practice to obtain informed patient consent.
- The ACCHS is a member of NACCHO, and the relevant NACCHO State/Territory Affiliate.
- The ACCHS is an accredited practice in accordance with the RACGP Practice Standards.
- In non-remote locations, the ACCHS must be participating or eligible to participate in the PBS co-payment measure (practice incentive program).
- In remote locations, the ACCHS must be eligible to participate in the remote Section 100 arrangements for the supply of pharmaceutical benefits

These criteria have been developed with Affiliate input to suit most ACCHSs in Qld, Vic, and the NT, and to make the project as 'real life' as possible. It is important that ACCHSs have clinical information systems (CIS) that the pharmacist can use like other health staff. Only the listed clinical information systems can work with the GRHANITE^{TM} tool to collect information. (GRHANITE is explained later in this document).

The project will recognise the diversity of Aboriginal peoples and Torres Strait Islanders and models of care across Australia, and will select ACCHSs in urban, regional and remote areas.

This is so that the project can understand the many ways that ACCHSs may utilise the pharmacist in their clinic.

How will ACCHSs be invited to take part?

ACCHSs will be invited to participate in the project by NACCHO and Affiliates through an 'expression of interest' process. The 'expression of interest' process will explain to ACCHS the process that will be used for site selection.

The Project Operational Team, Chaired by the NACCHO Deputy CEO will review the expressions of interest and decide if a temporary Panel made up of Affiliate representatives is necessary to select the most suitable sites to participate in the project. As the recruitment process for sites will be staggered, this process will be repeated.

When NACCHO receives an expression of interest from an ACCHS, and the ACCHS is agreed to being a suitable site, the NACCHO Project Coordinator will contact the ACCHS and explain the project further to provide instructions on the process required to establish the site participation.

Formal participation of ACCHSs

After this consultation, a Site Agreement, Site Consent form, and Site Participation Brief *(this document)* will be provided to the ACCHS. Once this is signed and agreed, the project officers will arrange for practice pharmacist recruitment and placement within the ACCHS.

A visit to the ACCHS will be arranged to undertake a 'Needs Assessment' and a 'Health Systems Assessment' just before, or at the time that the practice pharmacist commences (these are explained later in this document).

How will each ACCHS benefit from this project?

Each service will be offered a practice pharmacist (aggregated 0.57 FTE across 22 sites each for 15 months duration) under a service agreement with the PSA. This will enhance the medicines-related workforce capacity of the ACCHS. Practice pharmacists are registered to work within their scope of practice and will have a non-dispensing role. The appointments will include salary, training, and the provision of supportive resources.

In the short-term, Medicare claims for medications-related, preventive care and chronic disease care may increase. The practice pharmacist will support other staff with quality prescribing and medicines use. The relationship with community pharmacies in the local area may improve if pharmacies' are helped to provide more appropriate services to the local community. Relationships between the ACCHS, local hospitals and other care providers may improve with communication between care providers when it pertains to the medicines that patients are taking.

These short-term benefits have potential for long-term gains for the sector as a whole. The project will provide the Australian Government with the evidence-base (biomedical, process, and economic evaluations) for the development of national health policies to potentially support on-going resourcing for practice pharmacists integrated within ACCHSs.

What is the role of the Affiliates in this Project?

NACCHO is a project partner and will maintain Aboriginal governance over this project. Affiliates are also participants in this project. They will be providing support to ACCHSs through funded project officer positions (0.2-0.4 FTE). The ACCHS will be notified of the name and contact details of the Affiliate staff to contact if and when the service needs to.

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What is the pharmacist's role in the ACCHS?

The pharmacist employed within the ACCHS will deliver medication advice and education to patients and staff. They will work to improve patient medication adherence, improve prescribing, tailor medications to best suit the patient in collaboration with the prescriber, and assist with/oversee medication management processes. They may provide health promotion, disease prevention, and assist patients with chronic disease self- management and more judicious use of medicines.

The pharmacist will be required to respond to medication enquiries from patients and health professionals such as general practitioners and Aboriginal and Torres Strait Islander Health Workers/Practitioners, conduct staff education, review prescribing, mentor new prescribers, participate in case conferences, liaise across health sectors, undertake medication management reviews, and evaluate drug utilisation to ensure optimal therapy. As part of their collaborative work, an important element of the practice pharmacist's role is liaison with local community pharmacists to ensure continuity of care, and assist in medication management with transitions of care (such as when the patient is discharged from hospital).

Overall, there are 10 core roles targeting *patients*, and *health professionals and health systems.* These roles are all non-dispensing, for which practice pharmacists are registered to deliver. This is summarised in Table 1.

Whilst the project has developed these core roles for evaluation purposes, each participating ACCHS has the flexibility to utilise the services of the pharmacist according to service and client priorities. Practice pharmacists will be supported to adapt to cultural ways of delivering primary health care within each service. The project will aim to document the diversity in pharmacist core roles and in the patient journey. This will be possible through qualitative evaluation, but also through pre-post Health Systems Assessments (this is explained later in this document). The practice pharmacist will be supported to adapt to their role as directed by the staff and CEO.

Most of the practice pharmacist's activity must be devoted to providing supportive clinical care to patients who are participants in this project.

Table 1. Summary of practice pharmacists core roles

SUMMARY OF PRACTICE PHARMACISTS CORE ROLES

Core Role #	Theme	Core activity
1 (a)	**Medication Management Reviews**	Pharmacist reviews the medication the patient is taking. The pharmacist initiates and facilitates a medication management review- which may be a Home Medicines Review (HMR) or a non-HMR (medication management review not conducted in the patient's home)
1 (b)		Pharmacist reviews the patient who had a HMR after 12 months and a Non-HMR after 3-6 months.
1 (c)		Pharmacist ensures the MMR is claimed by the practice when completed (as a DMMR item 900 or RMMR item 903)
2	**Team-based collaboration**	Pharmacist participates in clinic activities that support team-based chronic disease care plans, and cardiovascular (CV) risk assessment
3 (a)	**Medication adherence assessment & support**	Pharmacist assesses the medication adherence of the patient being seen
3 (b)		Pharmacist improves the patient's experience with their medicines
4	**Medication appropriateness audit**	Pharmacist assesses 'medication appropriateness and underutilisation of medicines' as an audit of a sample of patients with chronic disease.
5	**Preventative health care**	Pharmacist provides preventive interventions to patients

6	**Drug Utilisation Review**	Pharmacist conducts a DUR to audit and improve a priority issue at the service
7	**Education and training**	Pharmacist conducts education sessions at the service
8	**Medicines information service**	Pharmacist provides medicines related information to staff within the service and responds to clinician medicines enquiries.
9	**Medicines stakeholder liaison**	Pharmacist develops a written stakeholder liaison plan supporting engagement with community pharmacies.
10	**Transitional care**	Pharmacist facilitates care coordination with relevant hospitals; residential aged care facilities, etc.

Pharmacist's qualifications

Pharmacist's who will be able to work in ACCHSs will be required to have:

- current registration with the Australian Health Practitioners Regulation Agency (AHPRA) as a pharmacist;
- more than 2 years post-registration experience;
- medication review accreditation such as from the Australia Association of Consultant Pharmacy (AACP) or Society of Hospital Pharmacists of Australia (SHPA) or working towards accreditation;
- post-graduate clinical qualifications or demonstrated clinical experience (e.g. hospital or HMRs).

The need for post-graduate qualifications or accreditation will be dependent on ACCHSs preference regarding the applicant and an adequate supply of accredited and experienced pharmacist applicants.

The PSA confirms that the proposed activities are consistent with the existing scope of practice of pharmacists as defined by the PSA Competency Standards endorsed by the Australian Health Practitioner Registration Agency.

Training the pharmacist at the ACCHS

The PSA will deliver the training to practice pharmacists in partnership with NACCHO. Some of the training will be off-site (before the pharmacist starts) and some will be on-site (at the start of their placement in the ACCHS). The NACCHO Coordinator and PSA training facilitator will arrange a training time with the practice pharmacist and with the nominated ACCHS, so that on-site training can best suit the ACCHS.

To follow up training, pharmacists will also have access to structured pharmacist mentor program that will link them with a dedicated mentor pharmacist with experience in the ACCH sector and to the other practice pharmacists within the project.

What patients' are eligible to be participants in this project?

If the patient is aged 18 years of age and over and has the following conditions, then they are eligible to be a participant in this project:

- Cardiovascular disease (coronary heart disease, stroke, hypertension, dyslipidaemia and any other CV disease)
- Type 2 diabetes mellitus,
- Chronic kidney disease,
- Other chronic conditions that mean a patient is at high risk of developing medication-related problems (e.g. polypharmacy).

These conditions are selected because *most* of the mortality gap for Aboriginal and Torres

Strait Islanders is due to these chronic diseases. Optimizing medicines for people with these conditions can make an important impact on their health.

The consent of the patient will be required to participate in this project. Most of the patients attending ACCHSs are of Aboriginal and Torres Strait Islander origin (81%).[4] Therefore, we expect most of the patients involved in this project will be of Aboriginal and Torres Strait Islander origin.

Patients who are regular patients of the service should be prioritised as pharmacists will make sure they follow-up these patients over time.

If a patient consents to be a participant, how may they benefit from this project?

These participants will have immediate access to an on-site pharmacist at no charge. The Pharmacist will check their medicines and make sure they are right for them. Some recommendations may require the prescriber to change medicines or their dose, or cease a medication, or start a necessary medication.

The pharmacist will help resolve problems the participant may have with taking medicines, storing them, and will assess for adverse effects. Participants will be offered medication review in the clinic, or at home, or a place that best suits them. Just like the doctors and other staff, the pharmacist will record the encounter and recommendations in the CIS so that the doctor and health team can read them and make any agreed prescribing changes. The pharmacist also has more time to spend on supporting participants with medications than the doctor has.

The Pharmacist will see participants again to provide them with ongoing support. The pharmacist may follow-up with other members of the primary healthcare team, including with community pharmacy, and depending on the participants needs, with the hospital for discharge medications. This intensive support may help to improve the health of the participant.

There are no other expectations on participants in this project. Personal details of participants are not collected at all, and the data being extracted for the project is completely de-identified. A *Participant Consent Form* and *Participant Information Brief* is available for the ACCHS and practice pharmacist to seek patient consent. Patient participation in this project is voluntary. If consent is not given, this will not affect the patient's routine treatment, or their relationship the clinic, and the patient will still be able to be referred to the Pharmacist.

If a patient consents to be a participant, how may this benefit the ACCHS?

If patients agree to be participants, this enables the ACCHS to collect information for the purpose of the project. The participation of the patient will assist the ACCHS to collect information to determine the clinical and cost-effectiveness of the practice pharmacist, and will support the clinic activity overall (with Medicare and staff education). The information will inform on whether the health of participants improves over time, compared to their health before they received the services of the pharmacist. The ACCHS may receive a site-specific report if they wish. If patient consent is not given, information cannot be extracted from the CIS for this project. Patient consent is therefore vital to assess the value of the practice pharmacist within ACCHSs.

How will patients be referred to the pharmacist in the ACCHS?

The staff within the ACCHS will need to be briefed about this project and the role of the practice pharmacist. The project will also seek the consent of general practitioners in the clinic

and provide them with an *information brief*. This *Site Participation Brief* can assist the ACCHS with informing other staff.

Patients attending the ACCHSs doctor, health worker or other healthcare provider will be invited to talk to a practice pharmacist. These staff can refer the patient to the practice pharmacist. NACCHO and the PSA will prepare some simple promotional material to help health staff with this referral, so that patients who are most in need and meet the inclusion criteria are offered the services of the pharmacist.

The practice pharmacist or a designated staff member will tell the patient about this Project (and provide the patient with the *participant information brief*) and ask them if they want to take part. They will then be asked to *sign a participant consent form*. They may see the Pharmacist straight away or an appointment may need to be made for a later time.

The practice pharmacists (with assistance from trained ACCHS staff) may also directly approach patients attending the clinic who meet the individual participant criteria. The process for participant recruitment will be flexible according to the preferred process recommended by the ACCHS. This can be arranged during the first site visit to the ACCHS (see later in this document).

How will our ACCHS seek patient consent?

A suggested process for seeking individual patient consent has been developed in consultation with NACCHO Affiliates on the Evaluation Team. The process respects the systems that ACCHSs may wish and choose to adopt.

The practice pharmacist will be trained to seek the participant's consent. Training for seeking participant consent will also be provided to other staff who may be designated by the ACCHS to seek the participant's consent for cultural appropriateness reasons.

The participants consent form will then be signed and dated by the patient, a witness, and the designated staff member seeking patient consent. The consent form will be stored in a locked briefcase by the practice pharmacist until posted by registered post. It may be transmitted electronically to JCU after scanning. A written copy of the verbal information will be provided to the patient, including advice on how they may ask questions or make complaints about the project.

Consent will then be recorded on the clinical information system (CIS) by the practice pharmacist and GRHANITE will extract information only from consented patients. This suggested process is summarised in Figure 4.

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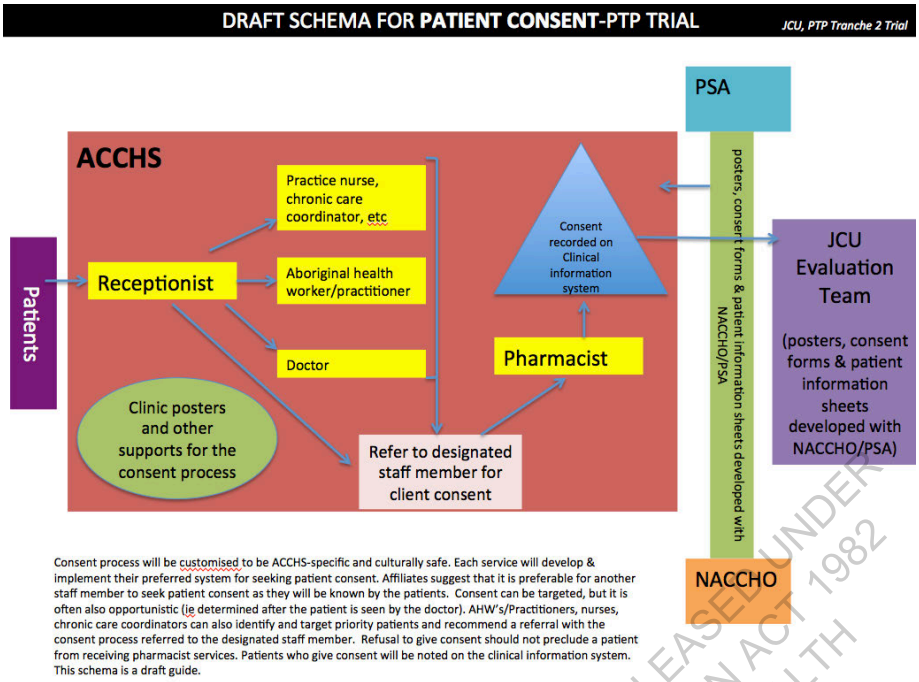
Figure 4. A suggested process to seek patient consent.



How will participants be followed-up?

Practice Pharmacists will aim to follow-up participants using the usual clinic processes. Pharmacists will work with the existing staff in the ACCHS to follow-up participants in the same way used for all patients. Participants will need to be reviewed according to clinical needs and Medicare rules, and may include 3-monthly, 6-monthly or an annual review or more frequent review by the pharmacist.

The pharmacist will need to use the CIS within the ACCHS to record follow-up clinical details like other healthcare staff. The pharmacist will also record follow-up details in the pharmacist log-book as is appropriate for the type of review being conducted (such as medication appropriateness index measurements).

How many patients will ACCHS be asking to participate?

It is estimated that the practice pharmacist and the ACCHS may seek consent from about 350 people to be part of this Project and to see the Pharmacist over 15 months. This may vary considerably from service to service.

It is important for the ACCHS to encourage patients to be referred to the pharmacist early in the project. This is so that enough time is available to follow-up patients during the 15 months the pharmacist is employed in the project.

Are there any risks or benefits to patients from taking part?

The Pharmacist is a qualified and registered health professional who will be trained to work in this ACCHS. The risks to patients are no different to seeing a Pharmacist in a Pharmacy, except that patients will be seeing Pharmacists in this clinic. The Pharmacists will not be prescribing or dispensing medicines as they would in a Pharmacy. They will be working with the primary health care team in the ACCHS.

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How will information for the project be collected?

The project has been designed to be acceptable and feasible to ACCHSs and practice pharmacists, by making most of the data collection a 'by-product' of service delivery. There are three main types of information that will be collected with the help of ACCHSs. Information will be collected from clinical information systems (CIS), pharmacist log-books (managed by the pharmacist), and from site visits to ACCHSs.

1. Deidentified information about patients who have consented (participants) will be collected from services clinical information systems (CIS), using an electronic data extraction tool known as **GRHANITE™**. ACCHSs will be supported to have the GRHANITE data extraction software installed in one personal computer in the clinic. This software will be installed in one workstation to minimise practice impact. When GRHANITE runs, it does so at a scheduled time and queries data from the practice database server. This is the only time GRHANITE communicates with the practice server. GRHANITE will extract weekly data from the CIS to the secure JCU repository. The ACCHS does not need to do anything to maintain that this program is working.

2. Practice pharmacists will also collect information about what they do through an **electronic log-book**. This system will be an online secure database requiring practice pharmacist secure log-in. It will be used by practice pharmacists to record deidentified daily activity. Each electronic log-book entry will be able to be interrogated by the JCU data custodian. The daily-recorded activity will refer to 6 core pharmacists roles. The electronic interface will be user-friendly to minimise the reporting burden of practice pharmacists.

3. **Health systems assessment, qualitative data, and cost-effectiveness analysis** data will be collected during visits to the ACCHS. Mainly the NACCHO Project Coordinator, will undertake visits to the ACCHS. A qualitative researcher will visit only three ACCHSs if they are invited by the service. The costs related to the employment of pharmacists will be sourced mainly from the PSA.

How does GRHANITE work and how secure is it?

GRHANITE™ strictly conforms to extract only data that is approved. It provides ethical and secure mechanisms for the provision of data from the CIS. If an individual gives their permission to be involved in a project, GRHANITE can read this consent information if it is recorded in the clinical notes. Patients who have not consented will not have their data interrogated, even if deidentified. This is an 'opt-in' consent process. Patient names, dates of birth, address or other identifying information are not extracted.

The data extraction from the CIS within the ACCHS will only extract deidentified data and then transmit it securely to the secure repository at JCU. The exported data is encrypted, and can only be decrypted at its final destination. This ensures transmission security. Data is deidentified as patients are assigned a unique patient ID. It is not possible for the project partners to reidentify any patient.

GRHANITE software will not operate if copied or moved from one computer to another. All installations require a unique authorising license. It is a nationally recognised tool as over 1000 health services across Australia have used/are using this for quality improvement and for research activity.

JCU will be the repository body responsible for the protection of data from loss, misuse and unauthorised access. A data custodian will be appointed (the biostatistician investigator). JCU will comply with the Code for the Responsible Conduct of Research (JCU) [This Code has been adapted from the Australian Code for the Responsible Conduct of Research ["the National

Code"], developed jointly by the National Health and Medical Research Council, Australian Research Council and Universities Australia, and published in 2007.[5]

What type of information will be collected by GRHANITE?

The information will be deidentified and only from consented patients (participants). The information will refer to periods 12 months before, and the periods after the pharmacist first provided support to the participants. This is summarised in Table 2.

Table 2. Deidentified patient information that will be extracted from clinical information systems (CIS) in the ACCHS

Measure	Detail
Patient characteristics	age, year of birth, sex, height and weight (for BMI), condition (diabetes, hypertension, dyslipidaemia, CHD, PAD, CVA, CKD, plus other disease *(in patients who fit the inclusion criteria with polypharmacy)*, smoking status (history details: start/stop year), postcode, CTG status, ethnicity, Aboriginal and Torres Strait Islander status, DVA status, pension/concessional status, year of death.
Encounter/contact indices & other demographic measures	contacts with staff (different job roles), episodes of care (date of visit, reason for visit, duration, visit type), patient status/record status (active), created and updated dates and user who created and updated the record; consented patients; patients ID/MRN/UR number/chart No/record No
Biometric indices	Diastolic and systolic BP, HbA1c, lipids (HDL, LDL, TG's, and TC), CV absolute risk assessment (levels and risk), ACR, e-GFR,
Prescribing indices	All medications (including PBS drug code); all information contained within prescriptions (route, strength, formulation, quantity); date of the script being generated, including ceased/delete date; deleted flag (if any) and reason for delete or ceased; created and updated dates, and user (job role) who created and updated the record. This information is for both current medications and past medications.
Dispensing indices	All medications (including PBS drug code); all information contained within prescriptions (route, strength, formulation, quantity); date of the medicine being supplied and dispensed; user (job role) who created and updated the record. This information is for both current medications and past medications.
Measures of health service utilisation:	
Medicare Benefits Schedule indices	900 (DMMR or HMR), 903 (residential aged care DMMR or HMR), 721 (GPMP), 732 (GPMP review 3 months later), 715 (Health Check) and other MBS items related to the evaluation of pharmacist activities; record status, created and updated dates, and user (job role) who created and updated the record, item billing amount.
Non-HMR data (out-of home interviews)	non-HMR flagged in CIS will link this to the above variables *(to be recorded by the pharmacist).*
Measures of medication adherence	• Electronic measures of medication adherence *(to be calculated by the evaluators)* • Medication Adherence *(to be recorded by the pharmacist)*

ACR= albumin-creatinine ratio; BP= blood pressure; CIS= clinical information systems; CKD= chronic kidney disease; CTG= Close The Gap; CV= cardiovascular; CVA= cerebrovascular disease; DET= data extraction tool (GRHANITE); DMMR= Domiciliary Medication Management Review; DVA: Dept of Veterans Affairs; e-GFR= electronic glomerular

filtration rate; GPMP= General Practice Management Plan; HDL= high density lipoprotein; HMR= Home Medications Review; LDL= low density lipoprotein; MAI= Medication Appropriateness Index; PAD= peripheral artery disease; TC= total cholesterol; TG= triglyceride

What type of information will be collected by the pharmacist in the log-book?

The pharmacist will record their daily activity in the log-book. This will include information about education sessions they provided to staff, adhoc advice provided and any evidence this led to an outcome, the development of any resources for patients or the ACCHS, whether the pharmacist developed a plan to liaise with community pharmacy (and details of that plan), and the number of medicines reconciliations from stakeholders like hospitals.

In particular, the pharmacists log-book will enable practice pharmacists to record the results of medication assessments for each of 30 participants. Of the participants seen by a practice pharmacist, 30 participants per site will have their medications intensively appraised as part of the medication management review.

No personal information about participants is contained in the log-book. The participant does not need to be present for the medication assessment as it is an audit of the participants medications held in the CIS.

The pharmacist will only record the unique 'patient ID' to enable matching of the medication assessment audit of 30 participants to the participant data extracted through GRHANITE.

The practice pharmacist will communicate the findings of the medication assessment for the participant to the prescribing team within the ACCHS so that appropriate clinical action is taken. Practice pharmacists will ensure that the assessment takes account of additional clinical information such as an assessment of the participant's absolute cardiovascular risk when assessing their medications.

Practice Pharmacists will follow-up participants as per usual clinic processes. These follow-up mechanisms may vary from service to service (see above).

What type of information will be collected during the site visits?

Every participating ACCHS site will be visited at least twice during the project.

1. The 'needs assessment' visit (see '*what will happen during the first visit'*).

2. To conduct a 'health systems assessment' (HSA):

- at the time of, or just prior to the appointment of the pharmacist, and
- repeated towards the end of the implementation phase (month 12-15).

The NACCHO Project Coordinator will conduct visits and assessment with assistance from Affiliate staff. The needs assessment and health systems assessment will be conducted at the first visit.

The '*needs assessment'* will collect information about what the ACCHS may need to support the practice pharmacist to work in that clinic. This will be used to help the pharmacist to get started.

The *'health systems assessment'* will source information about the ACCHS. Each ACCHS is different in many ways. The project needs to understand how many staff (and types) are employed within the ACCHS, the total service population, the total service budget, Aboriginal governance structures, health services on offer, quality improvement processes, models of care such as outreach, if home medicines reviews are conducted and how, type of CIS used, recall systems in place, the adequacy of existing communication with the hospital, and community pharmacy/ies, medicines access information, use of point of care testing, regional

services available such as specialist and allied health visits, and how the ACCHS will implement and define the core roles of practice pharmacists.

A meeting with key informant staff in a focus group setting will be needed to undertake the health systems assessment. This information will be collated in a summary report for the ACCHS to use for any quality assurance activity.

What type of information will be collected for qualitative analysis?

Three ACCHSs will be invited to participate in a qualitative evaluation of the Project in mid-late 2019. ACCHSs will be asked if they will support focus group discussions with certain patients, Aboriginal health workers/practitioners, and with the pharmacist on site. These meetings will be fully catered and will be conducted in ways to minimize clinic disruption. ACCHSs will be contacted closer to that time to explain what that might involve.

What will happen during the first visit to the ACCHS?

The 'needs assessment' visit to the ACCHS will elicit the type of support needed by the ACCHS so that the practice pharmacist may best be integrated within the service. The visit will also assist the ACCHS to establish their preferred system to seek patient consent, and ensure the pharmacist can use the CIS, has a space to consult with patients, and the CIS is set to accept the 'job-role' for the pharmacist (this is necessary for the GRHANITE data extraction). A 'health systems assessment' may also be undertaken at this visit (see above).

The NACCHO Project Coordinator will make contact at this visit with the nominated ACCHS staff member who will act as a 'go to' person. Together with the nominated 'go to' person/s and relevant ACCHS staff, a project consent pathway and process that is responsive to the local ACCHS' model of care will be planned. A second 'go to' person may also need to be identified by the ACCHS and Coordinator as contingency for leave, resignation or movement between clinics or roles.

The NACCHO Project Coordinator will ensure that the service has adequate promotional material and strategies to engage both ACCHS staff and clients.

Who owns the GRHANITE information?

The raw (unanalysed) data collected from the GRHANITE data extraction is owned by the ACCHS even though it will be used, analysed and stored safely by JCU. Details regarding this is included in the service agreement with the ACCHS for this project.

Intellectual Property

Details regarding Intellectual Property of the Project will be included in the Service Agreement with the PSA.

Use of information collected by the Project

The information collected from this project will be used to prepare reports to the Australian Government on 'quality of care' outcomes (the project objective) that arise from integrating a practice pharmacist within ACCHSs. The reports will assess change in the:

- quality of prescribing,
- quality of medicines support through indicators of health service utilization,
- quality of the patient, service and stakeholder experience, and
- ultimately an effect of these improvements on biometric indices as a measure of health outcome.

The reports will also assess the cost-effectiveness of the practice pharmacist within ACCHSs.

The data analysis will also be able to provide ACCHSs and Affiliates with local level and aggregated data. Most analyses at this level would not be meaningful because the number of participants will be too small. However, the information will be aggregated at a national level for the NACCHO, Affiliates, ACCHSs, and the PSA, as well as the Australian Government. This will inform the development of health policy about practice pharmacists and the role they can play supporting Aboriginal and Torres Strait Islander peoples with chronic disease in Australian primary health care settings.

Health systems assessment summaries will also be able to be provided to ACCHSs for their use.

Security of information collected by the Project

As the leading research organisation, JCU (the repository body) will be responsible for the protection of data from loss, misuse and unauthorised access. The Data Custodian (Biostatistician: Erik Biros) will be responsible for this role.

Further, the Project Operational Team, Chaired by the Deputy CEO of NACCHO, will be consulted in all matters brought to its attention with regard to concerns about data security.

How will the collected information be transported to JCU?

Completed Site Consent Forms will be collected by the NACCHO Project Coordinator, scanned and sent electronically to the data custodian. Participant consent forms will scanned by the practice pharmacist and electronically transmitted to the data custodian. The forms will be stored electronically in a secure computer under the management of the data custodian on the property of College of Medicine and Dentistry, James Cook University.

Information extracted using GRHANITE and from the Pharmacist log-book will be transmitted electronically and stored on password-protected internal server on JCU premises. Data accessed during the analysis phase will be stored in JCU-supported database applications only.

Health Systems Assessment (HSA) and Needs Assessment information collected from site visits, will be collected on paper-based forms, (or in electronic format) collected by the NACCHO Project Coordinator and will be transported in a locked briefcase, scanned and stored in electronic format in a secure computer under the management of the data custodian.

Where and for how long is the information going to be kept?

Data will be kept for a minimum period of 7 years from the end of the year of publication of the last refereed publication or other form of public release to an audience external to JCU.

Electronic data will be stored on password-secured databases only. Any paper-based documents will be scanned and stored electronically, and the paper documents stored in a locked cabinet in a secure room at JCU. The data custodian (Biostatistician- Erik Biros) will be responsible for data storage consistent with the JCU *Code for the Responsible Conduct of Research.*

After the minimum period of storage, the data may be considered for disposal if there is a written request to the Evaluation Lead, from both the NACCHO and the PSA for the disposal of the data. As the raw unanalyzed data extracted by GRHANITE is owned by the ACCHSs, JCU will seek instruction from NACCHO and each ACCHS as to the ongoing use or destruction of this data. The Evaluation Lead will authorize the data custodian to delete the data if this is instructed by NACCHO, in accordance with the JCU *Code.*

Who will be able to access this information?

Data will be accessible only to members of the Evaluation Team who will have a role in handling this information. From time to time, one member of the evaluation team (the

University of Melbourne HaBIC Research Information Technology Unit) may need access to the data-landing server at JCU to provide technical support services.

ACCHSs may request access to de-identified information from their service. These requests can be made to the Project Operational Team or its members, or directly through the NACCHO Affiliate or Project Officers involved in this project. The request must also include documentation of intended data use and must align with project objectives (the individual consent provided by each participant). Requests to access the data that *does not align* with the project objectives will need HREC approval. Similarly, Affiliates may request access to data at their jurisdictional level. This request must be in writing and align with the project objectives.

External requests from other organizations and research agencies not participating in this project to access data from this project will need to be submitted to the Project Operational Team. NACCHO will recommend that external agencies seek approval from Affiliates and from participating ACCHSs relevant to the request. Approval will not be granted for the release of data if it is not approved by NACCHO. There may be a need to seek approval from the Department of Health if this is a condition in the Head Agreement for this project. All external requests will need to have HREC approval prior to the release of this data.

What can we do if we have concerns about data security, research misconduct or complaints?

ACCHSs can report any breaches in data security or research misconduct or complaints to:

- project partners/staff,
- Affiliates,
- NACCHO directly, and/or
- Designated HREC representative.

Reports received by project staff will be forwarded to the Project Operational Team and the Deputy CEO of NACCHO.

What is the role of ACCHSs in this project?

The ACCHS will host the practice pharmacist who will be providing health services to the patients in the community. The pharmacist will effectively be an employee of the PSA, who will provide all employment support. This will minimise the administrative burden on the ACCHS so that the pharmacist and ACCHS can focus on effective service delivery from the start. NACCHO and respective Affiliates will have the capacity to liaise closely with PSA, ACCHS and the pharmacist to ensure that the pharmacist's roles are understood clearly by both parties.

The Head Agreement between the PSA and the Department of Health will influence the service agreement between the PSA and the ACCHS. The Service Agreement with the ACCHS will document the terms of participation including: Health Service Responsibilities and Financial Arrangements.

ACCHSs will be provided with a *Site Consent Form* that will need to be signed if the ACCHS agrees to be a participant in this project.

The NACCHO Project Coordinator will be available to ACCHSs to assist in understanding and delivering on their roles within the project. They may also work with their Affiliate representative to assist ACCHSs.

The following is a summary of the ACCHSs role as a participant in this project that will be negotiated with each ACCHS to be most appropriate for that service. The role of the ACCHS is:

- To nominate a 'go to' person to be a point of contact for the project staff.

- To support the practice pharmacist to use the CIS within the practice, and access the patient's clinical records in order to support patient care and make medicines-related recommendations to other health staff.
- To enable the CIS to recognise the practice pharmacist in their 'job role'. (The ACCHS will be assisted with this. This is so that the information can be collected about the work the pharmacist has done).
- To support the pharmacist to access a private consulting room to meet with patients.
- To support the practice pharmacist to have time to record their work and findings in the pharmacist log-book.
- To assist the practice pharmacist to work with other members of the health care team by sharing information about the project with other members of the team.
- To assist the pharmacist to prepare a workplan that best suits the model of care of the ACCHS.
- To host information for patients attending the practice by using posters and other health promotion material to promote patients to be participants in this project.
- To develop a participant consent process that is approved by the ACCHS involving the practice pharmacist and/or other staff in the ACCHS.
- To support site visits and support a focus group with relevant staff for 'health systems assessment' and 'needs assessment'.
- To support site visits and support focus groups with relevant staff for the qualitative evaluation if the ACCHS wishes to volunteer as a case study site (further information about this will be provided to ACCHS to make a decision in 2019).
- Any other matters that are relevant to the work of the practice pharmacist that the ACCHS may wish to consider. (Examples include mechanisms for home medicines review, or use of point of care testing, etc).

What support will ACCHSs receive in this project?

Each ACCHS that participates in the project will receive:

- The services of an on-site registered practice pharmacist for a 15-month duration.
- Administration of pharmacist employment and contract to be provided by PSA.
- The opportunity to select their preferred practice pharmacist.
- A 'Needs Assessment' site visit to ascertain any specific needs of ACCHS.
- A facilitated 'training' on-site visit to support and prepare the practice pharmacist within the primary healthcare team.
- Resources to support the practice pharmacist, such as medication management guides.
- A supportive mentor for the practice pharmacist (that will be managed by NACCHO and the PSA).
- Installation of the GRHANITE data extraction tool in the CIS and licence for its use for 15 months.
- Two site visits to explore Health Systems Assessment (one of these will be at the same time as the needs assessment visit).
- A Health Systems Assessment Report for ACCHS use for CQI.
- Involvement of a nominated staff member to be a member of the Project Reference Group in the project.
- Support from a nominated Affiliate officer involved in this project.
- Support from the NACCHO Project Coordinator during site visits and contact by email and phone.
- An opportunity to review project findings and provide feedback through ACCHS membership of the Project Reference Group.

- Customised reports specific to the participating ACCHS (if requested and if the data analysis is meaningful due to limitations with small participant numbers).

Each Affiliate that participates in the project will receive:

- Remuneration to participate in the project. This can be used to employ a part-time project officer (or to back-fill existing staff).
- Involvement of nominated staff as members of the Evaluation Team in the project.
- An opportunity to review project findings and provide feedback (through membership of the evaluation team and Project reference group).
- Customised reports specific to the jurisdiction (if requested).

How will ACCHSs find out the results of the Project?

ACCHSs will receive information about the Project through NACCHO communication mechanisms. The Project will finish at ACCHSs in late 2019. The ACCHSs will know the results in 2020. Other ways in which ACCHSs will be informed include:

- Through the Project Reference Group which will be provided with updates on progress with the project and extracts of reports arising from the project.
- Summary results to individual ACCHSs (pertaining to their own data) may be provided upon request to the Project Operational Team, although these may not be meaningful due to small participant numbers and the inability to undertake data analysis.
- Extracts of reports arising from this project will be summarized in plain language and disseminated according to usual NACCHO communication mechanisms, such as email, the NACCHO News, and NACCHO website, including communication with any relevant special interest groups supported by NACCHO.
- Presentations detailing progress and results will be communicated at NACCHO and/or Affiliate Conferences and Annual Meetings.

The findings of the project will also be reported for publication in articles and journals relevant to this project. There may also be presentations at conferences.

Reports will also be provided to the Australian Government, Department of Health, and through communication mechanisms used by the Pharmaceutical Society of Australia. NACCHO (as a project partner) will check this information before it is released.

Can ACCHSs decide to withdraw from this project?

ACCHSs and Affiliates that are participants reserve the right to withdraw their participation in the project in accordance with their service agreements. If an ACCHS site withdraws, the ACCHS will be asked to provide a written reason for the withdrawal to the PSA (for the contract) and the Project Operational Team. The ACCHS will be asked whether they agree to the continued use of the data collected in this Project prior to their withdrawal of Site Consent. The withdrawal of the Site from the project will mean the withdrawal of the site support specified in the service agreement (and explained above). The withdrawal of the Site will be reported to all relevant HRECs when the Project's annual report is due.

Who can the ACCHS contact for more information or to make a complaint?

The ACCHS can contact the NACCHO Project Lead: Mike Stephens, Tel: s47F ; Email: mike.stephens@naccho.org.au. Other Project staff to contact include: Deb Bowden from the Pharmaceutical Society of Australia: Tel: 02 6283 4740; Email: Deb.Bowden@psa.org.au. You can also contact the NACCHO Deputy Chief Executive Officer: Ms Dawn Casey at dawn.casey@naccho.org.au.

The Human Research Ethics Committees will continue to provide oversight as the project progresses. You can contact the Ethics Committee with any concerns about the safety and

fairness of the Project at: Executive Office of Research, St Vincent's Hospital Melbourne, Tel: 03 9231 2394, or email: research.ethics@svhm.org.au

Thank you on behalf of the IPAC Project Team.

The ***IPAC Project*** is the *Integrating Pharmacists within ACCHSs to improve Chronic Disease Management Project (IPAC).* The Project Partners and Project Operational Team for the ***IPAC Project*** include: The National Aboriginal Community Controlled Health Organisation (NACCHO); Pharmaceutical Society of Australia, and the College of Medicine and Dentistry, James Cook University. ***Evaluation Team*** members include the Project Partners, and the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); Queensland Aboriginal and Islander Health Council (QAIHC); and the Aboriginal Medical Services Alliance in the NT (AMSANT). The Project Reference Group includes representatives of NACCHO, Affiliates and ACCHSs.

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[1] Pharmaceutical Society of Australia. *Guide to providing pharmacy services to Aboriginal and Torres Strait Islander people.* Jul 2014. http://www.psa.org.au/download/guidelines/Guide-to-providing-pharmacy-services-to-Aboriginal-and-Torres-Strait-Islander-people.pdf

[2] Couzos S, Murray R: Health, Human Rights and the Policy Process. In: *Aboriginal Primary Health Care: An Evidence-based Approach.* edn. Edited by Couzos S, Murray R. Melbourne: Oxford University Press; 2007: 29-63.

[3] Tan ECK, Stewart K, Elliott RA, George J. Integration of pharmacists into general practice clinics in Australia: the views of general practitioners and pharmacists. Int J Pharm Pract 2014;22(1):28–37. At: http://onlinelibrary.wiley.com/doi/10.1111/ijpp.12047/pdf

[4] Australian Institute of Health and Welfare 2016. Healthy Futures—Aboriginal Community Controlled Health Services: Report Card 2016. Cat. no. IHW 171. Canberra: AIHW.

[5] JCU Code for the Responsible Conduct of Research (JCU) https://www.jcu.edu.au/policy/research-management/code-for-the-responsible-conduct-of-research

College of Medicine and Dentistry, James Cook University on behalf of the
National Aboriginal Community Controlled Health Organisation, and the
Pharmaceutical Society of Australia (IPAC Project Partners).
Douglas Parade, Townsville, Qld, 4812.
Tel: 07 47816062; Email: sophia.couzos@jcu.edu.au

MASTER SITE CONSENT FORM

Name of Project: *Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Project*

Name of Aboriginal Community Controlled Health Organisation: insert name of ACCHS
Project Leaders: Ms Dawn Casey, Mr Mike Stephens (NACCHO), Associate Professor Sophia Couzos (JCU), Ms Deb Bowden (PSA)
Evaluation Organisation: Evaluation Team led by the College of Medicine and Dentistry, JCU.
Project Sponsor: James Cook University (JCU)

I, ……can confirm that the

(insert name of Aboriginal Community Controlled Health Service) gives its consent to the above project, subject to the following conditions:

1. We have the right to withdraw our consent and cease any further involvement in this Project at any time without any penalty and without giving any reasons.
2. The purpose of the Project, as outlined in the attached Site Participation Brief has been explained, and we have had the opportunity to ask questions about the project. We have received satisfactory answers to our questions and have been given adequate time to consider the appropriateness of the project.
3. The Project Partners will need to obtain additional consent if there are any changes to the overall design of this Project.
4. The Practice Pharmacist, who will be employed by our service, will receive off-site and on-site training by a visiting facilitator from the PSA in consultation with NACCHO. This will be conducted in consultation with your nominated staff, and your Affiliate.
5. The Practice Pharmacist will be able use our clinical information system and access the information contained within it to allow them to undertake their clinical duties, and to support the data collection required for this Project including completing their Pharmacist Log Book.
6. Our ACCHS will receive at least two on-site support visits to assist our service to integrate the Practice Pharmacist into our health service team, and to collect data about our health service.
7. We agree to allow data to be extracted from our clinical information system using the GRHANITE™ Data Extraction Tool, for the purpose of evaluating this Project. This will occur only for individual participants who have consented for this to occur and be de-identified.
8. Our ACCHS will assist the Practice Pharmacist to set up appropriate systems within our ACCHS to obtain the written consent of individual participants in this Project. This includes nominating a dedicated 'go to' ACCHS staff member to assist in obtaining consent.
9. Data collected from our ACCHS, in its raw and unanalysed form, is owned by our ACCHS. It will be stored and managed by the Data Custodian at the College of Medicine and Dentistry (JCU) and adhere to all ethical requirements.
10. Any results from this Project that are published by the Project Partners will acknowledge the ACCHSs ownership of this data.

College of Medicine and Dentistry, James Cook University on behalf of the
National Aboriginal Community Controlled Health Organisation, and the
Pharmaceutical Society of Australia (IPAC Project Partners).
Douglas Parade, Townsville, Qld, 4812.
Tel: 07 47816062; Email: sophia.couzos@jcu.edu.au

11. Any information that identifies this ACCHS or the Aboriginal and Torres Strait Islander community that it serves will not be used nor published without the written permission of the Board or CEO of this ACCHS.
12. This Project will not proceed until all required negotiation has occurred to the satisfaction of this ACCHS. This will include a legal Agreement with the PSA, described in the attached Site Participation Brief.
13. The ethical provisions relating to the health of Aboriginal and Torres Strait Islander peoples, as set out in NHMRC publications, will be complied with and this Project will not proceed until the St Vincent's Hospital Melbourne Human Research Ethics Committee has endorsed the Project.
14. We understand that if we have any complaints or questions concerning this Project we can contact any of the key contacts mentioned in the Site Participation Brief. This includes the St Vincent's Hospital Melbourne Human Research Ethics Committee with contact details as follows: Executive Office of Research, St Vincent's Hospital Melbourne, Tel: 03 9231 2394, or email: research.ethics@svhm.org.au
15. We understand we will receive a signed copy of this document and the Site Participation Brief to keep.

Signed on behalf of (insert name of ACCHS)

Signature …….

Position in the organisation (Board Chair or CEO) …….

Date ……

Witnessed by ……. *Date* …….

As the Contractor (PSA) and in this Project and on behalf of the Project Partners, I acknowledge the conditions set out above:

Name: …….

Signature…… *Date* ……

Witnessed by …… *Date* …….

The Project Partners, and Project Operational Team for the *Integrating Pharmacists within ACCHSs to improve Chronic Disease Management Project (IPAC)* include: The National Aboriginal Community Controlled Health Organisation (NACCHO); Pharmaceutical Society of Australia, and the College of Medicine and Dentistry, James Cook University. *Evaluation Team* members include the Project Partners, and the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); Queensland Aboriginal and Islander Health Council (QAIHC); and the Aboriginal Medical Services Alliance in the NT (AMSANT). The Project Reference Group includes representatives of NACCHO, Affiliates and ACCHSs.

College of Medicine and Dentistry, James Cook University on behalf of the
National Aboriginal Community Controlled Health Organisation, and the
Pharmaceutical Society of Australia (IPAC Project Partners).
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MASTER GENERAL PRACTITIONER PARTICIPATION BRIEF

Title	*Integrating Pharmacists within Aboriginal Community Controlled Health Service (ACCHSs) to improve Chronic Disease Management Project (IPAC)*
Short Title	*Putting Pharmacists into ACCHSs*
Project Sponsor	*James Cook University*
Coordinating Investigators	*Associate Professor Sophia Couzos (JCU), Ms Deb Bowden (PSA), Mr Mike Stephens (NACCHO), Ms Dawn Casey (NACCHO)*
Evaluation Team	s47F *Dr Erik Biros (JCU), Dr Deborah Smith (JCU),* s47F
Location	*[Name of ACCHS]*

What is the IPAC Project?

IPAC stands for *'Integrating Pharmacists within Aboriginal Community Controlled Health Service (ACCHSs) to improve Chronic Disease Management'* Project.

This project will explore if including a registered non-dispensing practice pharmacist as part of the primary health care team within Aboriginal community controlled health services (ACCHSs) leads to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples. The project will explore improvements in prescribing by doctors, if patients are more likely to take their medicines, and if indicators of their health are improving over time, by measuring these factors before and after the pharmacist is appointed. Practice pharmacists will work with the doctors and other health staff in each ACCHS for a period of 15 months per service, in Vic, Qld and the NT.

Practice pharmacists will provide relevant healthcare activities within their scope of practice to patients. They will also provide education and training to existing staff within the services (as appropriate), improve relations with community pharmacies to overcome barriers that patients may face in accessing medicines, and assist in managing medications at transitions of care (such as discharge from hospital). This project will also explore the cost-effectiveness of pharmacist integration within ACCHSs.

How did this Project come about?

The Project was developed at the request of the National Aboriginal Community Controlled Health Organisation (NACCHO, representing ACCHSs across Australia) and the Pharmaceutical Society of Australia (PSA, representing pharmacists). The Project is a tripartite partnership between NACCHO, PSA and James Cook University (JCU). Participants include Affiliates of NACCHO in Vic, Qld, and the NT, up to 22 ACCHSs in these jurisdictions, practice pharmacists, and patients who will receive healthcare support from a pharmacist.

Community-based participatory research principles and methods are used to make sure there is appropriate Aboriginal governance over this Project.

Why is this Project important?

Aboriginal and Torres Strait Islander peoples experience a much higher burden of chronic disease due to cardiovascular, diabetes, and other health problems, and yet have poorer access to needed medicines.[12] Adverse health outcomes from these illnesses are preventable if prescribing quality is improved, and patients are better supported with medicines use, which is a key health equity issue.

Non-dispensing pharmacists are not currently funded consistently or reliably to work within primary health care settings in the public health sector in Australia. Despite this, several ACCHSs across Australia have innovatively sourced funds and/or developed partnerships with community pharmacy's to source pharmacists in non-dispensing roles. This project is modelled on these pharmacists' roles and on international research evidence. There is extensive global evidence that practice pharmacists co-located within general practice clinics can enhance chronic disease management and quality use of medicines.[3]

The NACCHO and the PSA have promoted the need for this project for many years. The project will help the Australian Government make decisions about future funding and the role practice pharmacists may play as members of primary health care teams within ACCHSs and potentially other settings in Australia.

What is the aim of this project?

This project aims to improve quality of care outcomes for Aboriginal and/or Torres Strait Islander adult patients with chronic disease by integrating a practice pharmacist within the primary health care team of ACCHSs. This means the Project will investigate:

- Improvements in health measures of those patients who have been receiving support from a pharmacist and who agree to participate in the Project;
- Improvements in:
    - prescribing so that medicines patients are taking are appropriate for them and their individual healthcare needs;
    - patient adherence to medicines;
    - health service utilisation of Medicare;
    - relationships with and perceptions of stakeholders (ACCHSs staff; community pharmacies; pharmacists);
- The cost-effectiveness of the intervention, which will investigate the costs of the pharmacist service and measures of effectiveness such as increased Medicare utilisation (as a marker of increased patient access to healthcare services towards equity).

Does this project have ethics approval?

Ethics approval has been received from a Victorian Human Research Ethics Committee (HREC). This is the St Vincent's Pubic Hospital HREC in Melbourne. This HREC participates in National Mutual Acceptance of ethics. This means that the review of this committee in Victoria may be acceptable to other HRECs. Acknowledgement from JCU has also been received. This Project will also seek ethics review from two other HRECs in the Northern Territory. These are the:

- Menzies School of Health Research HREC
- Central Australian HREC

As this project is to be run in Qld, Victoria and the NT, ethics review is required from all these jurisdictions.

The selection of project sites

The project will invite ACCHSs in geographically diverse settings in Vic, Qld, and NT. Up to 22 ACCHSs will be able to participate. ACCHSs need to meet certain eligibility criteria to participate as project sites.

What is the pharmacist's role in the ACCHS?

The pharmacist employed within the ACCHS will deliver medication advice and education to patients and staff. They will work to improve patient medication adherence, improve prescribing, tailor medications to best suit the patient in collaboration with the prescriber, and assist with/oversee

medication management processes. They may provide health promotion, disease prevention, and assist patients with chronic disease self- management and more judicious use of medicines.

As a core role, the pharmacist will be required to respond to medication enquiries from patients and health professionals such as general practitioners and Aboriginal and Torres Strait Islander Health Workers/Practitioners, conduct staff education, review prescribing, mentor new prescribers, participate in case conferences, liaise across health sectors, undertake medication management reviews, and evaluate drug utilisation to ensure optimal therapy. As part of their collaborative work, an important element of the practice pharmacist's role is liaison with local community pharmacists to ensure continuity of care, and assist in medication management with transitions of care (such as when the patient is discharged from hospital).

These roles make up 10 core roles targeted *towards patients*, and *health professionals and health systems.* These roles are all non-dispensing, for which practice pharmacists are registered to deliver. This is summarised in Table 1.

Whilst the project has developed these core roles which form the foundation for the evaluation, each participating ACCHS has the flexibility to utilise the services of the pharmacist according to service and client priorities at the local level. Practice pharmacists will be supported to adapt to cultural ways of delivering primary health care within each service. Each ACCHS will be different and reflect the unique ways of providing culturally appropriate healthcare. This provides a pragmatic evaluation opportunity to document the diversity in pharmacist core roles and in the patient journey. This will be possible through qualitative evaluation, but also through pre-post Health Systems Assessments (this is explained later in this document). The practice pharmacist will be supported to adapt to their role as directed by the staff and CEO.

Most of the practice pharmacist's activity must be devoted to providing supportive clinical care to patients who are participants in this project.

Table 1. Summary of practice pharmacists core roles

SUMMARY OF PRACTICE PHARMACISTS CORE ROLES

Core Role #	Theme	Core activity
1 (a)	**Medication Management Reviews**	Pharmacist reviews the medication the patient is taking. The pharmacist initiates and facilitates a medication management review- which may be a Home Medicines Review (HMR) or a non-HMR (medication management review not conducted in the patient's home)
1 (b)		Pharmacist reviews the patient who had a HMR after 12 months and a Non-HMR after 3-6 months.
1 (c)		Pharmacist ensures the MMR is claimed by the practice when completed (as a DMMR item 900 or RMMR item 903)
2	**Team-based collaboration**	Pharmacist participates in clinic activities that support team-based chronic disease care plans, and cardiovascular (CV) risk assessment
3 (a)	**Medication adherence assessment & support**	Pharmacist assesses the medication adherence of the patient being seen
3 (b)		Pharmacist improves the patient's experience with their medicines
4	**Medication appropriateness audit**	Pharmacist assesses 'medication appropriateness and underutilisation of medicines' as an audit of a sample of patients with chronic disease.
5	**Preventative health care**	Pharmacist provides preventive interventions to patients
6	**Drug Utilisation Review**	Pharmacist conducts a DUR to audit and improve a priority issue at the service
7	**Education and training**	Pharmacist conducts education sessions at the service

8	**Medicines information service**	Pharmacist provides medicines related information to staff within the service and responds to clinician medicines enquiries.
9	**Medicines stakeholder liaison**	Pharmacist develops a written stakeholder liaison plan supporting engagement with community pharmacies.
10	**Transitional care**	Pharmacist facilitates care coordination with relevant hospitals; residential aged care facilities, etc.

Pharmacist's qualifications

Pharmacists who will be able to work in ACCHSs will be required to have:

- current registration with the Australian Health Practitioners Regulation Agency (AHPRA) as a pharmacist;
- more than 2 years post-registration experience;
- medication review accreditation such as from the Australia Association of Consultant Pharmacy (AACP) or Society of Hospital Pharmacists of Australia (SHPA) or working towards accreditation;
- post-graduate clinical qualifications or demonstrated clinical experience (e.g. hospital or HMRs).

The need for post-graduate qualifications or accreditation will be dependent on ACCHSs preference regarding the applicant and an adequate supply of accredited and experienced pharmacist applicants.

The PSA confirms that the proposed activities are consistent with the existing scope of practice of pharmacists as defined by the PSA Competency Standards endorsed by the Australian Health Practitioner Registration Agency.

Training the pharmacist at the ACCHS

The PSA will deliver the training to practice pharmacists in partnership with NACCHO. Some of the training will be off-site (before the pharmacist starts) and some will be on-site (at the start of their placement in the ACCHS). The NACCHO Coordinator and PSA training facilitator will arrange a training time with the practice pharmacist and with the nominated ACCHS, so that on-site training can best suit the ACCHS.

Some of the training that will be necessary for the practice pharmacist includes:

- locally appropriate cultural safety training,
- training on the ACCHS model of care,
- use of the CIS and other software used by ACCHSs,
- introduction to the Pharmacists log-book software,
- how to measure medication adherence and MAI (medication appropriateness),
- processes for recording of information,
- how to explain the pharmacists roles to patients and how to obtain patient consent,
- how to develop a work plan to undertake core roles,
- confidentiality in the clinic setting, teamwork processes, and delivering disease-specific services.

To follow up training, pharmacists will also have access to structured pharmacist mentor program that will link them with a dedicated mentor pharmacist with experience in the ACCH sector and to the other practice pharmacists within the project.

What patients are eligible to be participants in this project?

If the patient is aged 18 years of age and over and has the following conditions, then they are eligible to be a participant in this project:

- Cardiovascular disease (coronary heart disease, stroke, hypertension, dyslipidaemia and any other CV disease)
- Type 2 diabetes mellitus,
- Chronic kidney disease,
- Other chronic conditions that mean a patient is at high risk of developing medication-related problems (e.g. polypharmacy).

These conditions are selected because most of the mortality gap for Aboriginal and Torres Strait Islanders is due to these chronic diseases. Optimizing medicines for people with these conditions can make an important impact on their health.

The consent of the patient will be required to participate in this project. Most of the patients attending ACCHSs are of Aboriginal and Torres Strait Islander origin (81%).[4] Therefore, most of the patients involved in this project will be of Aboriginal and Torres Strait Islander origin.

Patients who are regular patients of the service should be prioritised as pharmacists will make sure they follow-up these patients over time.

If a patient consents to be a participant, how may they benefit from this project?

These participants will have immediate access to an on-site pharmacist at no charge. The Pharmacist will check their medicines and make sure they are right for them. Some recommendations may require the prescriber to change medicines or their dose, or cease a medication, or start a necessary medication.

The pharmacist will help resolve problems the participant may have with taking medicines, storing them, and will assess for adverse effects. Participants will be offered medication review in the clinic, or at home, or a place that best suits them. Just like the doctors and other staff, the pharmacist will record the encounter and recommendations in the CIS so that the doctor and health team can read them and make any agreed prescribing changes. The pharmacist also has more time to spend on supporting participants with medications than the doctor has.

The Pharmacist will see participants again to provide them with ongoing support. The pharmacist may follow-up with other members of the primary healthcare team, including with community pharmacy, and depending on the participants needs, with the hospital for discharge medications. This intensive support may help to improve the health of the participant.

There are no other expectations on participants in this project. Personal details of participants are not collected at all, and the data being extracted for the project is completely de-identified. A *Participant Consent Form* and *Participant Information Brief* is available for the ACCHS and practice pharmacist to seek patient consent. Patient participation in this project is voluntary. If consent is not given, this will not affect the patient's routine treatment, or their relationship the clinic, and the patient will still be able to be referred to the Pharmacist.

If a patient consents to be a participant, how may this benefit the ACCHS?

If patients agree to be participants, this enables the ACCHS to collect information for the purpose of the project. The participation of the patient will assist the ACCHS to collect information to determine the clinical and cost-effectiveness of the practice pharmacist, and will support the clinic activity overall (with Medicare and staff education). The information will inform on whether the health of participants improves over time, compared to their health before they received the services of the pharmacist. The ACCHS may receive a site-specific report if they wish. If patient consent is not given, information cannot be extracted from the CIS for this project. Patient consent is therefore vital to assess the value of the practice pharmacist within ACCHSs.

How will patients be referred to the pharmacist in the ACCHS?

The staff within the ACCHS will need to be briefed about this project and the role of the practice pharmacist. This *Site Participation Brief* can assist the ACCHS with this task.

Patients attending the ACCHSs doctor, health worker or other healthcare provider will be invited to talk to a practice pharmacist. These staff can refer the patient to the practice pharmacist. NACCHO and the PSA will prepare some simple promotional material to help health staff with this referral, so that patients who are most in need and meet the inclusion criteria are offered the services of the pharmacist.

The practice pharmacist or a designated staff member will tell the patient about this Project (and provide the patient with the *participant information brief*) and ask them if they want to take part. They will then be asked to *sign a participant consent form*. They may see the Pharmacist straight away or an appointment may need to be made for a later time.

The practice pharmacists (with assistance from trained ACCHS staff) may also directly approach patients attending the clinic who meet the individual participant criteria. The process for participant recruitment will be flexible according to the preferred process recommended by the ACCHS. This can be arranged during the first site visit to the ACCHS (see later in this document).

How will our ACCHS seek patient consent?

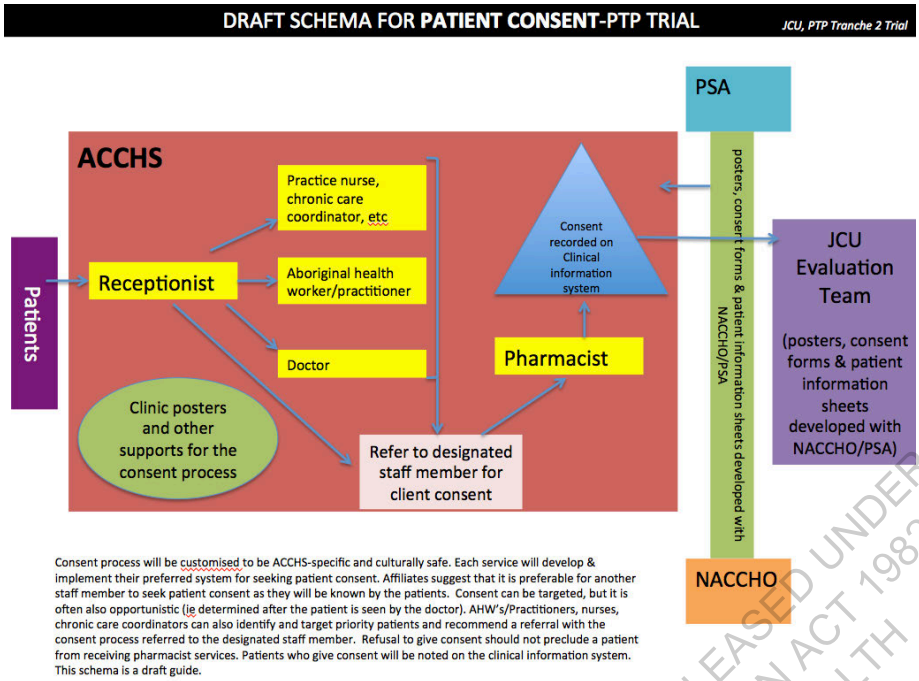
A suggested process for seeking individual patient consent has been developed in consultation with NACCHO Affiliates on the Evaluation Team. The process respects the systems that ACCHSs may wish and choose to adopt.

The practice pharmacist will be trained to seek the participant's consent. Training for seeking participant consent will also be provided to other staff who may be designated by the ACCHS to seek the participant's consent for cultural appropriateness reasons.

The participants consent form will then be signed and dated by the patient, a witness, and the designated staff member seeking patient consent. The consent form will be stored in a locked briefcase by the practice pharmacist until posted by registered post. It may be transmitted electronically to JCU after scanning. A written copy of the verbal information will be provided to the patient, including advice on how they may ask questions or make complaints about the project.

Consent will then be recorded on the clinical information system (CIS) by the practice pharmacist and GRHANITE will extract information only from consented patients. This suggested process is summarised in Figure 4.

Figure 4. A suggested process to seek patient consent.



How will participants be followed-up?

Practice Pharmacists will aim to follow-up participants using the usual clinic processes. Pharmacists will work with the existing staff in the ACCHS to follow-up participants in the same way used for all patients. Participants will need to be reviewed according to clinical needs and Medicare rules, and may include 3-monthly, 6-monthly or an annual review or more frequent review by the pharmacist.

The pharmacist will need to use the CIS within the ACCHS to record follow-up clinical details like other healthcare staff. The pharmacist will also record follow-up details in the pharmacist log-book as is appropriate for the type of review being conducted (such as medication appropriateness index measurements).

How many patients will ACCHS be asking to participate?

It is estimated that the practice pharmacist and the ACCHS may seek consent from about 350 people to be part of this Project and to see the Pharmacist over 15 months. This may vary considerably from service to service. It is important for the ACCHS to encourage patients to be referred to the pharmacist early in the project. This is so that enough time is available to follow-up patients during the 15 months the pharmacist is employed in the project.

Are there any risks or benefits to patients from taking part?

The Pharmacist is a qualified and registered health professional who will be trained to work in this ACCHS. The risks to patients are no different to seeing a Pharmacist in a Pharmacy, except that patients will be seeing Pharmacists in this clinic. The Pharmacists will not be prescribing or dispensing medicines as they would in a Pharmacy. They will be working with the primary health care team in the ACCHS.

How will information for the project be collected?

The project has been designed to be acceptable and feasible to ACCHSs and practice pharmacists, by making most of the data collection a 'by-product' of service delivery. There are three main types of information that will be collected with the help of ACCHSs. Information will be collected from clinical

information systems (CIS), pharmacist log-books (managed by the pharmacist), and from site visits to ACCHSs.

1. Deidentified information about patients who have consented (participants) will be collected from services clinical information systems (CIS), using an electronic data extraction tool known as **GRHANITE™**. ACCHSs will be supported to have the GRHANITE data extraction software installed in one personal computer in the clinic. This software will be installed in one workstation to minimise practice impact. When GRHANITE runs, it does so at a scheduled time and queries data from the practice database server. This is the only time GRHANITE communicates with the practice server. GRHANITE will extract weekly data from the CIS to the secure JCU repository. The ACCHS does not need to do anything to maintain that this program is working.

2. Practice pharmacists will also collect information about what they do through an **electronic log-book**. This system will be an online secure database requiring practice pharmacist secure log-in. It will be used by practice pharmacists to record deidentified daily activity. Each electronic log-book entry will be able to be interrogated by the JCU data custodian. The daily-recorded activity will refer to 6 core pharmacists' roles. The electronic interface will be user-friendly to minimise the reporting burden of practice pharmacists.

3. **Health systems assessment, qualitative data, and cost-effectiveness analysis** data will be collected during visits to the ACCHS. Mainly the NACCHO Project Coordinator, will undertake visits to the ACCHS. A qualitative researcher will visit only three ACCHSs if they are invited by the service. The costs related to the employment of pharmacists will be sourced mainly from the PSA.

What type of information will be collected by GRHANITE?

The information will be deidentified and only from consented patients (participants). The information will refer to periods 12 months before, and the periods after the pharmacist first provided support to the participants. This is summarised in Table 2.

Table 2. Deidentified patient information that will be extracted from clinical information systems (CIS) in the ACCHS

Measure	Detail
Patient characteristics	age, year of birth, sex, height and weight (for BMI), condition (diabetes, hypertension, dyslipidaemia, CHD, PAD, CVA, CKD, plus other disease *(in patients who fit the inclusion criteria with polypharmacy)*, smoking status (history details: start/stop year), postcode, CTG status, ethnicity, Aboriginal and Torres Strait Islander status, DVA status, pension/concessional status, year of death.
Encounter/contact indices & other demographic measures	contacts with staff (different job roles), episodes of care (date of visit, reason for visit, duration, visit type), patient status/record status (active), created and updated dates and user who created and updated the record; consented patients; patients ID/MRN/UR number/chart No/record No
Biometric indices	Diastolic and systolic BP, HbA1c, lipids (HDL, LDL, TG's, and TC), CV absolute risk assessment (levels and risk), ACR, e-GFR,
Prescribing indices	All medications (including PBS drug code); all information contained within prescriptions (route, strength, formulation, quantity); date of the script being generated, including ceased/delete date; deleted flag (if any) and reason for delete or ceased; created and updated dates, and user (job role) who

	created and updated the record. This information is for both current medications and past medications.
Dispensing indices	All medications (including PBS drug code); all information contained within prescriptions (route, strength, formulation, quantity); date of the medicine being supplied and dispensed; user (job role) who created and updated the record. This information is for both current medications and past medications.
Measures of health service utilisation:	
Medicare Benefits Schedule indices	900 (DMMR or HMR), 903 (residential aged care DMMR or HMR), 721 (GPMP), 732 (GPMP review 3 months later), 715 (Health Check) and other MBS items related to the evaluation of pharmacist activities; record status, created and updated dates, and user (job role) who created and updated the record, item billing amount.
Non-HMR data (out-of home interviews)	non-HMR flagged in CIS will link this to the above variables *(to be recorded by the pharmacist).*
Measures of medication adherence	• Electronic measures of medication adherence *(to be calculated by the evaluators)* • Medication Adherence *(to be recorded by the pharmacist)*

ACR= albumin-creatinine ratio; BP= blood pressure; CIS= clinical information systems; CKD= chronic kidney disease; CTG= Close The Gap; CV= cardiovascular; CVA= cerebrovascular disease; DET= data extraction tool (GRHANITE); DMMR= Domiciliary Medication Management Review; DVA: Dept of Veterans Affairs; e-GFR= electronic glomerular filtration rate; GPMP= General Practice Management Plan; HDL= high density lipoprotein; HMR= Home Medications Review; LDL= low density lipoprotein; MAI= Medication Appropriateness Index; PAD= peripheral artery disease; TC= total cholesterol; TG= triglyceride

What type of information will be collected by the pharmacist in the log-book?

The pharmacist will record their daily activity in the log-book. This will include information about education sessions they provided to staff, adhoc advice provided and any evidence this led to an outcome, the development of any resources for patients or the ACCHS, whether the pharmacist developed a plan to liaise with community pharmacy (and details of that plan), and the number of medicines reconciliations from stakeholders like hospitals.

In particular, the pharmacists log-book will enable practice pharmacists to record the results of the measurement of the 'medication appropriateness index' (MAI) and to assess for underutilisation of medicines (if necessary medicines are missing) for each of 30 participants.

A MAI is a more detailed and comprehensive assessment of the appropriateness of a patient's medication. Of the participants seen by a practice pharmacist, 30 participants per site will have their medications intensively appraised as part of the medication management review. The MAI will be measured in the first three months of the intervention phase (baseline) and recorded in the pharmacist's logbook. These audited participants will have their MAI assessed again 12 months later (within the implementation phase).

No personal information about participants is contained in the log-book. The participant does not need to be present as it is an audit of the participants medications held in the CIS.

The pharmacist will only report the unique 'patient ID' to enable matching of the medication appropriateness index audit of 30 participants to the participant data extracted through GHRANITE.

It is expected that the practice pharmacist will communicate the findings of the MAI and underutilization of medicines to the prescribing team within the ACCHS for each participant so that

appropriate clinical action is taken. Practice pharmacists will ensure that the MAI assessment takes account of additional clinical information such as an assessment of the participant's absolute cardiovascular risk when assessing their medications.

Practice Pharmacists will follow-up participants as per usual clinic processes. These follow-up mechanisms may vary from service to service (see above).

What type of information will be collected during the site visits?

Every participating ACCHS site will be visited at least twice during the project.

1. The 'needs assessment' visit (see '*what will happen during the first visit'*).

2. To conduct a 'health systems assessment' (HSA):

- at the time of, or just prior to the appointment of the pharmacist, and
- repeated towards the end of the implementation phase (month 12-15).

The NACCHO Project Coordinator will conduct visits and assessment with assistance from Affiliate staff. The needs assessment and health systems assessment will be conducted at the first visit.

The needs assessment will collect information about what the ACCHS may need to support the practice pharmacist to work in that clinic. This will be used to help the pharmacist to get started.

The 'health systems assessment' will source information about the ACCHS. Each ACCHS is different in many ways. The project needs to understand how many staff (and types) are employed within the ACCHS, the total service population, the total service budget, Aboriginal governance structures, health services on offer, CQI processes, models of care such as outreach, if home medicines reviews are conducted and how, type of CIS used, recall systems in place, the adequacy of existing communication with the hospital, and community pharmacy/ies, medicines access information, use of point of care testing, regional services available such as specialist and allied health visits, and how the ACCHS will implement and define the core roles of practice pharmacists.

A meeting with key informant staff in a focus group setting will be needed. This information will be collated in a summary report for the ACCHS to use for any quality assurance activity.

What type of information will be collected for qualitative analysis?

Three ACCHSs will be invited to participate in a qualitative evaluation of the Project in mid-late 2019. ACCHSs will be asked if they would support focus group discussions with certain patients, Aboriginal health workers/practitioners, and with the pharmacist on site. These meetings will be fully catered and will be conducted in ways to minimize clinic disruption. ACCHSs will be contacted closer to that time to explain what that might involve.

What will happen during the first visit to the ACCHS?

The 'needs assessment' visit to the ACCHS will elicit the type of support needed by the ACCHS so that the practice pharmacist may best be integrated within the service. The visit will also assist the ACCHS to establish their preferred system to seek patient consent, and ensure the pharmacist can use the CIS, has a space to consult with patients, and the CIS is set to accept the 'job-role' for the pharmacist (this is necessary for the GRHANITE data extraction). A 'health systems assessment' may also be undertaken at this visit (see above).

The NACCHO Project Coordinator will make contact at this visit with the nominated ACCHS staff member who will act as a 'go to' person. Together with the nominated 'go to' person/s and relevant ACCHS staff, a project consent pathway and process that is responsive to the local ACCHS' model of care will be planned. A second 'go to' person may also need to be identified by the ACCHS and Coordinator as contingency for leave, resignation or movement between clinics or roles.

A template poster for the ACCHS clinic will be provided by NACCHO. The NACCHO Project Coordinator will ensure that the service has adequate promotional material and strategies to engage both ACCHS staff and clients.

Use of information collected by the Project

The information collected from this project will be used to prepare reports to the Australian Government on 'quality of care' outcomes (the project objective) that arise from integrating a practice pharmacist within ACCHSs. The reports will assess change in the:

- quality of prescribing,
- quality of medicines support through indicators of health service utilization,
- quality of the patient, service and stakeholder experience, and
- ultimately an effect of these improvements on biometric indices as a measure of health outcome.

The reports will also assess the cost-effectiveness of the practice pharmacist within ACCHSs.

The data analysis will also be able to provide ACCHSs and Affiliates with local level and aggregated data. Most analyses at this level would not be meaningful because the number of participants will be too small. However, the information will be aggregated at a national level for the NACCHO, Affiliates, ACCHSs, and the PSA, as well as the Australian Government. This will inform the development of health policy about practice pharmacists and the role they can play supporting Aboriginal and Torres Strait Islander peoples with chronic disease in Australian primary health care settings.

Health systems assessment summaries will also be able to be provided to ACCHSs for their use.

Security of information collected by the Project

As the leading research organisation, JCU (the repository body) will be responsible for the protection of data from loss, misuse and unauthorised access. The Data Custodian (Biostatistician: Erik Biros) will be responsible for this role.

Further, the Project Operational Team, Chaired by the Deputy CEO of NACCHO, will be consulted in all matters brought to its attention with regard to concerns about data security.

How will the collected information be transported to JCU?

Completed Site Consent Forms will be collected by the NACCHO Project Coordinator, scanned and sent electronically to the data custodian. Participant consent forms will scanned by the practice pharmacist and electronically transmitted to the data custodian. The forms will be stored electronically in a secure computer under the management of the data custodian on the property of College of Medicine and Dentistry, James Cook University.

Information extracted using GRHANITE and from the Pharmacist log-book will be transmitted electronically and stored on password-protected internal server on JCU premises. Data accessed during the analysis phase will be stored in JCU-supported database applications only.

Health Systems Assessment (HSA) and Needs Assessment information collected from site visits, will be collected on paper-based forms, (or in electronic format) collected by the NACCHO Project Coordinator and will be transported in a locked briefcase, scanned and stored in electronic format in a secure computer under the management of the data custodian.

Where and for how long is the information going to be kept?

Data will be kept for a minimum period of 7 years from the end of the year of publication of the last refereed publication or other form of public release to an audience external to JCU.

Electronic data will be stored on password-secured databases only. Any paper-based documents will be scanned and stored electronically, and the paper documents stored in a locked cabinet in a secure room at JCU. The data custodian (Biostatistician- Erik Biros) will be responsible for data storage consistent with the JCU *Code for the Responsible Conduct of Research.*

After the minimum period of storage, the data may be considered for disposal if there is a written request to the Evaluation Lead, from both the NACCHO and the PSA for the disposal of the data. As the raw unanalyzed data extracted by GRHANITE is owned by the ACCHSs, JCU will seek instruction from NACCHO and each ACCHS as to the ongoing use or destruction of this data. The Evaluation Lead will authorize the data custodian to delete the data if this is instructed by NACCHO, in accordance with the JCU *Code.*

Who will be able to access this information?

Data will be accessible only to members of the Evaluation Team who will have a role in handling this information. From time to time, one member of the evaluation team (the University of Melbourne HaBIC Research Information Technology Unit) may need access to the data-landing server at JCU to provide technical support services.

ACCHSs may request access to de-identified information from their service. These requests can be made to the Project Operational Team or its members, or directly through the NACCHO Affiliate or Project Officers involved in this project. The request must also include documentation of intended data use and must align with project objectives (the individual consent provided by each participant). Requests to access the data that *does not align* with the project objectives will need HREC approval. Similarly, Affiliates may request access to data at their jurisdictional level. This request must be in writing and align with the project objectives.

External requests from other organizations and research agencies not participating in this project to access data from this project will need to be submitted to the Project Operational Team. NACCHO will recommend that external agencies seek approval from Affiliates and from participating ACCHSs relevant to the request. Approval will not be granted for the release of data if it is not approved by NACCHO. There may be a need to seek approval from the Department of Health if this is a condition in the Head Agreement for this project. All external requests will need to have HREC approval prior to the release of this data.

What can we do if we have concerns about data security, research misconduct or complaints?

ACCHSs can report any breaches in data security or research misconduct or complaints to:

- project partners/staff,
- Affiliates,
- NACCHO directly, and/or
- Designated HREC representative.

Reports received by project staff will be forwarded to the Project Operational Team and the Deputy CEO of NACCHO.

Who can GPs contact for more information or to make a complaint?

GPs can contact the NACCHO Project Lead: Mike Stephens, Tel: s47F ; Email: mike.stephens@naccho.org.au. Other Project staff to contact include: Deb Bowden from the Pharmaceutical Society of Australia: Tel: 02 6283 4740; Email: Deb.Bowden@psa.org.au. You can also contact the NACCHO Deputy Chief Executive Officer: Ms Dawn Casey at dawn.casey@naccho.org.au.

The Human Research Ethics Committees will continue to provide oversight as the project progresses. You can contact the Ethics Committee with any concerns about the safety and fairness of the Project

at: Executive Office of Research, St Vincent's Hospital Melbourne, Tel: 03 9231 2394, or email: research.ethics@svhm.org.au

Thank you on behalf of the IPAC Project Team.

The ***IPAC Project*** is the *Integrating Pharmacists within ACCHSs to improve Chronic Disease Management Project (IPAC).* The Project Partners and Project Operational Team for the ***IPAC Project*** include: The National Aboriginal Community Controlled Health Organisation (NACCHO); Pharmaceutical Society of Australia, and the College of Medicine and Dentistry, James Cook University. ***Evaluation Team*** members include the Project Partners, and the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); Queensland Aboriginal and Islander Health Council (QAIHC); and the Aboriginal Medical Services Alliance in the NT (AMSANT). The Project Reference Group includes representatives of NACCHO, Affiliates and ACCHSs.

[1] Pharmaceutical Society of Australia. *Guide to providing pharmacy services to Aboriginal and Torres Strait Islander people.* Jul 2014. http://www.psa.org.au/download/guidelines/Guide-to-providing-pharmacy-services-to-Aboriginal-and-Torres-Strait-Islander-people.pdf

[2] Couzos S, Murray R: Health, Human Rights and the Policy Process. In: *Aboriginal Primary Health Care: An Evidence-based Approach.* edn. Edited by Couzos S, Murray R. Melbourne: Oxford University Press; 2007: 29-63.

[3] Tan ECK, Stewart K, Elliott RA, George J. Integration of pharmacists into general practice clinics in Australia: the views of general practitioners and pharmacists. Int J Pharm Pract 2014;22(1):28–37. At: http://onlinelibrary.wiley.com/doi/10.1111/ijpp.12047/pdf

College of Medicine and Dentistry, James Cook University on behalf of the
National Aboriginal Community Controlled Health Organisation, and the
Pharmaceutical Society of Australia (IPAC Project Partners).
Douglas Parade, Townsville, Qld, 4812.
Tel: 07 47816062; Email: sophia.couzos@jcu.edu.au

MASTER GENERAL PRACTITIONER CONSENT FORM

Name of Project: *Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Project*

Name of Aboriginal Community Controlled Health Organisation: insert name of ACCHS
Project Leaders: Ms Dawn Casey, Mr Mike Stephens (NACCHO), Associate Professor Sophia Couzos (JCU), Ms Deb Bowden (PSA)
Evaluation Organisation: Evaluation Team led by the College of Medicine and Dentistry, JCU.
Project Sponsor: James Cook University (JCU)

1. The purpose of the Project, as outlined in the attached General Practitioner Participation Brief, has been explained, and I have had the opportunity to ask questions about the project.
2. I have the right to withdraw my consent and cease any further involvement in this Project at any time in accordance with my employment contract.
3. I will support the Practice Pharmacist to utilise the information contained within the clinical information system to undertake their clinical duties, and support the data collection required for this Project.
4. I will support the recording of de-identified participant data from consenting patients in the clinical information system.
5. I will participate in on-site support visits to assist our service to integrate the Practice Pharmacist role into our health service team
6. I will participate in on-site visits and telephone interviews if required to facilitate data collection about our health service.
7. I will support the ACCHS staff to obtain the written consent of individual participants in this Project.
8. I understand that if I have any complaints or questions concerning this Project I can contact any of the key contacts mentioned in the General Practitioner Participation Brief. This includes the St Vincent's Hospital Melbourne, Human Research Ethics Committee with contact details as follows: Executive Office of Research, St Vincent's Hospital Melbourne, Tel: 03 9231 2394, or email: research.ethics@svhm.org.au
9. I understand I will receive a signed copy of this document and the General Practitioner Participation Brief to keep.

_____	_____	_____
(General Practitioner)	(Signature of General Practitioner)	(Date)
_____	_____	_____
(Witness)	(Signature of Witness)	(Date)
_____	_____	_____
(Team member)	(Signature of Team member)	(Date)

The ***IPAC Project*** is the *Integrating Pharmacists within ACCHSs to improve Chronic Disease Management Project (IPAC).* The Project Partners and Project Operational Team for the ***IPAC Project*** include: The National Aboriginal Community Controlled Health Organisation (NACCHO); Pharmaceutical Society of Australia, and the College of Medicine and Dentistry, James Cook University. *Evaluation Team* members include the Project Partners, and the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); Queensland Aboriginal and Islander Health Council (QAIHC); and the Aboriginal Medical Services Alliance in the NT (AMSANT). The Project Reference Group includes representatives of NACCHO, Affiliates and ACCHSs.

College of Medicine and Dentistry, James Cook University on behalf of the **National Aboriginal Community Controlled Health Organisation, and the Pharmaceutical Society of Australia (**IPAC Project Partners).
Douglas Parade, Townsville, Qld, 4812.
Tel: 07 47816062; Email: sophia.couzos@jcu.edu.au

MASTER PHARMACIST PARTICIPATION BRIEF

Title	*Integrating Pharmacists within Aboriginal Community Controlled Health Service (ACCHSs) to improve Chronic Disease Management Project (IPAC)*
Short Title	*Putting Pharmacists into ACCHSs*
Project Sponsor	*James Cook University*
Coordinating Investigators	*Associate Professor Sophia Couzos (JCU), Ms Deb Bowden (PSA), Mr Mike Stephens (NACCHO), Ms Dawn Casey (NACCHO)* s47F *Dr Erik Biros (JCU), Dr Deborah Smith (JCU),* s47F
Evaluation Team	
Location	*[Name of ACCHS]*

What is the IPAC Project?

IPAC stands for *'Integrating Pharmacists within Aboriginal Community Controlled Health Service (ACCHSs) to improve Chronic Disease Management'* Project.

This project will explore if including a registered non-dispensing practice pharmacist as part of the primary health care team within Aboriginal community controlled health services (ACCHSs) leads to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples. The project will explore improvements in prescribing by doctors, if patients are more likely to take their medicines, and if indicators of their health are improving over time, by measuring these factors before and after the pharmacist is appointed. Practice pharmacists will work with the doctors and other health staff in each ACCHS for a period of 15 months per service, in Vic, Qld and the NT.

Practice pharmacists will provide relevant healthcare activities within their scope of practice to patients. They will also provide education and training to existing staff within the services (as appropriate), improve relations with community pharmacies to overcome barriers that patients may face in accessing medicines, and assist in managing medications at transitions of care (such as discharge from hospital). This project will also explore the cost-effectiveness of pharmacist integration within ACCHSs.

How did this Project come about?

The Project was developed at the request of the National Aboriginal Community Controlled Health Organisation (NACCHO, representing ACCHSs across Australia) and the Pharmaceutical Society of Australia (PSA, representing pharmacists). The Project is a tripartite partnership between NACCHO, PSA and James Cook University (JCU). Participants include Affiliates of NACCHO in Vic, Qld, and the NT, up to 22 ACCHSs in these jurisdictions, practice pharmacists, and patients who will receive healthcare support from a pharmacist.

Community-based participatory research principles and methods are used to make sure there is appropriate Aboriginal governance over this Project.

Why is this Project important?

Aboriginal and Torres Strait Islander peoples experience a much higher burden of chronic disease due to cardiovascular, diabetes, and other health problems, and yet have poorer access to needed medicines.[1,2] Adverse health outcomes from these illnesses are preventable

if prescribing quality is improved, and patients are better supported with medicines use, which is a key health equity issue.

Non-dispensing pharmacists are not currently funded consistently or reliably to work within primary health care settings in the public health sector in Australia. Despite this, several ACCHSs across Australia have innovatively sourced funds and/or developed partnerships with community pharmacy's to source pharmacists in non-dispensing roles. This project is modelled on these pharmacists' roles and on international research evidence. There is extensive global evidence that practice pharmacists co-located within general practice clinics can enhance chronic disease management and quality use of medicines.[3]

The NACCHO and the PSA have promoted the need for this project for many years. The project will help the Australian Government make decisions about future funding and the role practice pharmacists may play as members of primary health care teams within ACCHSs and potentially other settings in Australia.

What is the aim of this project?

This project aims to improve quality of care outcomes for Aboriginal and/or Torres Strait Islander adult patients with chronic disease by integrating a practice pharmacist within the primary health care team of ACCHSs. This means the Project will investigate:

- Improvements in health measures of those patients who have been receiving support from a pharmacist and who agree to participate in the Project;
- Improvements in:
    - prescribing so that medicines patients are taking are appropriate for them and their individual healthcare needs;
    - patient adherence to medicines;
    - health service utilisation of Medicare;
    - relationships with and perceptions of stakeholders (ACCHSs staff; community pharmacies; pharmacists);
- The cost-effectiveness of the intervention, which will investigate the costs of the pharmacist service and measures of effectiveness such as increased Medicare utilisation (as a marker of increased patient access to healthcare services towards equity).

Does this project have ethics approval?

Ethics approval has been received from a Victorian Human Research Ethics Committee (HREC). This is the St Vincent's Pubic Hospital HREC in Melbourne. This HREC participates in National Mutual Acceptance of ethics. This means that the review of this committee in Victoria may be acceptable to other HRECs. Acknowledgement from JCU has also been received. This Project will also seek ethics review from two other HRECs in the Northern Territory. These are the:

- Menzies School of Health Research HREC
- Central Australian HREC

As this project is to be run in Qld, Victoria and the NT, ethics review is required from all these jurisdictions.

How is the Project funded?

The Australian Government under the Pharmacy Trials Program of the 6th Community Pharmacy Agreement has funded the project for 29 months.

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Governance

The Project Partners and the Project Operational Team

This project is a partnership between the PSA, NACCHO, and JCU (College of Medicine and Dentistry), guided by a Memorandum of Understanding that outlines communication and governance processes.

The PSA, as the lead agency, is responsible for managing the Head Agreement with the Department of Health, and service agreements with partners and ACCHSs, and will coordinate the appointment of practice pharmacists, their recruitment, selection, placement, and training. The NACCHO will provide Aboriginal governance leadership for the project and coordinate all communication with ACCHSs, Affiliates and the NACCHO Board. JCU will undertake the project evaluation, having developed the research methodology based around a pragmatic, community-based participatory research model.

The Project Operational Team is made up of the project partners and is Chaired by the Deputy CEO of NACCHO, Ms Dawn Casey.

Steering Committee

The Project Operational Team will report to this group as this is made up of representatives of the Project partners, the Department of Health, the Pharmacy Guild of Australia and external experts.

Members of the Evaluation Team

The Project Partners are members of the evaluation team as are other Aboriginal community representative bodies. These are the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); the Queensland Aboriginal and Islander Health Council (QAIHC), and the Aboriginal Medical Services Alliance in the NT (AMSANT). These organisations are NACCHO Affiliates and will be responsible for state-based service support to registered ACCHSs, and provide guidance to the project as members of the evaluation team.

Project Reference Group

State and Territory Affiliates of NACCHO (QAIHC, VACCHO and AMSANT) will be members of the Project Reference Group. Participating ACCHSs will also be invited to be members of the Project Reference Group managed by NACCHO. The Chair of the Project Reference Group will be a nominated member of the NACCHO Board of Directors. This group will meet by teleconference or web-based platforms.

Aboriginal governance and leadership

The way in which these groups communicate and link with each other is shown in Figure 1 and 2. The Project respects and acknowledges Aboriginal governance principles, and ACCHS sector leadership and involvement.

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Figure 1. Governance and partnership structure of the IPAC project

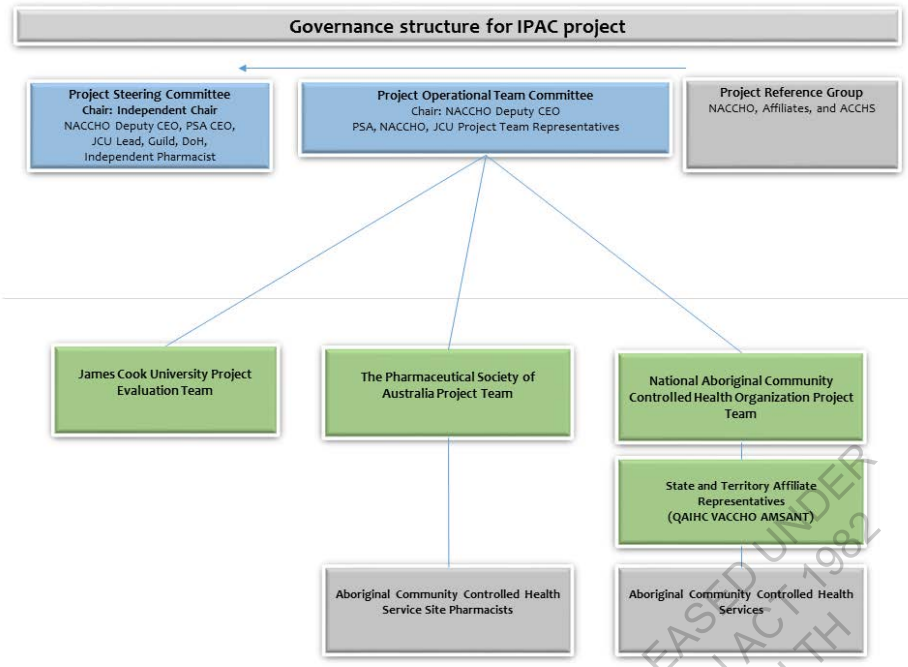
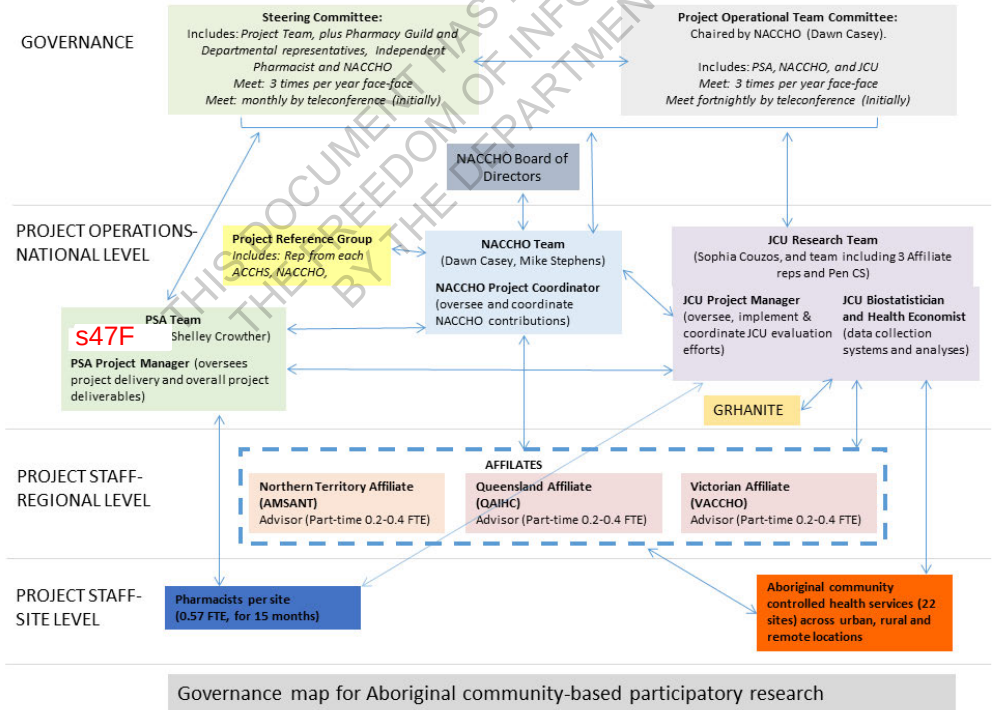


Figure 2. Governance map for the IPAC project.



What is the design of this project?

The project partners are committed to undertaking the Project to ensure clear benefits to ACCHSs, and to ensure acceptability and sustainability of the intervention within ACCHSs.

The project is a pre and post study where the pharmacist intervention will be added to standard primary health care practice within ACCHSs. Information will be collected from the time the pharmacist starts until they finish, and this will be compared with information from 12 months before the pharmacist started.

The parts of the project

There are three project phases over a 29 month project duration: Phase 1: Establishment (4 months); Phase 2: Implementation/intervention (19 months); Phase 3: Analysis and Reporting (6 months). The project is scheduled by be completed by April 2020. ACCHSs will be invited in stages (tranches) and will therefore be staggered. This is so that the project can give time to each service to get them ready for the project.

The selection of project sites

The project is inviting ACCHSs in geographically diverse settings in Vic, Qld, and NT. Up to 22 ACCHSs will be able to participate. ACCHSs need to meet certain eligibility criteria to participate as project sites.

The eligibility criteria for ACCHSs is:

- The ACCHS employs at least one (1) full-time- equivalent (FTE) general practitioner per clinic who is able to prescribe medicines to clients of that organisation.
- The ACCHS does not currently employ a non-dispensing practice pharmacist at the participating clinic.
- The ACCHS uses a clinical information system such as Communicare, Best Practice, and Medical Director.
- The ACCHS has participated in continuing quality improvement and reporting on the national Key Performance Indicators for at least 24 months through the use of electronic data extraction tools.
- The ACCHS is participating in the *Quality Assurance for Aboriginal and Torres Strait Islander Medical Services* (QAAMS) program, if it is conducting 'point of care' testing.
- The ACCHS agrees to download the GRHANITE data extraction tool into one computer within the practice, adhere to program business rules/protocol and guidelines, data provision requirements, and patient/service consent requirements for the evaluation of the program.
- The ACCHS can provide the practice pharmacist access to a private consulting room on the clinic premises that has access to the clinical information system used by the practice.
- The ACCHS can allocate a staff member who will act as a 'go to' person to assist the practice to obtain informed patient consent.
- The ACCHS is a member of NACCHO, and the relevant NACCHO State/Territory Affiliate.
- The ACCHS is an accredited practice in accordance with the RACGP Practice Standards.
- In non-remote locations, the ACCHS must be participating or eligible to participate in the PBS co-payment measure (practice incentive program).
- In remote locations, the ACCHS must be eligible to participate in the remote Section 100 arrangements for the supply of pharmaceutical benefits

These criteria have been developed with Affiliate input to suit most ACCHSs in Qld, Vic, and the NT, and to make the project as 'real life' as possible. It is important that ACCHSs have clinical information systems (CIS) that the pharmacist can use like other health staff. Only the listed clinical information systems can work with the GRHANITE^{TM} tool to collect information. (GRHANITE is explained later in this document).

The project will recognise the diversity of Aboriginal peoples and Torres Strait Islanders and models of care across Australia, and will select ACCHSs in urban, regional and remote areas. This is so that the project can understand the many ways that ACCHSs may utilise the pharmacist in their clinic.

How will ACCHSs be invited to take part?

ACCHSs will be invited to participate in the project by NACCHO and Affiliates through an 'expression of interest' process. The 'expression of interest' process will explain to ACCHS the process that will be used for site selection.

The Project Operational Team, Chaired by the NACCHO Deputy CEO will review the expressions of interest and decide if a temporary Panel made up of Affiliate representatives is necessary to select the most suitable sites to participate in the project. As the recruitment process for sites will be staggered, this process will be repeated.

When NACCHO receives an expression of interest from an ACCHS, and the ACCHS is agreed to being a suitable site, the NACCHO Project Coordinator will contact the ACCHS and explain the project further to provide instructions on the process required to establish the site participation.

Formal participation of ACCHSs

After this consultation, a Site Agreement, Site Consent form, and Site Participation Brief *(this document)* will be provided to the ACCHS. Once this is signed and agreed, the project officers will arrange for practice pharmacist recruitment and placement within the ACCHS.

A visit to the ACCHS will be arranged to undertake a 'Needs Assessment' and a 'Health Systems Assessment' just before, or at the time that the practice pharmacist commences (these are explained later in this document).

How will each ACCHS benefit from this project?

Each service will be offered a practice pharmacist (aggregated 0.57 FTE across 22 sites each for 15 months duration) under a service agreement with the PSA. This will enhance the medicines-related workforce capacity of the ACCHS. Practice pharmacists are registered to work within their scope of practice and will have a non-dispensing role. The appointments will include salary, training, and the provision of supportive resources.

In the short-term, Medicare claims for medications-related, preventive care and chronic disease care may increase. The practice pharmacist will support other staff with quality prescribing and medicines use. The relationship with community pharmacies in the local area may improve if pharmacies' are helped to provide more appropriate services to the local community. Relationships between the ACCHS, local hospitals and other care providers may improve with communication between care providers when it pertains to the medicines that patients are taking.

These short-term benefits have potential for long-term gains for the sector as a whole. The project will provide the Australian Government with the evidence-base (biomedical, process, and economic evaluations) for the development of national health policies to potentially support on-going resourcing for practice pharmacists integrated within ACCHSs.

What is the role of the Affiliates in this Project?

NACCHO is a project partner and will maintain Aboriginal governance over this project. Affiliates are also participants in this project. They will be providing support to ACCHSs through funded project officer positions (0.2-0.4 FTE). The ACCHS will be notified of the name and contact details of the Affiliate staff to contact if and when the service needs to.

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What is the pharmacist's role in the ACCHS?

The pharmacist employed within the ACCHS will deliver medication advice and education to patients and staff. They will work to improve patient medication adherence, improve prescribing, tailor medications to best suit the patient in collaboration with the prescriber, and assist with/oversee medication management processes. They may provide health promotion, disease prevention, and assist patients with chronic disease self- management and more judicious use of medicines.

The pharmacist will be required to respond to medication enquiries from patients and health professionals such as general practitioners and Aboriginal and Torres Strait Islander Health Workers/Practitioners, conduct staff education, review prescribing, mentor new prescribers, participate in case conferences, liaise across health sectors, undertake medication management reviews, and evaluate drug utilisation to ensure optimal therapy. As part of their collaborative work, an important element of the practice pharmacist's role is liaison with local community pharmacists to ensure continuity of care, and assist in medication management with transitions of care (such as when the patient is discharged from hospital).

Overall, there are 10 core roles targeting *patients*, and *health professionals and health systems.* These roles are all non-dispensing, for which practice pharmacists are registered to deliver. This is summarised in Table 1.

Whilst the project has developed these core roles for evaluation purposes, each participating ACCHS has the flexibility to utilise the services of the pharmacist according to service and client priorities. Practice pharmacists will be supported to adapt to cultural ways of delivering primary health care within each service. The project will aim to document the diversity in pharmacist core roles and in the patient journey. This will be possible through qualitative evaluation, but also through pre-post Health Systems Assessments (this is explained later in this document). The practice pharmacist will be supported to adapt to their role as directed by the staff and CEO.

Most of the practice pharmacist's activity must be devoted to providing supportive clinical care to patients who are participants in this project.

Table 1. Summary of practice pharmacists core roles

SUMMARY OF PRACTICE PHARMACISTS CORE ROLES

Core Role #	Theme	Core activity
1 (a)	**Medication Management Reviews**	Pharmacist reviews the medication the patient is taking. The pharmacist initiates and facilitates a medication management review- which may be a Home Medicines Review (HMR) or a non-HMR (medication management review not conducted in the patient's home)
1 (b)		Pharmacist reviews the patient who had a HMR after 12 months and a Non-HMR after 3-6 months.
1 (c)		Pharmacist ensures the MMR is claimed by the practice when completed (as a DMMR item 900 or RMMR item 903)
2	**Team-based collaboration**	Pharmacist participates in clinic activities that support team-based chronic disease care plans, and cardiovascular (CV) risk assessment
3 (a)	**Medication adherence assessment & support**	Pharmacist assesses the medication adherence of the patient being seen
3 (b)		Pharmacist improves the patient's experience with their medicines
4	**Medication appropriateness audit**	Pharmacist assesses 'medication appropriateness and underutilisation of medicines' as an audit of a sample of patients with chronic disease.

5	**Preventative health care**	Pharmacist provides preventive interventions to patients
6	**Drug Utilisation Review**	Pharmacist conducts a DUR to audit and improve a priority issue at the service
7	**Education and training**	Pharmacist conducts education sessions at the service
8	**Medicines information service**	Pharmacist provides medicines related information to staff within the service and responds to clinician medicines enquiries.
9	**Medicines stakeholder liaison**	Pharmacist develops a written stakeholder liaison plan supporting engagement with community pharmacies.
10	**Transitional care**	Pharmacist facilitates care coordination with relevant hospitals; residential aged care facilities, etc.

Pharmacist's qualifications

Pharmacists who will be able to work in ACCHSs will be required to have:

- current registration with the Australian Health Practitioners Regulation Agency (AHPRA) as a pharmacist;
- more than 2 years post-registration experience;
- medication review accreditation such as from the Australia Association of Consultant Pharmacy (AACP) or Society of Hospital Pharmacists of Australia (SHPA) or working towards accreditation;
- post-graduate clinical qualifications or demonstrated clinical experience (e.g. hospital or HMRs).

The need for post-graduate qualifications or accreditation will be dependent on ACCHSs preference regarding the applicant and an adequate supply of accredited and experienced pharmacist applicants.

The PSA confirms that the proposed activities are consistent with the existing scope of practice of pharmacists as defined by the PSA Competency Standards endorsed by the Australian Health Practitioner Registration Agency.

Training the pharmacist at the ACCHS

The PSA will deliver the training to practice pharmacists in partnership with NACCHO. Some of the training will be off-site (before the pharmacist starts) and some will be on-site (at the start of their placement in the ACCHS). The NACCHO Coordinator and PSA training facilitator will arrange a training time with the practice pharmacist and with the nominated ACCHS, so that on-site training can best suit the ACCHS.

To follow up training, pharmacists will also have access to structured pharmacist mentor program that will link them with a dedicated mentor pharmacist with experience in the ACCH sector and to the other practice pharmacists within the project.

What patients' are eligible to be participants in this project?

If the patient is aged 18 years of age and over and has the following conditions, then they are eligible to be a participant in this project:

- Cardiovascular disease (coronary heart disease, stroke, hypertension, dyslipidaemia and any other CV disease)
- Type 2 diabetes mellitus,
- Chronic kidney disease,
- Other chronic conditions that mean a patient is at high risk of developing medication-related problems (e.g. polypharmacy).

These conditions are selected because *most* of the mortality gap for Aboriginal and Torres Strait Islanders is due to these chronic diseases. Optimizing medicines for people with these conditions can make an important impact on their health.

The consent of the patient will be required to participate in this project. Most of the patients attending ACCHSs are of Aboriginal and Torres Strait Islander origin (81%).[4] Therefore, we expect most of the patients involved in this project will be of Aboriginal and Torres Strait Islander origin.

Patients who are regular patients of the service should be prioritised as pharmacists will make sure they follow-up these patients over time.

If a patient consents to be a participant, how may they benefit from this project?

These participants will have immediate access to an on-site pharmacist at no charge. The Pharmacist will check their medicines and make sure they are right for them. Some recommendations may require the prescriber to change medicines or their dose, or cease a medication, or start a necessary medication.

The pharmacist will help resolve problems the participant may have with taking medicines, storing them, and will assess for adverse effects. Participants will be offered medication review in the clinic, or at home, or a place that best suits them. Just like the doctors and other staff, the pharmacist will record the encounter and recommendations in the CIS so that the doctor and health team can read them and make any agreed prescribing changes. The pharmacist also has more time to spend on supporting participants with medications than the doctor has.

The Pharmacist will see participants again to provide them with ongoing support. The pharmacist may follow-up with other members of the primary healthcare team, including with community pharmacy, and depending on the participants needs, with the hospital for discharge medications. This intensive support may help to improve the health of the participant.

There are no other expectations on participants in this project. Personal details of participants are not collected at all, and the data being extracted for the project is completely de-identified. A *Participant Consent Form* and *Participant Information Brief* is available for the ACCHS and practice pharmacist to seek patient consent. Patient participation in this project is voluntary. If consent is not given, this will not affect the patient's routine treatment, or their relationship the clinic, and the patient will still be able to be referred to the Pharmacist.

If a patient consents to be a participant, how may this benefit the ACCHS?

If patients agree to be participants, this enables the ACCHS to collect information for the purpose of the project. The participation of the patient will assist the ACCHS to collect information to determine the clinical and cost-effectiveness of the practice pharmacist, and will support the clinic activity overall (with Medicare and staff education). The information will inform on whether the health of participants improves over time, compared to their health before they received the services of the pharmacist. The ACCHS may receive a site-specific report if they wish. If patient consent is not given, information cannot be extracted from the CIS for this project. Patient consent is therefore vital to assess the value of the practice pharmacist within ACCHSs.

How will patients be referred to the pharmacist in the ACCHS?

The staff within the ACCHS will need to be briefed about this project and the role of the practice pharmacist. The project will also seek the consent of general practitioners in the clinic

and provide them with an *information brief*. This *Site Participation Brief* can assist the ACCHS with informing other staff.

Patients attending the ACCHSs doctor, health worker or other healthcare provider will be invited to talk to a practice pharmacist. These staff can refer the patient to the practice pharmacist. NACCHO and the PSA will prepare some simple promotional material to help health staff with this referral, so that patients who are most in need and meet the inclusion criteria are offered the services of the pharmacist.

The practice pharmacist or a designated staff member will tell the patient about this Project (and provide the patient with the *participant information brief*) and ask them if they want to take part. They will then be asked to *sign a participant consent form*. They may see the Pharmacist straight away or an appointment may need to be made for a later time.

The practice pharmacists (with assistance from trained ACCHS staff) may also directly approach patients attending the clinic who meet the individual participant criteria. The process for participant recruitment will be flexible according to the preferred process recommended by the ACCHS. This can be arranged during the first site visit to the ACCHS (see later in this document).

How will our ACCHS seek patient consent?

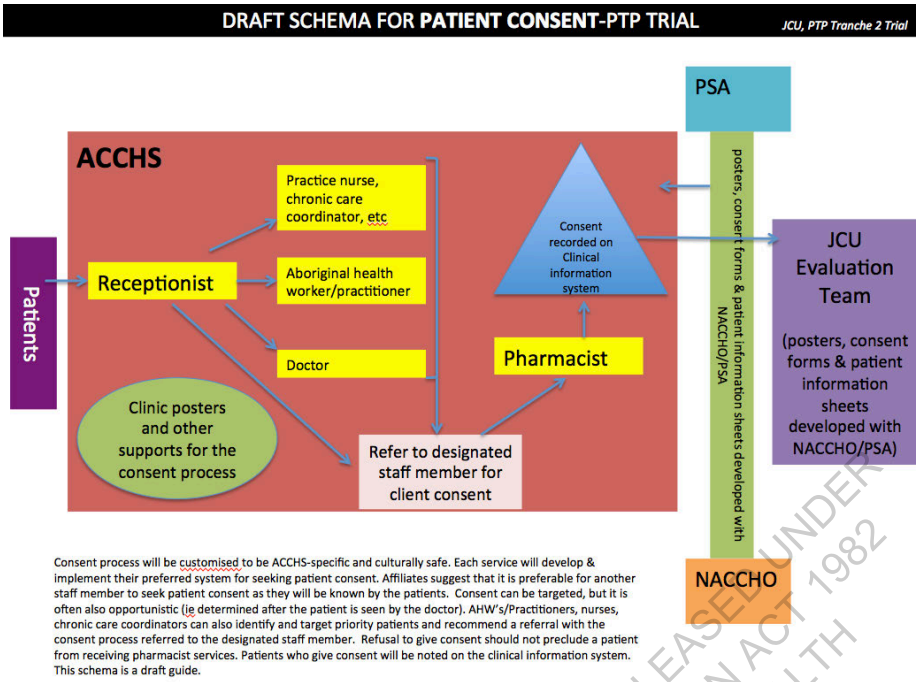
A suggested process for seeking individual patient consent has been developed in consultation with NACCHO Affiliates on the Evaluation Team. The process respects the systems that ACCHSs may wish and choose to adopt.

The practice pharmacist will be trained to seek the participant's consent. Training for seeking participant consent will also be provided to other staff who may be designated by the ACCHS to seek the participant's consent for cultural appropriateness reasons.

The participants consent form will then be signed and dated by the patient, a witness, and the designated staff member seeking patient consent. The consent form will be stored in a locked briefcase by the practice pharmacist until posted by registered post. It may be transmitted electronically to JCU after scanning. A written copy of the verbal information will be provided to the patient, including advice on how they may ask questions or make complaints about the project.

Consent will then be recorded on the clinical information system (CIS) by the practice pharmacist and GRHANITE will extract information only from consented patients. This suggested process is summarised in Figure 4.

Figure 4. A suggested process to seek patient consent.



How will participants be followed-up?

Practice Pharmacists will aim to follow-up participants using the usual clinic processes. Pharmacists will work with the existing staff in the ACCHS to follow-up participants in the same way used for all patients. Participants will need to be reviewed according to clinical needs and Medicare rules, and may include 3-monthly, 6-monthly or an annual review or more frequent review by the pharmacist.

The pharmacist will need to use the CIS within the ACCHS to record follow-up clinical details like other healthcare staff. The pharmacist will also record follow-up details in the pharmacist log-book as is appropriate for the type of review being conducted (such as medication appropriateness index measurements).

How many patients will ACCHS be asking to participate?

It is estimated that the practice pharmacist and the ACCHS may seek consent from about 350 people to be part of this Project and to see the Pharmacist over 15 months. This may vary considerably from service to service.

It is important for the ACCHS to encourage patients to be referred to the pharmacist early in the project. This is so that enough time is available to follow-up patients during the 15 months the pharmacist is employed in the project.

Are there any risks or benefits to patients from taking part?

The Pharmacist is a qualified and registered health professional who will be trained to work in this ACCHS. The risks to patients are no different to seeing a Pharmacist in a Pharmacy, except that patients will be seeing Pharmacists in this clinic. The Pharmacists will not be prescribing or dispensing medicines as they would in a Pharmacy. They will be working with the primary health care team in the ACCHS.

How will information for the project be collected?

The project has been designed to be acceptable and feasible to ACCHSs and practice pharmacists, by making most of the data collection a 'by-product' of service delivery. There

are three main types of information that will be collected with the help of ACCHSs. Information will be collected from clinical information systems (CIS), pharmacist log-books (managed by the pharmacist), and from site visits to ACCHSs.

1. Deidentified information about patients who have consented (participants) will be collected from services clinical information systems (CIS), using an electronic data extraction tool known as **GRHANITE™**. ACCHSs will be supported to have the GRHANITE data extraction software installed in one personal computer in the clinic. This software will be installed in one workstation to minimise practice impact. When GRHANITE runs, it does so at a scheduled time and queries data from the practice database server. This is the only time GRHANITE communicates with the practice server. GRHANITE will extract weekly data from the CIS to the secure JCU repository. The ACCHS does not need to do anything to maintain that this program is working.

2. Practice pharmacists will also collect information about what they do through an **electronic log-book**. This system will be an online secure database requiring practice pharmacist secure log-in. It will be used by practice pharmacists to record deidentified daily activity. Each electronic log-book entry will be able to be interrogated by the JCU data custodian. The daily-recorded activity will refer to 6 core pharmacists' roles. The electronic interface will be user-friendly to minimise the reporting burden of practice pharmacists.

3. **Health systems assessment, qualitative data, and cost-effectiveness analysis** data will be collected during visits to the ACCHS. Mainly the NACCHO Project Coordinator, will undertake visits to the ACCHS. A qualitative researcher will visit only three ACCHSs if they are invited by the service. The costs related to the employment of pharmacists will be sourced mainly from the PSA.

How does GRHANITE work and how secure is it?

GRHANITE™ strictly conforms to extract only data that is approved. It provides ethical and secure mechanisms for the provision of data from the CIS. If an individual gives their permission to be involved in a project, GRHANITE can read this consent information if it is recorded in the clinical notes. Patients who have not consented will not have their data interrogated, even if deidentified. This is an 'opt-in' consent process. Patient names, dates of birth, address or other identifying information are not extracted.

The data extraction from the CIS within the ACCHS will only extract deidentified data and then transmit it securely to the secure repository at JCU. The exported data is encrypted, and can only be decrypted at its final destination. This ensures transmission security. Data is deidentified as patients are assigned a unique patient ID. It is not possible for the project partners to reidentify any patient.

GRHANITE software will not operate if copied or moved from one computer to another. All installations require a unique authorising license. It is a nationally recognised tool as over 1000 health services across Australia have used/are using this for quality improvement and for research activity.

JCU will be the repository body responsible for the protection of data from loss, misuse and unauthorised access. A data custodian will be appointed (the biostatistician investigator). JCU will comply with the Code for the Responsible Conduct of Research (JCU) [This Code has been adapted from the Australian Code for the Responsible Conduct of Research ["the National Code"], developed jointly by the National Health and Medical Research Council, Australian Research Council and Universities Australia, and published in 2007.[5]

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What type of information will be collected by GRHANITE?

The information will be deidentified and only from consented patients (participants). The information will refer to periods 12 months before, and the periods after the pharmacist first provided support to the participants. This is summarised in Table 2.

Table 2. Deidentified patient information that will be extracted from clinical information systems (CIS) in the ACCHS

Measure	Detail
Patient characteristics	age, year of birth, sex, height and weight (for BMI), condition (diabetes, hypertension, dyslipidaemia, CHD, PAD, CVA, CKD, plus other disease *(in patients who fit the inclusion criteria with polypharmacy)*, smoking status (history details: start/stop year), postcode, CTG status, ethnicity, Aboriginal and Torres Strait Islander status, DVA status, pension/concessional status, year of death.
Encounter/contact indices & other demographic measures	contacts with staff (different job roles), episodes of care (date of visit, reason for visit, duration, visit type), patient status/record status (active), created and updated dates and user who created and updated the record; consented patients; patients ID/MRN/UR number/chart No/record No
Biometric indices	Diastolic and systolic BP, HbA1c, lipids (HDL, LDL, TG's, and TC), CV absolute risk assessment (levels and risk), ACR, e-GFR,
Prescribing indices	All medications (including PBS drug code); all information contained within prescriptions (route, strength, formulation, quantity); date of the script being generated, including ceased/delete date; deleted flag (if any) and reason for delete or ceased; created and updated dates, and user (job role) who created and updated the record. This information is for both current medications and past medications.
Dispensing indices	All medications (including PBS drug code); all information contained within prescriptions (route, strength, formulation, quantity); date of the medicine being supplied and dispensed; user (job role) who created and updated the record. This information is for both current medications and past medications.
Measures of health service utilisation:	
Medicare Benefits Schedule indices	900 (DMMR or HMR), 903 (residential aged care DMMR or HMR), 721 (GPMP), 732 (GPMP review 3 months later), 715 (Health Check) and other MBS items related to the evaluation of pharmacist activities; record status, created and updated dates, and user (job role) who created and updated the record, item billing amount.
Non-HMR data (out-of home interviews)	non-HMR flagged in CIS will link this to the above variables *(to be recorded by the pharmacist).*
Measures of medication adherence	• Electronic measures of medication adherence *(to be calculated by the evaluators)* • Medication Adherence *(to be recorded by the pharmacist)*

ACR= albumin-creatinine ratio; BP= blood pressure; CIS= clinical information systems; CKD= chronic kidney disease; CTG= Close The Gap; CV= cardiovascular; CVA= cerebrovascular disease; DET= data extraction tool (GRHANITE); DMMR= Domiciliary Medication Management Review; DVA: Dept of Veterans Affairs; e-GFR= electronic glomerular filtration rate; GPMP= General Practice Management Plan; HDL= high density lipoprotein; HMR= Home Medications Review; LDL= low density lipoprotein; MAI= Medication Appropriateness Index; PAD= peripheral artery disease; TC= total cholesterol; TG= triglyceride

What type of information will be collected by the pharmacist in the log-book?

The pharmacist will record their daily activity in the log-book. This will include information about education sessions they provided to staff, adhoc advice provided and any evidence this led to an outcome, the development of any resources for patients or the ACCHS, whether the pharmacist developed a plan to liaise with community pharmacy (and details of that plan), and the number of medicines reconciliations from stakeholders like hospitals.

In particular, the pharmacists' log-book will enable practice pharmacists to record the results of medication assessments for each of 30 participants. Of the participants seen by a practice pharmacist, 30 participants per site will have their medications intensively appraised as part of the medication management review.

No personal information about participants is contained in the log-book. The participant does not need to be present for the medication assessment as it is an audit of the participants medications held in the CIS.

The pharmacist will only record the unique 'patient ID' to enable matching of the medication assessment audit of 30 participants to the participant data extracted through GRHANITE.

The practice pharmacist will communicate the findings of the medication assessment for the participant to the prescribing team within the ACCHS so that appropriate clinical action is taken. Practice pharmacists will ensure that the assessment takes account of additional clinical information such as an assessment of the participant's absolute cardiovascular risk when assessing their medications.

Practice Pharmacists will follow-up participants as per usual clinic processes. These follow-up mechanisms may vary from service to service (see above).

What type of information will be collected during the site visits?

Every participating ACCHS site will be visited at least twice during the project.

1. The 'needs assessment' visit (see '*what will happen during the first visit'*).

2. To conduct a 'health systems assessment' (HSA):

- at the time of, or just prior to the appointment of the pharmacist, and
- repeated towards the end of the implementation phase (month 12-15).

The NACCHO Project Coordinator will conduct visits and assessment with assistance from Affiliate staff. The needs assessment and health systems assessment will be conducted at the first visit.

The '*needs assessment'* will collect information about what the ACCHS may need to support the practice pharmacist to work in that clinic. This will be used to help the pharmacist to get started.

The *'health systems assessment'* will source information about the ACCHS. Each ACCHS is different in many ways. The project needs to understand how many staff (and types) are employed within the ACCHS, the total service population, the total service budget, Aboriginal governance structures, health services on offer, quality improvement processes, models of care such as outreach, if home medicines reviews are conducted and how, type of CIS used, recall systems in place, the adequacy of existing communication with the hospital, and community pharmacy/ies, medicines access information, use of point of care testing, regional services available such as specialist and allied health visits, and how the ACCHS will implement and define the core roles of practice pharmacists.

A meeting with key informant staff in a focus group setting will be needed to undertake the health systems assessment. This information will be collated in a summary report for the ACCHS to use for any quality assurance activity.

What type of information will be collected for qualitative analysis?

Three ACCHSs will be invited to participate in a qualitative evaluation of the Project in mid-late 2019. ACCHSs will be asked if they will support focus group discussions with certain patients, Aboriginal health workers/practitioners, and with the pharmacist on site. These meetings will be fully catered and will be conducted in ways to minimize clinic disruption. ACCHSs will be contacted closer to that time to explain what that might involve.

What will happen during the first visit to the ACCHS?

The 'needs assessment' visit to the ACCHS will elicit the type of support needed by the ACCHS so that the practice pharmacist may best be integrated within the service. The visit will also assist the ACCHS to establish their preferred system to seek patient consent, and ensure the pharmacist can use the CIS, has a space to consult with patients, and the CIS is set to accept the 'job-role' for the pharmacist (this is necessary for the GRHANITE data extraction). A 'health systems assessment' may also be undertaken at this visit (see above).

The NACCHO Project Coordinator will make contact at this visit with the nominated ACCHS staff member who will act as a 'go to' person. Together with the nominated 'go to' person/s and relevant ACCHS staff, a project consent pathway and process that is responsive to the local ACCHS' model of care will be planned. A second 'go to' person may also need to be identified by the ACCHS and Coordinator as contingency for leave, resignation or movement between clinics or roles.

The NACCHO Project Coordinator will ensure that the service has adequate promotional material and strategies to engage both ACCHS staff and clients.

Who owns the GRHANITE information?

The raw (unanalysed) data collected from the GRHANITE data extraction is owned by the ACCHS even though it will be used, analysed and stored safely by JCU. Details regarding this is included in the service agreement with the ACCHS for this project.

Intellectual Property

Details regarding Intellectual Property of the Project will be included in the Service Agreement with the PSA.

Use of information collected by the Project

The information collected from this project will be used to prepare reports to the Australian Government on 'quality of care' outcomes (the project objective) that arise from integrating a practice pharmacist within ACCHSs. The reports will assess change in the:

- quality of prescribing,
- quality of medicines support through indicators of health service utilization,
- quality of the patient, service and stakeholder experience, and
- ultimately an effect of these improvements on biometric indices as a measure of health outcome.

The reports will also assess the cost-effectiveness of the practice pharmacist within ACCHSs.

The data analysis will also be able to provide ACCHSs and Affiliates with local level and aggregated data. Most analyses at this level would not be meaningful because the number of

participants will be too small. However, the information will be aggregated at a national level for the NACCHO, Affiliates, ACCHSs, and the PSA, as well as the Australian Government. This will inform the development of health policy about practice pharmacists and the role they can play supporting Aboriginal and Torres Strait Islander peoples with chronic disease in Australian primary health care settings.

Health systems assessment summaries will also be able to be provided to ACCHSs for their use.

Security of information collected by the Project

As the leading research organisation, JCU (the repository body) will be responsible for the protection of data from loss, misuse and unauthorised access. The Data Custodian (Biostatistician: Erik Biros) will be responsible for this role.

Further, the Project Operational Team, Chaired by the Deputy CEO of NACCHO, will be consulted in all matters brought to its attention with regard to concerns about data security.

How will the collected information be transported to JCU?

Completed Site Consent Forms will be collected by the NACCHO Project Coordinator, scanned and sent electronically to the data custodian. Participant consent forms will scanned by the practice pharmacist and electronically transmitted to the data custodian. The forms will be stored electronically in a secure computer under the management of the data custodian on the property of College of Medicine and Dentistry, James Cook University.

Information extracted using GRHANITE and from the Pharmacist log-book will be transmitted electronically and stored on password-protected internal server on JCU premises. Data accessed during the analysis phase will be stored in JCU-supported database applications only.

Health Systems Assessment (HSA) and Needs Assessment information collected from site visits, will be collected on paper-based forms, (or in electronic format) collected by the NACCHO Project Coordinator and will be transported in a locked briefcase, scanned and stored in electronic format in a secure computer under the management of the data custodian.

Where and for how long is the information going to be kept?

Data will be kept for a minimum period of 7 years from the end of the year of publication of the last refereed publication or other form of public release to an audience external to JCU.

Electronic data will be stored on password-secured databases only. Any paper-based documents will be scanned and stored electronically, and the paper documents stored in a locked cabinet in a secure room at JCU. The data custodian (Biostatistician- Erik Biros) will be responsible for data storage consistent with the JCU *Code for the Responsible Conduct of Research.*

After the minimum period of storage, the data may be considered for disposal if there is a written request to the Evaluation Lead, from both the NACCHO and the PSA for the disposal of the data. As the raw unanalyzed data extracted by GRHANITE is owned by the ACCHSs, JCU will seek instruction from NACCHO and each ACCHS as to the ongoing use or destruction of this data. The Evaluation Lead will authorize the data custodian to delete the data if this is instructed by NACCHO, in accordance with the JCU *Code.*

Who will be able to access this information?

Data will be accessible only to members of the Evaluation Team who will have a role in handling this information. From time to time, one member of the evaluation team (the University of Melbourne HaBIC Research Information Technology Unit) may need access to the data-landing server at JCU to provide technical support services.

ACCHSs may request access to de-identified information from their service. These requests can be made to the Project Operational Team or its members, or directly through the NACCHO Affiliate or Project Officers involved in this project. The request must also include documentation of intended data use and must align with project objectives (the individual consent provided by each participant). Requests to access the data that *does not align* with the project objectives will need HREC approval. Similarly, Affiliates may request access to data at their jurisdictional level. This request must be in writing and align with the project objectives.

External requests from other organizations and research agencies not participating in this project to access data from this project will need to be submitted to the Project Operational Team. NACCHO will recommend that external agencies seek approval from Affiliates and from participating ACCHSs relevant to the request. Approval will not be granted for the release of data if it is not approved by NACCHO. There may be a need to seek approval from the Department of Health if this is a condition in the Head Agreement for this project. All external requests will need to have HREC approval prior to the release of this data.

What can we do if we have concerns about data security, research misconduct or complaints?

ACCHSs can report any breaches in data security or research misconduct or complaints to:

- project partners/staff,
- Affiliates,
- NACCHO directly, and/or
- Designated HREC representative.

Reports received by project staff will be forwarded to the Project Operational Team and the Deputy CEO of NACCHO.

What is the role of ACCHSs in this project?

The ACCHS will host the practice pharmacist who will be providing health services to the patients in the community. The pharmacist will effectively be an employee of the PSA, who will provide all employment support. This will minimise the administrative burden on the ACCHS so that the pharmacist and ACCHS can focus on effective service delivery from the start. NACCHO and respective Affiliates will have the capacity to liaise closely with PSA, ACCHS and the pharmacist to ensure that the pharmacist's roles are understood clearly by both parties.

The Head Agreement between the PSA and the Department of Health will influence the service agreement between the PSA and the ACCHS. The Service Agreement with the ACCHS will document the terms of participation including: Health Service Responsibilities and Financial Arrangements.

ACCHSs will be provided with a *Site Consent Form* that will need to be signed if the ACCHS agrees to be a participant in this project.

The NACCHO Project Coordinator will be available to ACCHSs to assist in understanding and delivering on their roles within the project. They may also work with their Affiliate representative to assist ACCHSs.

The following is a summary of the ACCHSs role as a participant in this project that will be negotiated with each ACCHS to be most appropriate for that service. The role of the ACCHS is:

- To nominate a 'go to' person to be a point of contact for the project staff.
- To support the practice pharmacist to use the CIS within the practice, and access the patient's clinical records in order to support patient care and make medicines-related recommendations to other health staff.

- To enable the CIS to recognise the practice pharmacist in their 'job role'. (The ACCHS will be assisted with this. This is so that the information can be collected about the work the pharmacist has done).
- To support the pharmacist to access a private consulting room to meet with patients.
- To support the practice pharmacist to have time to record their work and findings in the pharmacist log-book.
- To assist the practice pharmacist to work with other members of the health care team by sharing information about the project with other members of the team.
- To assist the pharmacist to prepare a workplan that best suits the model of care of the ACCHS.
- To host information for patients attending the practice by using posters and other health promotion material to promote patients to be participants in this project.
- To develop a participant consent process that is approved by the ACCHS involving the practice pharmacist and/or other staff in the ACCHS.
- To support site visits and support a focus group with relevant staff for 'health systems assessment' and 'needs assessment'.
- To support site visits and support focus groups with relevant staff for the qualitative evaluation if the ACCHS wishes to volunteer as a case study site (further information about this will be provided to ACCHS to make a decision in 2019).
- Any other matters that are relevant to the work of the practice pharmacist that the ACCHS may wish to consider. (Examples include mechanisms for home medicines review, or use of point of care testing, etc).

What support will ACCHSs receive in this project?

Each ACCHS that participates in the project will receive:

- The services of an on-site registered practice pharmacist for a 15-month duration.
- Administration of pharmacist employment and contract to be provided by PSA.
- The opportunity to select their preferred practice pharmacist.
- A 'Needs Assessment' site visit to ascertain any specific needs of ACCHS.
- A facilitated 'training' on-site visit to support and prepare the practice pharmacist within the primary healthcare team.
- Resources to support the practice pharmacist, such as medication management guides.
- A supportive mentor for the practice pharmacist (that will be managed by NACCHO and the PSA).
- Installation of the GRHANITE data extraction tool in the CIS and licence for its use for 15 months.
- Two site visits to explore Health Systems Assessment (one of these will be at the same time as the needs assessment visit).
- A Health Systems Assessment Report for ACCHS use for CQI.
- Involvement of a nominated staff member to be a member of the Project Reference Group in the project.
- Support from a nominated Affiliate officer involved in this project.
- Support from the NACCHO Project Coordinator during site visits and contact by email and phone.
- An opportunity to review project findings and provide feedback through ACCHS membership of the Project Reference Group.
- Customised reports specific to the participating ACCHS (if requested and if the data analysis is meaningful due to limitations with small participant numbers).

Each Affiliate that participates in the project will receive:

- Remuneration to participate in the project. This can be used to employ a part-time project officer (or to back-fill existing staff).
- Involvement of nominated staff as members of the Evaluation Team in the project.
- An opportunity to review project findings and provide feedback (through membership of the evaluation team and Project reference group).
- Customised reports specific to the jurisdiction (if requested).

How will ACCHSs find out the results of the Project?

ACCHSs will receive information about the Project through NACCHO communication mechanisms. The Project will finish at ACCHSs in late 2019. The ACCHSs will know the results in 2020. Other ways in which ACCHSs will be informed include:

- Through the Project Reference Group which will be provided with updates on progress with the project and extracts of reports arising from the project.
- Summary results to individual ACCHSs (pertaining to their own data) may be provided upon request to the Project Operational Team, although these may not be meaningful due to small participant numbers and the inability to undertake data analysis.
- Extracts of reports arising from this project will be summarized in plain language and disseminated according to usual NACCHO communication mechanisms, such as email, the NACCHO News, and NACCHO website, including communication with any relevant special interest groups supported by NACCHO.
- Presentations detailing progress and results will be communicated at NACCHO and/or Affiliate Conferences and Annual Meetings.

The findings of the project will also be reported for publication in articles and journals relevant to this project. There may also be presentations at conferences.

Reports will also be provided to the Australian Government, Department of Health, and through communication mechanisms used by the Pharmaceutical Society of Australia. NACCHO (as a project partner) will check this information before it is released.

Can ACCHSs decide to withdraw from this project?

ACCHSs and Affiliates that are participants reserve the right to withdraw their participation in the project in accordance with their service agreements. If an ACCHS site withdraws, the ACCHS will be asked to provide a written reason for the withdrawal to the PSA (for the contract) and the Project Operational Team. The ACCHS will be asked whether they agree to the continued use of the data collected in this Project prior to their withdrawal of Site Consent. The withdrawal of the Site from the project will mean the withdrawal of the site support specified in the service agreement (and explained above). The withdrawal of the Site will be reported to all relevant HRECs when the Project's annual report is due.

Can Pharmacists decide to withdraw from this project?

Pharmacists participating reserve the right to withdraw their participation in the project in accordance with their employment contract.

Who can Pharmacists contact for more information or to make a complaint?

Pharmacists can contact Deb Bowden from the Pharmaceutical Society of Australia: Tel: 02 6283 4740; Email: Deb.Bowden@psa.org.au. Alternatively you can contact the NACCHO Project Lead: Mike Stephens, Tel: s47F Email: mike.stephens@naccho.org.au. Or the NACCHO Deputy Chief Executive Officer: Ms Dawn Casey at dawn.casey@naccho.org.au.

College of Medicine and Dentistry, James Cook University on behalf of the
National Aboriginal Community Controlled Health Organisation, and the
Pharmaceutical Society of Australia (IPAC Project Partners).
Douglas Parade, Townsville, Qld, 4812.
Tel: 07 47816062; Email: sophia.couzos@jcu.edu.au

The Human Research Ethics Committees will continue to provide oversight as the project progresses. You can contact the Ethics Committee with any concerns about the safety and fairness of the Project at: Executive Office of Research, St Vincent's Hospital Melbourne, Tel: 03 9231 2394, or email: research.ethics@svhm.org.au

Thank you on behalf of the IPAC Project Team.

The ***IPAC Project*** is the *Integrating Pharmacists within ACCHSs to improve Chronic Disease Management Project (IPAC).* The Project Partners and Project Operational Team for the ***IPAC Project*** include: The National Aboriginal Community Controlled Health Organisation (NACCHO); Pharmaceutical Society of Australia, and the College of Medicine and Dentistry, James Cook University. ***Evaluation Team*** members include the Project Partners, and the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); Queensland Aboriginal and Islander Health Council (QAIHC); and the Aboriginal Medical Services Alliance in the NT (AMSANT). The Project Reference Group includes representatives of NACCHO, Affiliates and ACCHSs.

[1] Pharmaceutical Society of Australia. *Guide to providing pharmacy services to Aboriginal and Torres Strait Islander people.* Jul 2014. http://www.psa.org.au/download/guidelines/Guide-to-providing-pharmacy-services-to-Aboriginal-and-Torres-Strait-Islander-people.pdf

[2] Couzos S, Murray R: Health, Human Rights and the Policy Process. In: *Aboriginal Primary Health Care: An Evidence-based Approach.* edn. Edited by Couzos S, Murray R. Melbourne: Oxford University Press; 2007: 29-63.

[3] Tan ECK, Stewart K, Elliott RA, George J. Integration of pharmacists into general practice clinics in Australia: the views of general practitioners and pharmacists. Int J Pharm Pract 2014;22(1):28–37. At: http://onlinelibrary.wiley.com/doi/10.1111/ijpp.12047/pdf

[4] Australian Institute of Health and Welfare 2016. Healthy Futures—Aboriginal Community Controlled Health Services: Report Card 2016. Cat. no. IHW 171. Canberra: AIHW.

[5] JCU Code for the Responsible Conduct of Research (JCU) https://www.jcu.edu.au/policy/research-management/code-for-the-responsible-conduct-of-research

College of Medicine and Dentistry, James Cook University on behalf of the **National Aboriginal Community Controlled Health Organisation, and the Pharmaceutical Society of Australia (**IPAC Project Partners).
Douglas Parade, Townsville, Qld, 4812.
Tel: 07 47816062; Email: sophia.couzos@jcu.edu.au

MASTER PHARMACIST CONSENT FORM

Name of Project: *Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Project*

Name of Aboriginal Community Controlled Health Organisation: insert name of ACCHS
Project Leaders: Ms Dawn Casey, Mr Mike Stephens (NACCHO), Associate Professor Sophia Couzos (JCU), Ms Deb Bowden (PSA)
Evaluation Organisation: Evaluation Team led by the College of Medicine and Dentistry, JCU.
Project Sponsor: James Cook University (JCU)

1. The purpose of the Project, as outlined in the attached Pharmacist Participation Brief, has been explained, and I have had the opportunity to ask questions about the project.
2. I have the right to withdraw my consent and cease any further involvement in this Project at any time in accordance with my employment contract.
3. As the Practice Pharmacist employed by the ACCHS, I will participate in off-site and on-site training as required, delivered by a visiting facilitator from the PSA in consultation with NACCHO.
4. I will have access to the clinical information system and will utilise the information contained within to undertake my clinical duties, and to support the data collection required for this Project.
5. I will record participant data from consenting patients in the clinical information system, and also record activity in a Pharmacist Log-book as outlined in the Pharmacist Participation Brief.
6. I will participate in on-site support visits to assist our service to integrate my role into our health service team
7. I will participate in on-site visits and telephone interviews to facilitate data collection about our health service.
8. I will receive assistance from the ACCHS staff to obtain the written consent of individual participants in this Project.
9. Project staff and partners will ensure there is continuing consultation with me during the course of this Project.
10. I understand that if I have any complaints or questions concerning this Project I can contact any of the key contacts mentioned in the Pharmacist Participation Brief. This includes the St Vincent's Hospital Melbourne Human Research Ethics Committee with contact details as follows: Executive Office of Research, St Vincent's Hospital Melbourne, Tel: 03 9231 2394, or email: research.ethics@svhm.org.au
11. I understand I will receive a signed copy of this document and the Pharmacist Participation Brief to keep.

_____	_____	_____
(Pharmacist)	(Signature of Pharmacist)	(Date)
_____	_____	_____
(Witness)	(Signature of Witness)	(Date)
_____	_____	_____
(Team member)	(Signature of Team member)	(Date)

The ***IPAC Project*** is the *Integrating Pharmacists within ACCHSs to improve Chronic Disease Management Project (IPAC).* The Project Partners and Project Operational Team for the ***IPAC Project*** include: The National Aboriginal Community Controlled Health Organisation (NACCHO); Pharmaceutical Society of Australia, and the College of Medicine and Dentistry, James Cook University. *Evaluation Team* members include the Project Partners, and the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); Queensland Aboriginal and Islander Health Council (QAIHC); and the Aboriginal Medical Services Alliance in the NT (AMSANT). The Project Reference Group includes representatives of NACCHO, Affiliates and ACCHSs.

Economic evaluation of the Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) to improve Chronic Disease Management (IPAC Project)

Final Report, May 2020.

Prepared by: Hendrie D, Smith D, Couzos S. College of Medicine and Dentistry, James Cook University, on behalf of the IPAC Project Team.

Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project.

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Townsville, Queensland, 4811

Australia

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The authors also acknowledge the Project Partners and Project Team members: Ms Hannah Loller, Ms Megan Tremlett, Mr Mike Stephens, Ms Alice Nugent, Ms Fran Vaughan, and Dr Erik Biros, the Affiliates of the National Aboriginal Community Controlled Organisation, the participating ACCHSs, IPAC pharmacists, and the IPAC Steering Committee members.

ABSTRACT

Objective

An economic analysis was conducted as part of the IPAC project to establish its costs and impacts and assess the extent to which it represented value for money.

Methods

The economic evaluation was a within-trial analysis that adopted a perspective of the publicly funded health system. Participants were Aboriginal and Torres Strait Islander patients with chronic disease who were 18 years and above and who were regular patients of the ACCHSs. Three types of economic analysis were conducted: (i) a cost-consequence analysis that included all participants with changes in biomedical indices for whom pre- and post-measures of outcomes were recorded; (ii) a cost-effectiveness analysis for two sub-groups of participants: those with T2DM with pre- and post-measures of HbA1c and those selected for MAI assessments at baseline and at the end of the study, with potential prescribing omissions (PPOs) used as the relevant outcome measure; and (iii) for participants with a clinical diagnosis of T2DM, a cost-utility analysis that derived lifetime quality of life changes from the decreases in HbA1c observed during the trial period based on T2DM simulation models. Costs and outcome data, with the exception of the modelled QALY changes, were obtained directly from the IPAC trial. Costs included value of resources from delivering the intervention as well as changes in health service use in the short term (trial time period compared with pre-intervention period). Cost offsets from savings as a result of integrating pharmacists in usual care were also included.

Results

In the cost-consequence analysis, the net costs of delivering the intervention of $1,493 per person was associated with statistically significant improvements in the following biomedical indices for participants with pre and post-intervention measures: glycated haemoglobin (HbA1c) (for participants with a clinical diagnosis of T2DM), diastolic blood pressure (DBP), total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), triglycerides (TG), cardiovascular risk 5-year risk (CVD 5-year risk) and estimated glomerular filtration rate (eGFR). In the cost-effectiveness analysis, for participants with a clinical diagnosis of T2DM, the ICER of the IPAC intervention versus no intervention was $3,769 per participant with a clinically meaningful reduction in HbA1c of at least 0.5%. In the case of the subset of participants selected for MAI assessments, the corresponding ICER was $6,809 per reduction in the number of participants with a PPO. For participants with a clinical diagnosis of T2DM, the cost-utility analysis yielded an ICER of $7,463 (95% CI $6,030 –$9,664) per gain in quality adjusted life years (QALYs), assuming no lifetime costs additional to usual care were required to maintain the reduction in HbA1c. Financial implications of implementing the IPAC intervention more widely within ACCHSs were also calculated. On an annual basis, the extended IPAC intervention was estimated to cost $13.2 million. The corresponding annual increase in utilisation of medications and primary health care services associated with better medication management support was $5.1 million. However, cost savings were also likely to be achieved from the improvement in health outcomes, for example, from a reduction in the utilisation and corresponding costs of emergency department presentations and hospital admissions. Under different scenarios, these cost savings were assessed as falling between $0.6 and $1.9 million per annum, varying according to the expected decrease in utilisation achieved.

Conclusion

The IPAC intervention found relatively low costs to be associated with increases in the utilisation of medications and primary health care services, the latter having the potential to contribute to more equitable, needs-based health care expenditure for the Aboriginal and Torres Strait Islander population. Additionally, the modelled cost-utility analysis conducted for patients with T2DM found that, based on commonly used reference ICERs for the Australian health system, the ICER of $7,463 represented good value for money.

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INTRODUCTION

The *Integrating Pharmacists within Aboriginal Community Controlled Health Services* (ACCHSs) *to Improve Chronic Disease Management* (IPAC) Project investigated the potential gains in health outcomes arising from integrating a registered pharmacist as part of the primary health care team within ACCHSs. Study participants included adult patients aged 18 years and over with a diagnosis of cardiovascular disease, Type 2 diabetes mellitus (T2DM), chronic kidney disease, or other chronic conditions and at high risk of developing medication-related problems. Findings indicated that integrated pharmacists embedded into usual care of Aboriginal and Torres Strait islander adults with chronic disease significantly improved the control of CVD risk factors and glycaemic control in patients with T2DM, and reduced absolute CVD risk.

Given scarce resources and limited budgets, advocating for inclusion of a pharmacist as part of the primary health care team within ACCHSs requires that such an initiative is economically feasible in addition to meeting its objective of improving quality of care outcomes. In order to address this question, an economic evaluation was conducted as part of the IPAC project to establish its relative costs and impacts, and with the underlying objective of assessing the extent to which it represents value for money.

Structure of the economic evaluation

This economic evaluation compared the costs and outcomes of the IPAC intervention versus usual care prior to the addition of an integrated non-dispensing pharmacist within ACCHSs to promote the quality use of medicines. The perspective adopted was the publicly funded health system. Discounting was not applied as the mean participant enrolment period was less than one year.

The analysis was trial-based, rather than model-based, with costs and outcomes compared in the post- and pre-intervention periods. As such, types of events and health states did not need to be defined. The trial used a pragmatic study design to evaluate quality of care outcome measures consistent with measures usually explored for quality improvement within clinical practice, with the comparator being 'usual care'. For these reasons, quality of life measures for cost utility analysis were not collected from trial participants to reduce the burden on participants and on clinical staff. Furthermore, (i) changes in quality of life would be unlikely to have been achieved over the relatively short time frame of the IPAC Trial and (ii) problems have been demonstrated in the use of existing instruments to measure the quality of life in Aboriginal populations, especially in populations experiencing more chronic conditions.[1] A single-item question for self-assessed health status of participants (SF1 of the SF-36 scale) was used in the IPAC evaluation but this was not suitable for use in the economic evaluation.

A cost-effectiveness analysis was undertaken for two sub-groups of participants: (i) those with T2DM with pre- and post-measures of HbA1c and (ii) those selected for MAI assessments at baseline and at

the end of the study, with potential prescribing omissions (PPOs) used as the relevant outcome measure.

A cost-consequence analysis was undertaken for all participants, with changes in biomedical indices reported for participants with pre- and post-measures of each outcome. Cost-consequence analysis differs from cost-effectiveness analysis in not reporting a single summary measure such as the incremental cost per incremental change in outcome. Rather, costs are presented alongside a range of outcomes to demonstrate the full impact of the intervention and allow policy makers to interpret the findings as appropriate to their decision-making context. Cost-consequence analysis has been recommended for complex interventions with multiple effects and public health interventions which have a range of health and non-health benefits that are difficult to measure in a common unit.[2 3]

For participants with a clinical diagnosis of T2DM, a cost-utility analysis was also conducted that derived lifetime quality of life changes from the decreases in HbA1c observed during the trial period. The economic evaluation was conducted using SPSS and MS Excel.

A description of the proposed population, disease states and settings and intervention has been described elsewhere.[4 5]

Assumptions

The *theory of change* for the integrated pharmacist's intervention demonstrates the relationships and interactions between the various events that can influence outcomes and the economic evaluation.[6] In short, the effect of integrated pharmacists is influenced by their training and the integration model within the ACCHS (fidelity to the conditions of the IPAC intervention), as well as assumptions that are outside the control of the ACCHS and integrated pharmacist. For example, patient adherence behaviour can be mediated by social and economic factors outside the control of the patient and the healthcare team, and the effect of integrated pharmacists may also be mediated by the capacity of community pharmacy to engage and support systems that enhance patient-centredness in the quality use of medicines.

The economic evaluation estimated the net cost of medication utilisation during the IPAC trial (as a health system cost). Certain assumptions made in developing these estimates have been reported elsewhere.[7] The cost of medications that were actually dispensed during the study period could not be directly ascertained as dispensing data was not collected for this study.

Consequently, assumptions were applied when estimating the cost of changes to prescription medicines and a conservative approach was taken. It is likely that each of the following assumptions had the effect of overestimating the cost of medication changes during the study period. Costs were assigned to continuous-use medicines (at a standard dosage) for: a) the whole study period; b) assumed complete participant adherence over this time; and c) assumed that prescribing changes occurred immediately following the date of the baseline medication review.

Given that there are delays in patients filling prescriptions from community pharmacy, and a usual non-adherence rate of at least 30% for Aboriginal peoples and Torres Strait Islanders,[8] the actual cost of medications dispensed for the whole follow-up period would most likely have been less than what was assumed. The same assumptions were applied to ceased medications to offset the cost of newly started medications. This may have overestimated the costs saved, as medications may not have been ceased immediately after the baseline MAI. The net effect of these competing assumptions would favour an overestimation of medication costs as it is easier to cease a medication than to take it.

The costs of single-expense medications may also have been overestimated by extending the cost period to 30 days for some items according to the defined standard dosages, but this applied to only a few medications. An assumption was made that these single-expense items were not prescribed at repeated intervals during the study and this may have also underestimated the costs of these type of medications. In this case, the net effect is a more balanced set of assumptions.

The PBS patient co-payment did not factor in any of the medication cost estimates as most participants were concessional and the co-payment for Aboriginal peoples and Torres Strait Islanders in this situation is waived under the Closing the Gap PBS Co-Payment Measure. In addition, some participants were from remote locations sourcing their medications through the ACCHS under the section 100 (of the National Health Act, 1953) scheme that also waives a co-payment. The few remaining participants not in either of these situations may have paid a reduced co-payment of $6.50 (2019 prices) per medication dispensed. If the patient contribution was able to be factored into these estimates, the direction of the net effect on patient 'out of pocket' expenses arising from the medication changes is unclear given that new medications were started as well as ceased.

These assumptions provide a conservative estimate of the costs of medication changes that may be attributed to the pharmacist intervention.

Inputs to the economic evaluation

Intervention costs

Resources used to deliver the intervention included the integrated pharmacist's salary, training time, GP time spent with pharmacists in medicine information sessions and attending workshops conducted by integrated pharmacists, resources provided by the ACCHSs and miscellaneous items. Information on the amount of resource use was collected directly from record keeping systems implemented specifically for the IPAC trial. Unit costs were similarly obtained directly from the trial records or, in the case of GP time, from an official source (i.e. ABS earnings data adjusted to 2019 base year based on the change in average weekly earnings).[9] [10]

The change in use of health care resources resulting from the intervention included: (i) the net change in number of MBS item number 900 consultations with GPs and corresponding Home Medicines Reviews (HMRs) in the pre- and post- periods and (ii) the net effect of new medicines started less medicines stopped (for the subset of participants who had an MAI).

Net costs do not include changes in health system resource utilisation such as hospitalisations. Hospitalisation rates were not investigated as a measure in the IPAC Trial, as the trial was community-based and participatory, being restricted to data extracted from ACCHS clinical information systems in order to respect Aboriginal and Torres Strait Islander participants ownership of their own data.

Including an integrated pharmacist as part of the primary health care team also generated cost savings (i.e. cost offsets). The costs-savings related to the provision by integrated pharmacists of medication management reviews, either as a HMR (MBS item 900 rebate claim) or a comprehensive medication review that was conducted under circumstances that did not fulfil all criteria of the HMR program. Examples of such circumstances included reviews conducted outside the patient's home, or if the pharmacist conducting the review was not accredited to conduct a HMR. These comprehensive reviews were designated for the purposes of the trial as 'non-HMRs'.

In addition to (i) HMRs conducted by the integrated pharmacists for which no Sixth Community Pharmacy Agreement (6CPA) claim was made and (ii) non-HMRs conducted by integrated pharmacists that substituted for HMRs that may, in the absence of the non-HMRs, have resulted in MBS/6CPA claims, time savings for GPs due to health care activities undertaken by pharmacists, were also included as a cost offset on the basis that they relieved GPs of these duties.

Home Medicines Reviews

The number of MBS item 900 claims was obtained for each participant for the 12-month period prior to enrolment and was collected for the duration of the implementation phase of the trial. The fee for MBS item number 900 is $157.30[11] and under the 6CPA the pharmacist's fee for a HMR is $222.77 (the total of HMR fees being $380.07).[12] Given varying follow-up periods for participants, MBS item 900 claims in the 12-month period prior to enrolment were proportionately adjusted to correspond to the period for which the participant was enrolled (i.e. number of MBS item 900 claims in 12-month pre-period multiplied by days in trial divided by 365).

Net cost of change in medicines

A method was developed to derive an estimate of the cost of additional medicines started, with cost-offsets for the number of medicines stopped for the subset of participants who had a MAI assessment.[13] Comparisons were made per patient between medicines at baseline and end of study. Whilst the study records could inform on the number and type of 'new medicine started' or 'previous medicine stopped', neither the dose of medicine prescribed nor the date when the medicine change occurred was known. Consequently, a standard, maximum or minimum medication dose was assigned by an expert panel and the dispensed price per maximum quantity (DPMQ) listed by the PBS used to assign costs for a standard time period consistent with complete adherence. A maximum drug dose for 'new drugs started' overestimates the cost of new medicines, and a minimum drug dose for 'medicines stopped' underestimates cost savings. An assumption was made that the medication change occurred from the date of the baseline MAI and continued until the date of the repeat MAI. Participants for whom information on medicine use was not collected were allocated the average cost of PBS medicines per participant as calculated for participants with a medicine cost.

HMRs and non-HMRs conducted by the integrated pharmacists

The number of HMRs and non-HMRs conducted during the IPAC Trial were ascertained from the integrated pharmacist logbook. The majority (96.4%) of HMRs conducted during the trial period were completed by the integrated pharmacists, with approximately half (52.8%) conducted within IPAC hours and for which no 6CPA claim was submitted. Given the fee of $222.77 per HMR, this amounts to a cost offset to the system of $113.39 per HMR (0.964 x 0.528 x $222.77). The non-HMRs were also a cost offset for which the equivalent cost of a HMR of $380.07 was assigned.[14] [15]

Omitted from the analysis was the cost of follow-ups to HMRs and non-HMRs. Approximately half of the HMRs and non-HMRs resulted in follow-up encounters within the implementation phase, which represent a cost offset. However, these follow-up encounters were excluded as a cost offset as they did not relate to an activity funded at the time of the intervention.

Time saved for GPs

Inclusion of an integrated pharmacist as part of the primary health care team resulted in time saved by GPs. A survey of GPs for the qualitative evaluation of the IPAC trial suggested a wide variation in the amount of GP time saved from the support provided to them by integrated pharmacists. This time saving ranged from 3% to 41%.[16] In view of the variation, the evaluation team adopted a minimal and conservative time saving that amounted to approximately 5% of their time. As indicated earlier, the cost of GP time was assigned based on ABS earnings data.[17]

Allocating intervention costs to participants

Intervention costs were divided into (i) variable costs that could be attributed directly to participants (e.g. HMRs, non-HMRs, medicines started/stopped) and (ii) fixed costs which included intervention costs plus cost offsets.

Variable costs were allocated directly to participants based on their unit costs. Fixed cost components were allocated to each ACCHS based on relative resource use. These fixed cost components were allocated to participants based on the number of months each participant was enrolled in the study as a proportion of the total number of months measured across all participants enrolled at that ACCHS. In the case of time saved by GPs, the cost was allocated to participants based on the number of months they were enrolled in the study as a proportion of the total number of months of enrolment measured across all participants. The rationale for this latter was to account for the varying number of participants at each site and thus to allocate these cost offsets in a way more likely to reflect time saved.

Total costs for each participant was calculated as the sum of their variable costs plus share of fixed costs.

Table 1 presents data relating to how direct health care resources used in delivering the IPAC intervention were calculated including unit costs, the source of unit cost data, and relevant explanatory comments. Similarly, Table 2 shows these items in regard to the utilisation of direct health

care resource items by trial participants. Table 3 lists the range of outcome measures used in the primary and secondary economic evaluations.

Table 1. Direct health care resource items associated with delivering the IPAC intervention

Item	Units	Unit cost	Source	Comment
Integrated pharmacist salary	Hours	$50 per hour*	Financial records	Casual hourly rate for a pharmacist at two sites was $68.44. Salary for two discontinued sites was reallocated across other sites based on proportion of total pharmacist hours.
Integrated pharmacist on-costs	% of salary	17% ($8.50 per hour)*	Financial records	Range of $4.81 - $9.86 depending on employment arrangements.
Integrated pharmacist allowances (including relocation costs where applicable)	$	-	Financial records	Total amount across all sites allocated to pharmacists at each site based on their proportion of total hours
Out-of-pocket pharmacists' payments	$	-	Self-report	As above
Integrated pharmacist training	$	-	Financial records	As above
ACCHS support of integrated pharmacists	$	-	ACCHS records	As above
General practitioner time spent in receiving a medicines information service	Hours	$86.80 per hour	Hours from pharmacist logbook; unit cost from ABS (2019a). Updated to 2019 using ABS (2019b) [1,2].	As above

*Cost estimates were provided by the Pharmaceutical Society of Australia. The pharmacists' salary was budgeted by the PSA for the integrated pharmacist role in the IPAC project. For some pharmacists this rate was an increase on their salary rate prior to IPAC project, whilst for others the rate was lower than their pay rate immediately prior to IPAC. Market rates vary depending on remoteness.

[1] Australian Bureau of Statistics. Employee earnings and hours, Australia, May 2018. Cat no 6306.0. Canberra:ABS; 2019..

[2] Australian Bureau of Statistics. Average weekly earnings, Australia, May 2019. Cat no 6302.0. Canberra:ABS; 2019.

Table 2. Utilisation of direct health care resource items by IPAC Trial participants

Item	Units	Unit cost	Source	Comment
Net Home Medicines Reviews (HMRs)	n	$380.07	MBS and 6CPA	Comprises $157.30 for MBS item 900 plus 6CPA fee for pharmacists of $222.77
Cost offset HMRs conducted within IPAC hours (no 6CPA claim).	n	$113.38	Financial records, MBS item 900 and 6CPA	Attributed as a cost saving
Cost offset Non-HMRs	n	$380.07	MBS and 6CPA	As above
Time saved by GPs	% of time	$86.80 per hour	% of time from GP survey; earnings from ABS (2019a); ABS (2019b)	As above
Net cost of PBS medicines	n	Various based on DPMQ listed by the PBS	See 'Net cost of change in medicines' section above	-

6CPA= 6Th Community Pharmacy Agreement; ABS= Australian bureau of Statistics; MBS= Medicare Benefits Schedule

Table 3. Outcome measures used in the primary and secondary economic evaluations

Outcomes	Measures	Source
Primary outcome measures	Biomedical indices including changes in HbA1c for participants with T2DM, and changed in SDP, DBP, TC, LDL-C, HDL-C, TG, ACR and CVD 5-year risk	Trial data
Primary outcome measure – participants with T2DM	Clinically meaningful reduction in HbA1c	Trial data
Secondary outcome measure	Potential prescribing omission	Trial data

ACR= albumin-creatine ratio
BMI= body mass index;
BP= blood pressure;
CVD= cardiovascular disease.
DBP= diastolic blood pressure
eGFR= estimated glomerular filtration rate
HbA1C= glycated haemoglobin
HDL-C= high density lipoprotein cholesterol
LDL-C= low density lipoprotein cholesterol
SBP= systolic blood pressure
TC= total cholesterol
TG= triglycerides
T2DM= type 2 diabetes mellitus

The cost-consequence analysis was undertaken using biomedical indices listed above, while the cost-effectiveness analysis was undertaken with regard to the primary outcome of a clinically meaningful reduction in HbA1c for participants with T2DM[18] and potential prescribing omissions for participants selected for MAI assessments.[19] These intermediate health outcome measures reflect 'quality of care' measures, consistent with quality measures used by the Australian Government to monitor the provision of primary health care through arrangements with Primary Health Networks and the ACCHS sector nationally.[20]

The cost of implementing the IPAC intervention was $1,946,876 (Table 4). As a result of the intervention, the net cost of health services (HMRs) increased by $132,899 ($179,012-$46,113) and the net cost of PBS medicines (i.e. medicines started less medicines stopped) increased by $553,849 ($132,899+$418,049). Cost offsets from time saved by GPs and integrated pharmacists conducting HMRs and non-HMRs during the trial period amounted to $459,643.

The net total cost of implementing the IPAC trial was $2,173,981 (calculated as [$1,946,876+($132,899+$553,849)-$459,643]). **On a per participant basis, this cost was equivalent to $1,493 per person**.

Table 4. Resource use, costs and cost offsets in delivering the IPAC intervention (n=1,456)

Item	Resource use (units)	Costs ($)	
		During-trial period	Pre-trial period ("comparator")
Integrated pharmacist salary	27,478 hours	$1,621,079	
Integrated pharmacist allowances	-	$136,658	
Pharmacist out-of-pocket payment	-	$9,741	
Integrated pharmacist training	-	$64,820	
ACCHS contribution[1]	-	$52,158	
General Practitioner time spent	719 hours	$62,420	
Total: Intervention costs	**-**	**$1,946,876**	
Home Medicines Review based on item 900 claims (HMR)	149 pre-intervention; 471 during intervention[2]	$179,012 [2]	$46,113[3]
Net cost of PBS medicines (participants for whom medicines was measured)		$135,800[4]	
- (PBS medicines started)	-	($514,467)[4]	
- (PBS medicines stopped)	-	($378,667)[4]	
Net cost of medicines (participants for whom medicines were not directly measured)		**$418,049[5]**	
Cost of utilisation health services		**$732,861**	**$46,113[3]**
Time saved by General Practitioners	1366 hours	$118,528	
Cost offsets HMRs	-	$53,402 [6]	
Non-HMRs	757	$287,713	
Cost offsets		**$459,643**	
Net total costs		**$2,220,094**	**$46,113[4]**

HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management review that fulfils the criteria for a Medicare Benefits Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the integrated pharmacist's logbook.
PBS= Pharmaceutical Benefit Scheme.

1. Excludes overheads and infrastructure costs (e.g. office space, computers, etc)
2. Data from HMR report.[21] A cost offset of $380.07 per HMR was applied.
3. A cost offset of $380.07 per HMR was applied but was adjusted for each participant to reflect equivalent number of days in pre-trial period as during trial period.
4. Derived from: *Couzos S, Drovandi A, Smith D, Hendrie D, Biros E. Net cost to the PBS of medication changes arising from the IPAC intervention: Method used to assess health system costs for economic analysis. Supplement to the Economic Evaluation for the IPAC Project. Report to the PSA, December 2019.* The costs differ slightly from this report as the costs here also include the cost of medicines for four participants who were not in the AoU group, totalling $2593.69 ($135,800 - $133,206). This cost relates to the subset of participants who had an AoU conducted.
5. Participants for whom information on medicine use was not collected were allocated the average cost of PBS medicines per participant as calculated for participants with a medicine cost.
6. Derived from 471 HMRs X $113.39. The majority (96.4%) of HMRs conducted during the trial period were completed by the integrated pharmacists, with approximately half (52.8%) conducted within IPAC hours and for which no 6CPA claim was submitted. Given the fee of $222.77 per HMR, this amounts to a cost offset to the system of $113.39 per HMR (0.964 x 0.528 x $222.77).

Table 5 presents costs for subgroups of participants. It was possible to report costs for subgroups as intervention costs (variable and fixed) and components of the net cost of direct health care resources

were apportioned to individuals either directly or based on allocation factors. Identifying costs separately for subgroups enabled the appropriate costs to be compared with corresponding outcomes in the incremental cost-effectiveness ratios presented in the cost-effectiveness analysis. Calculating costs for subgroup of participants assumes that the costs of implementing the IPAC intervention are proportionately divisible.

Table 5. Resource use, costs and cost offsets in delivering the IPAC intervention for specific subgroups of participants.

Subgroup	No. of participants	Total intervention costs[1]	Net cost of utilisation of health services[2]	Cost offsets	Net total costs (including cost offsets)
Participants with T2DM and pre-post HbA1c measures[3]	539	$732,130	$198,822	$177,178	$753,774
Participants for whom AoU conducted[3]	353	$690,949	$161,115	$137,105	$714,959

AoU= Assessment of medication underutilisation
HbA1C= glycated haemoglobin
T2DM= type 2 diabetes mellitus
[1] Includes sum of variable and fixed costs of the IPAC intervention for participants in each subgroup.
[2] Includes net cost of utilisation of health services for participants in each subgroup.
[3] Participants with T2DM and in the AoU groups had a mean length of participation in the IPAC trial of 287 and 326 days respectively. Additionally, more participants in the AoU group were associated with ACCHSs with higher mean costs per participant.

RESULTS OF THE ECONOMIC EVALUATION

Cost-consequence analysis

The results of the cost-consequence analysis, comparing the cost of the IPAC intervention with changes in biomedical indices for which statistically significant differences were observed, are presented below (Table 6). Changes in biomedical indices were calculated using paired pre and post-intervention measures, adjusted for health service cluster and the length of follow-up time.

The total cost of implementing the IPAC intervention was $1,493 per participant. This cost was associated with statistically significant improvements in the following biomedical indices for participants with pre and post-intervention measures: glycated haemoglobin (HbA1c) (for participants with a clinical diagnosis of T2DM , diastolic blood pressure (DBP), total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), triglycerides (TG), cardiovascular risk 5-year risk (CVD 5-year risk) and estimated glomerular filtration rate (eGFR).

Table 6 Cost-consequence analysis comparing mean incremental cost with mean differences in biomedical indices[1]

Variable	Mean incremental cost	Mean difference in biomedical indices mean (SD, 95% CI)	p-value[1]
Net total cost (including cost offsets)[2]	$1,493		
HbA1c mmol/mol *[% units]* (n=539 in T2DM)		-2.8 (19.5, -4.5 to -1.0) *[-0.3% (3.9%, -0.4% to -0.1%)]*	0.001
DBP, mmHg (n=1045)		-0.8 (9.4, -1.4 to -0.2)	0.008
TC, mmol/L (n=660)		-0.15 (0.77, -0.22 to -0.09)	<0.001
LDL-C mmol/L (n=575)		-0.08 (0.48, -0.13 to -0.03)	0.001
TG mmol/L (n=730)		-0.11 (1.08, -0.20 to -0.01)	0.006
CVD 5-year risk % units (n=38)		-1.0 (2.6, -1.8 to -0.12)	0.027
eGFR (no minimum follow-up time) ml/min/1.73m^2 (n=895)		1.9 (25.7, 0.1 to 3.7)	<0.001
eGFR (6-month follow-up time) ml/min/1.73m^2 (n=895)		-0.2 (36.0, -2.99 to 2.7)	0.034

1. Data pertains to biomedical indices with mean difference that was statistically significant at the 0.05 level, as sourced from clinical endpoint analysis report.[22]
BP= blood pressure;
CVD= cardiovascular disease.
DBP= diastolic blood pressure
eGFR= estimated glomerular filtration rate
HbA1C= glycated haemoglobin
LDL-C= low density lipoprotein cholesterol
TC= total cholesterol
TG= triglycerides
T2DM= type 2 diabetes mellitus
2. The estimate of $1,493 per participant, which includes the net costs of utilisation of health services and PBS medicines, is believed to be an overestimate. The net cost of medicine was estimated for a subset of participants based on assumptions that maximised the cost of new medicines started and minimised the cost of medicines that were stopped (see Appendix 15).

Cost-effectiveness analysis

The cost-effectiveness analysis was undertaken for: (i) participants with a clinical diagnosis of T2DM with pre- and post-measures of HbA1c and (ii) participants selected for MAI assessments at baseline and at the end of the study, with potential prescribing omissions used as the relevant outcome measure.[23]

For participants with a clinical diagnosis of T2DM, and with pre and post-measures of HbA1c, costs and outcomes for the IPAC intervention compared with no IPAC intervention (the comparator) are shown in the Table 7. The ICER of the IPAC intervention versus no IPAC intervention was $3,769 ($753,774/200) per participant with a clinically meaningful reduction in HbA1c of at least 0.5%.[24]

Adopting the statistically significant but still clinically meaningful reduction in HbA1c of 0.3% as the benchmark (rather than the benchmark reduction of 0.5%), the ICER reduces to $3,235 ($753,774/233) per participant.

Table 7 Incremental cost effectiveness ratio for reduction in HbA1c in participants with Type 2 diabetes mellitus

		A		B	A/B
	Cost	**Incremental cost**	**Effectiveness: Mean HbA1c (SD) mmol/mol [% units]**	**No. of participants with a clinically meaningful reduction in HbA1c[2]**	**ICER[1]**
Intervention	$772,098	$753,774	64.0 (22.3) [8.0% (2.0%)]	200	$3,769
Comparator	$18,324[3]		66.8 (23.8) [8.3% (2.2%)]		

[1] ICER = Incremental Cost Effectiveness Ratio (defined as incremental cost divided by number of participants with a clinically meaningful reduction in HbA1c).

[2] Number with clinically meaningful reduction (mean difference) in HbA1c of at least 0.5% at the participant level, from baseline compared with end of study (n=539).[25] HbA1c conversions used the formula: %HbA1c (units) = [IFCC HbA1c (mmol/mol)* 0.0915] +2.15. Note that a clinically meaningful reduction refers to whether the difference is likely to impact current medical practice based on change at the individual rather than population level. It differs from statistical significance, which quantifies the probability of a study's results being due to chance.[26] This analysis therefore adopts a conservative approach to estimating the ICER, as even small reductions in HbA1c can be clinically meaningful at both individual and population levels.[27]

[3] Cost reflects health system costs in the pre-intervention period; HMRs were the only cost item included.

For the sample of participants assessed for the underutilisation of medications (AoU), the overall costs and outcomes, and incremental costs and outcomes, for the IPAC intervention compared with no IPAC intervention are shown below (Table 8). For this subset of participants, the ICER of the IPAC intervention versus no IPAC intervention was $6,809 per reduction in the number of participants with a potential prescribing omission.

Table 8 Incremental cost effectiveness ratio for reduction in potential prescribing omissions in participants assessed for the underutilisation of medications (AoU)

	Cost	**Incremental cost**	**Effectiveness PPOs (n)**	**Incremental effectiveness[1]**	**ICER**
Intervention	$729,237	$714,959	181	105	$6,809
Comparator	$14,278[2]		76		

AoU = Assessment of Underutilisation
ICER = Incremental Cost Effectiveness Ratio
PPO = Potential Prescribing Omission

[1] Reduction in the number of participants with a potential prescribing omission.

[2] Cost reflects health system costs in the pre-intervention period; HMRs were the only cost item included.

Cost-utility analysis

For participants with a clinical diagnosis of T2DM, and with pre and post-measures of HbA1c, changes in HbA1c during the trial period were mapped to lifetime quality of life changes based on the findings of a systematic review.[28] This review included 76 studies using T2DM simulation models to evaluate the relationship between improvements in HbA1c and modelled health outcomes in terms of quality-

adjusted life years (QALYs) or life expectancy. Of the 76 studies, 57 were based on the CORE Diabetes Model.[29]

Findings of the systematic review based on multivariable regression indicated a linear relationship of every 1% decrease in HbA1c resulting in a 0.371 (95% CI 0.286-0.456) increase in lifetime QALYs. However, studies did not appear to include a decrease in HbA1c exceeding 3%. Participants in the IPAC trial that were recorded to have HbA1c reductions of greater than 3% were assumed to have QALY gains corresponding to a 3% decrease. Percentage reductions in HbA1c refer to the change in measured HbA1c. For example, a change from 9% to 8% reflects a decrease of 1%.

The increase in lifetime QALYs for participants with T2DM were calculated based on the following assumptions:

1) Participants with a decrease in HbA1c of less than 1% were assigned no lifetime QALYs.
2) Participants with a decrease in HbA1c of between 1% and 3% were assigned lifetime QALY gains calculated as 0.371 multiplied by the corresponding decrease.
3) Participants with a decrease in HbA1c of more than 3% were assigned lifetime QALY gains calculated as 0.371 multiplied by 3.

Mapping changes in HbA1c over the trial period to a gain in lifetime QALYs resulted in a projected increase of 101 QALYs (95% CI 78-125) (Table 8a).

Table 8a Distribution of lifetime QALY gains by changes in HbA1c for participants with T2DM

Change in HbA1c (%)	No. of participants	Lifetime QALY gains
<1%	401	0
1% to 3%	111	71.27
>3%	27	30.05
Total	**539**	**101.32**

Based on an incremental cost of the IPAC intervention of $753,774 for participants with a clinical diagnosis of T2DM, and with pre and post-measures of HbA1c, this suggested an ICER of $7,463 (95% CI $6,030-$9,664) per QALY, assuming no lifetime costs additional to usual care are required to maintain the reduction in HbA1c.

Only one study identified in the literature review of the cost-effectiveness of non-dispensing pharmacist services integrated within primary health care presented an ICER based on lifetime cost/QALY, but its target group were patients with hypertension.[30]

While the concept of having a cost-effectiveness threshold as a guide for selecting health care interventions for inclusion in a national health insurance scheme has proved controversial,[31] these thresholds provide guidance as to which interventions provide relative value for money.[32] In Australia, analysis of public summary documents have shown that medical services with ICERs over $40,000 per QALY have been recommended for funding, whilst summary documents from the Pharmaceutical Benefits Advisory Committee have indicated an ICER threshold of between $45,000 and $75,000.[33,34] A recent study that estimated a reference ICER for the Australian health system showed a lower figure of $28,033 per QALY gained.[35] This latter threshold was based on adopting a supply-side rather than demand-side approach, which has been argued to be preferred in decisions about adding or subtracting interventions to a publicly funded health system.[36]

Based on these ICER thresholds for Australia of assessing the value of new interventions, the modelled ICER for the IPAC intervention for participants with T2DM of $7,463 (95% CI $6,030-$9,664) per QALY indicates good value for money.

Sensitivity analyses

The sensitivity analysis tested for uncertainty in two parameters: variability in the number of HMR claims (MBS item 900) during the trial period, which accounted for 57% of the cost of utilisation of health services; and an increase in time saved for GPs, which accounted for 29% of cost offsets. While varying the number of HMR claims adds direct health care costs, cost offsets are also generated as the majority of HMRs conducted during the trial period were conducted by integrated pharmacists with no 6CPA claims payments made. Salary and related costs of including integrated pharmacists within the ACCHS setting are the key driver of the cost of the IPAC intervention but unlikely to be subjected to variability.

Variability in HMR claims may occur if, in the future roll-out of the IPAC intervention, there are more integrated pharmacists who are accredited to complete HMRs. In the IPAC study, about 75% of integrated pharmacists were accredited. If this number increases to 100%, then even more HMRs are likely to be completed (and claimed). While this will increase health system costs, it increases patient access to the HMRs (which is a health system goal). Also, the variability in HMRs (costs to the health system) may also occur if community pharmacy (external pharmacists) complete more HMRs because the integrated pharmacist refers the patient to them, which occurred during the IPAC intervention.

The sensitivity analysis increased the number of HMRs during the trial period to 1.33 of the number conducted during the intervention period (n=626 rather than n=471). The number of HMRs is dependent on program rules; future changes to these rules will impact on the frequency of HMRs conducted.

Time saved for GPs may increase as the integrated pharmacists become more embedded in the practice and assume more roles related to their expertise in medication use and safety.[37] The survey of GPs for the qualitative evaluation of the IPAC trial suggested a variation in the amount of GP time saved from the support provided to them by integrated pharmacists of between 3% and 41%. In the sensitivity analysis this percentage was assumed to be 10%, an increase from 5% in the base case analysis.

Increasing the number of HMRs by one third during the trial period increased net total costs of the IPAC Trial by $76,492, while the increase in time saved for GPs by having integrated pharmacists embedded in the ACCHSs decreased costs by $118,528. The impact of varying both parameters was low (Table 9).

Table 9. Key drivers of the economic evaluation

Description	Method/Value	Impact
Increase in number of HMRs	1.33 of number completed by integrated pharmacists during trial period	Low, favours comparator
Increase in time savings for GPs	10% (instead of 5%)	Low; favours intervention

FINANCIAL IMPLICATIONS

Justification of the Selection of Sources of Data

The financial implications have been determined based on the integrated model of care for pharmacists investigated in the IPAC Trial.

The approach used to estimate the financial implications of the introduction of an integrated pharmacist within ACCHSs has been based on costings for recruitment, employment, training, the proposed settings and the proposed population, extrapolated to the proposed ACCHS services. Information is also drawn from the economic evaluation presented earlier.

Financial implications include the cost of (i) delivering the proposed service and (ii) additional utilisation of health services resulting from integrated pharmacists being part of the primary health care team. Costs presented are a maximum figure that assumes all ACCHSs across Australia will participate in the extended IPAC program and be able to access suitable pharmacists.

Cost offsets from implementing the IPAC model of care will be generated as the integrated pharmacists assume tasks previously undertaken by GPs, thus freeing up time for GPs. Additionally, improvement in biomedical indices for clients is likely to lead to a reduction in the need for acute health care services over time.

In brief, the proposed funding model for salary of the pharmacists adopted the IPAC methodology for allocation of pharmacist FTE and salary, with a baseline 0.2FTE allocated to each ACCHS and a further allocation according to ACCHSs' client numbers plus a rural loading added, as is applied in the Workforce Incentive Payment program.

Client numbers were estimated from: (i) data from the Australia Institute of Health and Welfare (AIHW), with assumptions made about the relative number of ACCHSs (the AIHW data combines the number of ACCHSs and state/territory primary health services), and (ii) the number of ACCHS clients likely to have their medication reviewed by an integrated pharmacist or have a HMR conducted annually, with these estimates based on findings of the IPAC trial.

Training for integrated pharmacists to enable them to work with complex patients and requiring an understanding of social determinants of health and the public health challenges related to Aboriginal and Torres Strait Islander peoples, includes the creation of online or face-to-face training courses (drawing on existing material) plus mentorship programs and ongoing support.

Program support for ACCHS has been based on methods for medicines-related programs within ACCHSs that have been found to be effective. The timing of program support is skewed towards the earlier stages to facilitate program uptake and early implementation including recruitment of pharmacists.

Ongoing evaluation of the extended program to embed pharmacists in ACCHSs is proposed to ensure the program is meeting its stated objectives and to identify any issues affecting implementation and address these in a timely manner.

Over the projected 5-year period, total costs of implementing the extended IPAC intervention average $13.2 million per annum (Table 10).

Table 10 Financial implications of extending the IPAC intervention to all ACCHSs

Item	Year 1 ($)	Year 2 ($)	Year 3 ($)	Year 4 ($)	Year 5 ($)
Pharmacists salary	11,735,262	11,735,262	11,735,262	11,735,262	**11,735,262**
Training and support for pharmacists	1,151,000	621,000	621,000	488,750	488,750
Program support for ACCHSs	647,500	622,500	490,000	357,500	332,500
Program monitoring and evaluation	312,380	294,780	294,780	294,780	294,780
TOTAL COSTS	13,846,142	13,273,542	13,141,042	12,876,292	12,851,292

The IPAC Trial was associated with an increase in the utilisation of medications and primary health care services, an important finding with the potential to contribute to more equitable, needs-based health care expenditure. The Australian Institute of Health and Welfare has estimated that the Aboriginal and Torres Strait Islander burden of disease is 2.3 times greater than the non-Indigenous burden,[38] yet underutilisation of mainstream services is reflected in ratios of Indigenous to non-Indigenous expenditure of 0.67 to 1.00 for the MBS and 0.80 to 1.00 for the PBS.[39]

The additional cost of utilisation of health services was based on scaling up costs presented in the economic evaluation to the estimated number of ACCHS clients with chronic disease who would be likely to: (i) have their medication reviewed by an integrated pharmacist (approximately 2.6% of patients with chronic disease; n=11,000) or (ii) have a HMR conducted annually. The unit cost applied to calculate the total cost of HMRs assumes no 6CPA amount is claimed; and the additional number of HMRs is based on the increase observed during the trial period compared with the pre-trial period.

Annual costs of the net cost of medicines and additional HMRs are estimated to be $ 5.1 million (Table 11).

Table 11 Financial implications of extending the IPAC intervention to all ACCHSs for more equitable use of PBS medicines and Home Medicines Review.

Items	Year 1 ($)	Year 2 ($)	Year 3 ($)	Year 4 ($)	Year 5 ($)
Net cost of PBS medicines*	4,684,865	4,684,865	4,684,865	4,684,865	4,684,865
Cost of additional HMRs**	454,912	454,912	454,912	454,912	454,912
TOTAL	5,139,777	5,139,777	5,139,777	5,139,777	5,139,777

*Based on scaling-up of the estimated net increase in the number of medications prescribed for IPAC participants within ACCHSs. The net increase occurred in participants who had an assessment of medication appropriateness completed by integrated pharmacists. Pharmacists made recommendations for medication adjustments to prescribers.[40]

**Based on scaling up of the observed increase in participant uptake of HMR services (based on item 900 claims) when pharmacists were integrated within ACCHSs. The additional number of HMRs will be dependent on program rules.

ACCHS= Aboriginal community-controlled health services

HMR= Home Medicines Review.

PBS= Pharmaceutical Benefits Scheme

Cost offsets from time saved for GPs across the 140 ACCHSs, assuming a conservative (and minimal) estimate of a 5% time saving, are estimated as $1,184,820 per annum. This type of cost offset may be much higher given that there was a considerable degree of variation in the estimates of GP time-saved, given by general practitioners within ACCHSs (see earlier).

Use and Costs of health services

The number of clients with chronic disease accessing ACCHS services from integrated pharmacists is based on the capacity of the pharmacists to deliver services, based on the findings of the IPAC trial (irrespective of the age of participants).

The cost of implementing the IPAC intervention and embedding pharmacists in all ACCHSs, and the additional use of health services (i.e. HMRs and appropriate use of medicines) has been estimated by scaling up the findings of the IPAC intervention to clients likely to have their medicines reviewed or have HMRs conducted across all ACCHSs (Table 12).

Table 12 Use of the proposed service and additional costs of extending the IPAC intervention to all ACCHSs

Items	Year 1	Year 2	Year 3	Year 4	Year 5
Number. of clients with chronic disease likely to be reviewed by an integrated pharmacist for medicines management	11,000[1]*	11,000	11,000	11,000	11,000
Number of additional HMRs	2,892	2,892	2,892	2,892	2,892
Cost of scaled-up IPAC intervention	$13,846,142	$13,273,542	$13,141,042	$12,876,292	$12,851,292
Cost of additional use of health services[1]	$5,139,777	$5,139,777	$5,139,777	$5,139,777	$5,139,777

[1] The total number of regular clients accessing ACCHSs was 409,646 (data provided by NACCHO, from AIHW statistics related to attendance of clients at Aboriginal primary health services).[41] The estimated number of ACCHS clients with chronic disease who would be reviewed by an integrated pharmacist or have a HMR conducted was based on the findings of the IPAC trial (irrespective of age).

Changes in Use and Cost of Other Medical Services

Other MBS-funded medical services are have not been analysed in preparing this submission.

Financial Implications for the MBS

The IPAC Trial identified that MBS item 900 claims for participants significantly increased (3.9 times in a period of 12 months, $p<0.001$) from the integration of pharmacists within ACCHSs.

For an integrated pharmacist program to be delivered more broadly to the proposed population, the financial implications for the MBS (with regard to item 900) are the cost of the rebate for this service multiplied by the proposed number of beneficiaries over a 12-month period.

PBS and MBS safety net implications have not been included, as co-payments may not be applicable to the majority of clients. Based on the clinical endpoints analysis, over 80% of participants were pensioners or had concessional status.[42] There is also an absence of data to make assumptions on this issue.

A cost offset from time saved for GPs as a result of the support provided by integrated pharmacists amounts to $1,184,820 per annum. This freeing up of GP capacity will allow more time for clinical activities rather than being realised in monetary terms, hence this is not included in Table 13.

Table 13 Total costs to the MBS of extending the IPAC intervention to all ACCHSs

	Year 1	Year 2	Year 3	Year 4	Year 5
Number of services (additional HMRs)*	2,892	2,892	2,892	2,892	2,892
Costs to the MBS**	$454,912	$454,912	$454,912	$454,912	$454,912

* The calculations are based on the number of regular clients attending ACCHSs with chronic disease who would have a HMR conducted based on the capacity of the integrated pharmacists to conduct HMRs, given the additional number conducted during the IPAC trial. This was derived by multiplying as the additional capacity from the program rollout (78/12.3) by the net increase in the number of HMRs during the intervention period (annualised), (see Appendix 12), which results in an expected increase of 2,892 HMRs per annum.
** The fee for the MBS item number 900 is $157.30 multiplied by the number of potential services over 12 months.

Financial Implications for Government Health Budgets

While the IPAC project did not monitor utilisation of health care and other services beyond its focus on primary medical services (including medications), the improvement in biomedical indices is expected to be associated with a reduction in the utilisation and corresponding costs of other government funded health services including emergency department presentations and hospital admissions.

For example, preliminary analysis of the outcomes of the Western Sydney integrated care program targeting patients with chronic disease, including people with type 2 diabetes, chronic obstructive pulmonary disease and coronary artery disease or congestive cardiac failure found statistically significant reductions as follows: 34% in the number of hospital admissions, 37% in potentially preventable hospitalisations; 32% in ED presentations; and 25% in unplanned admission length of stay.[43] While adopting different processes to achieve service improvement, the IPAC model shares the main objective of integrated care programs, namely to improve overall care for patients and achieve a better coordinated journey. An umbrella review of systematic reviews of integrated care programs found that more than half of reviews found a statistically significant improvement in at least one outcome measure, with improvements of the following order of magnitude: reductions in emergency admissions, 15-50%; all-cause readmissions, 10-30%; condition-specific readmissions, 15-50%; reported length of stay of 1 to 7 days; and lower emergency department presentations, 30-40%.[44]

Table 14 presents the financial implications for government budgets of extending the IPAC intervention to all ACCHSs, excluding the impact on the MBS and PBS (sections E1, E2 and E4).

Estimated reductions in the utilisation of hospital services from the improvement in biomedical indices achieved by the IPAC intervention were assumed to be 10%, 20% or 30%, based on findings of studies of the effectiveness of integrated care programs. These reductions were applied to estimates of the rate of hospital utilisation by the Aboriginal and Torres Strait Islander population for ACCHS clients, including hospital admissions for chronic disease (but excluding same day dialysis admissions for renal disease)[45] and emergency department presentations.[46] Costs per hospital admissions and emergency

department presentations were obtained from relevant unit costs extracted from the National Hospital Cost Data Collection Round 21 tables,[47] updated from 2016/2017 to 2018/2019 prices.[48]

The resultant impact for government budgets is a reduction in hospital costs of between $0.6 million and $1.9 million per annum, varying according to the decrease in utilisation achieved, with the majority of savings arising from fewer emergency department presentations.

Table 14. Financial implications for government budgets from a potential reduction in hospital costs

Items	Current utilisation of hospital services		Estimated reduction in utilisation of hospital services	
	(n)	($)	(n)	($)
ACCHS clients with chronic disease	11,000	-	-	-
ASSUMING A 10% REDUCTION				
Hospital admissions for chronic conditions	212[1]	1,189,101	21	118,910
ED presentations	7,394 [2]	5,146,224	739	514,622
Total	**-**	**6,335,325**	**-**	**633,532**
ASSUMING A 20% REDUCTION				
Hospital admissions for chronic conditions	212[1]	1,189,101	42	237,820
ED presentations	7,394 [2]	5,146,224	1,479	1,029,245
Total	**-**	**6,335,325**	**-**	**1,267,065**
ASSUMING A 30% REDUCTION				
Hospital admissions for chronic conditions	212[1]	1,189,101	64	356,730
ED presentations	7,394[2]	5,146,224	2,218	1,543,867
Total	**-**	**6,335,325**	**-**	**1,900,597**

[1] Estimates of the rate of hospital utilisation by the Indigenous Aboriginal and Torres Strait Islander Australian population applied to ACCHS clients reviewed by an integrated pharmacist, including hospital admissions for chronic disease (but excluding same day dialysis admissions for renal disease). [49]

[2] Estimates of the rate of emergency department presentations by the Indigenous Aboriginal and Torres Strait Islander Australian population applied to ACCHS clients reviewed by an integrated pharmacist.[50]

CONCLUSION

The economic analysis of the IPAC project included a cost-consequence analysis, a cost-effectiveness analysis and a cost-utility analysis.

In the cost-consequence analysis, the net costs of delivering the intervention of $1,493 per person was associated with statistically significant improvements in the following biomedical indices for participants with pre and post-intervention measures: glycated haemoglobin (HbA1c) (for participants with a clinical diagnosis of T2DM), diastolic blood pressure (DBP), total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), triglycerides (TG), cardiovascular risk 5-year risk (CVD 5-year risk) and estimated glomerular filtration rate (eGFR).

The cost-effectiveness analysis was undertaken for: (i) participants with a clinical diagnosis of T2DM with pre- and post-measures of HbA1c and (ii) participants selected for MAI assessments at baseline and at the end of the study, with potential prescribing omissions (PPO) used as the relevant outcome measure. For participants with a clinical diagnosis of T2DM, the ICER of the IPAC intervention versus no intervention was $3,769 per participant with a clinically meaningful reduction in HbA1c of at least 0.5%. In the case of the subset of participants selected for MAI assessments, the corresponding ICER was $6,809 per reduction in the number of participants with a PPO.

For participants with a clinical diagnosis of T2DM, and with pre and post-measures of HbA1c, a cost-utility analysis was conducted in which changes in HbA1c during the trial period were mapped to lifetime quality of life changes based on the findings of T2DM simulation models. The resultant ICER was $7,463 (95% CI $$6,030 –$9,664) per gain in quality adjusted life years (QALYs), assuming no lifetime costs additional to usual care were required to maintain the reduction in HbA1c. Based on commonly used reference ICERs for the Australian health system, this modelled ICER indicated good value for money.

Financial implications of implementing the IPAC intervention more widely within ACCHSs were also calculated. On an annual basis, implementing the extended IPAC intervention was estimated to cost $13.2 million. The corresponding annual increase in utilisation of medications and primary health care services associated with better medication management support and for more equitable use of health systems by the Aboriginal and Torres Strait Islander population was $5.1 million. However cost savings were also likely to be achieved from the improvement in health outcomes, for example, from a reduction in the utilisation and corresponding costs of emergency department presentations and hospital admissions. Under different scenarios, these cost savings were assessed as falling between $0.6 and $1.9 million per annum, varying according to the expected decrease in utilisation achieved.

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Table 4. Resource use, costs and cost offsets in delivering the IPAC intervention (n=1,456)

Item	Resource use (units)	Co
		During-trial period
Integrated pharmacist salary	27,478 hours	$1,621,079
Integrated pharmacist allowances	-	$136,658
Pharmacist out-of-pocket payment	-	$9,741
Integrated pharmacist training	-	$64,820
ACCHS contribution[1]	-	$52,158
General Practitioner time spent	719 hours	$62,420
Total: Intervention costs	**-**	**$1,946,876**
Home Medicines Review based on item 900 claims (HMR)	149 pre-intervention; 471 during intervention[2]	$179,013
Net cost of PBS medicines (participants for whom medicines was measured)		$1,358,004
- (PBS medicines started)	-	($514,467)[4]
- (PBS medicines stopped)	-	($378,667)[4]
Net cost of medicines (participants for whom medicines were not directly measured)		$418,049[5]
Cost of utilisation health services		**$732,861**
Time saved by General Practitioners	1366 hours	$118,528
Cost offsets HMRs	-	$53,402 [6]
Non-HMRs	757	$287,713
Cost offsets		**$459,643**
Net total costs		**$2,220,094**

Abbreviations:
HMR= Home Medicines Review. A completed HMR represents a comprehensive medication management r
Scheme (MBS) claim for item 900, as sourced from the integrated pharmacist's logbook.
Non-HMR= a comprehensive medication management review that was not an HMR, as sourced from the ir
PBS= Pharmaceutical Benefit Scheme.

Notes:
1. Excludes overheads and infrastructure costs (e.g. office space, computers, etc)
2. Data from HMR report. Couzos S, Smith D, Buttner P, Biros E. Assessment of Home Medicines Review (H
Islander patients with chronic disease receiving integrated pharmacist support within Aboriginal communit
to the PSA, Feb 2020. A cost offset of $380.07 per HMR was applied.
3. A cost offset of $380.07 per HMR was applied but was adjusted for each participant to reflect equivalent
4. Derived from: *Couzos S, Drovandi A, Smith D, Hendrie D, Biros E. Net cost to the PBS of medication chang*
system costs for economic analysis. Supplement to the Economic Evaluation for the IPAC Project. Report to t
the costs here also include the cost of medicines for four participants who were not in the AoU group, tota
of participants who had an AoU conducted.
5. Participants for whom information on medicine use was not collected were allocated the average cost o
medicine cost.
6. Derived from 471 HMRs X $113.39. The majority (96.4%) of HMRs conducted during the trial period wer
(52.8%) conducted within IPAC hours and for which no 6CPA claim was submitted. Given the fee of $222.7
per HMR (0.964 x 0.528 x $222.77).

sts ($)
Pre-trial period ("comparator")
$46,113[3]
$46,113[3]
$46,113[4]

review that fulfils the criteria for a Medicare Benefits

ntegrated pharmacist's logbook.

MR) and non-HMR in Aboriginal and Torres Strait
y -controlled health services (IPAC Project). Final Report

: number of days in pre-trial period as during trial period.
es arising from the IPAC intervention: Method used to assess health the PSA, December 2019. The costs differ slightly from this report as lling $2593.69 ($135,800 - $133,206). This cost relates to the subset

f PBS medicines per participant as calculated for participants with a

e completed by the integrated pharmacists, with approximately half 7 per HMR, this amounts to a cost offset to the system of $113.39

Table 5. Resource use, costs and cost offsets in delivering the IPAC intervention for specific subgroups of p

Subgroup	No. of participants	Total intervention costs[1]	Net cost of utilisation of health services[2]
Participants with T2DM and pre-post HbA1c measures[3]	539	$732,130	$198,822
Participants for whom AoU conducted[3]	353	$690,949	$161,115

Abbreviations:
AoU= Assessment of medication underutilisation
HbA1C= glycated haemoglobin
T2DM= type 2 diabetes mellitus

Notes:
[1] Includes sum of variable and fixed costs of the IPAC intervention for participants in each subgroup.
[2] Includes net cost of utilisation of health services for participants in each subgroup.
[3] Participants with T2DM and in the AoU groups had a mean length of participation in the IPAC trial of 287 ar were associated with ACCHSs with higher mean costs per participant

articipants.

Cost offsets	Net total costs (including cost offsets)
$177,178	$753,774
$137,105	$714,959

nd 326 days respectively. Additionally, more participants in the AoU group

Table 6. Cost-consequence analysis comparing mean incremental cost with mean differenc

Variable	Mean incremental cost
Net total cost (including cost offsets)	$1,493[2]
HbA1c mmol/mol *[% units]* (n=539 in T2DM)	
DBP, mmHg (n=1045)	
TC, mmol/L (n=660)	
LDL-C mmol/L (n=575)	
TG mmol/L (n=730)	
CVD 5-year risk % units (n=38)	
eGFR (no minimum follow-up time) ml/min/1.73m^2 (n=895)	
eGFR (6-month follow-up time) ml/min/1.73m^2 (n=895)	

Abbreviations:
CVD= cardiovascular disease.
DBP= diastolic blood pressure
eGFR= estimated glomerular filtration rate
HbA1C= glycated haemoglobin
LDL-C= low density lipoprotein cholesterol
TC= total cholesterol
TG= triglycerides
T2DM= type 2 diabetes mellitus

Notes:
1. Data pertains to biomedical indices with mean difference that was statistically significant a
2. The estimate of $1,493 per participant, which includes the net costs of utilisation of healt
medicine was estimated for a subset of participants based on assumptions that maximised tl
(see Appendix 15 of MSAC report).

:es in biomedical indices[1]

Mean difference in biomedical indices mean (SD, 95% CI)	p-value[1]
-2.8 (19.5, -4.5 to -1.0)	0.001
[-0.3% (3.9%, -0.4% to -0.1%)]	
-0.8 (9.4, -1.4 to -0.2)	0.008
-0.15 (0.77, -0.22 to -0.09)	<0.001
-0.08 (0.48, -0.13 to -0.03)	0.001
-0.11 (1.08, -0.20 to -0.01)	0.006
-1.0 (2.6, -1.8 to -0.12)	0.027
1.9 (25.7, 0.1 to 3.7)	<0.001
-0.2 (36.0, -2.99 to 2.7)	0.034

at the 0.05 level, as sourced from clinical endpoint analysis report.
n services and PBS medicines, is believed to be an overestimate. The net cost of
he cost of new medicines started and minimised the cost of new medicines stopped

Table 7. Incremental cost effectiveness ratio for reduction in HbA1c in participants v

		A	
	Cost	**Incremental cost**	**Effectiveness:**
			Mean HbA1c (SD)
			mmol/mol
			[% units]
Intervention	$772,098	$753,774	64.0 (22.3)
			[8.0% (2.0%)]
Comparator[3]	$18,324		66.8 (23.8)
			[8.3% (2.2%)]

1 ICER = Incremental Cost Effectiveness Ratio (defined as incremental cost divided by
2 Number with clinically meaningful reduction (mean difference) in HbA1c of at least
HbA1c conversions used the formula: %HbA1c (units) = [IFCC HbA1c (mmol/mol)* 0.0
difference is likely to impact current medical practice based on change at the individu
quantifies the probability of a study's results being due to chance. This analysis theref
reductions in HbA1c can be clinically meaningful at both individual and population lev
3 Cost of the comparator reflects health system costs in the pre-intervention period;

***n*ith Type 2 diabetes mellitus**

B	A/B
No. of participants with a clinically meaningful reduction in HbA1c[2]	**ICER[1]**
200	$3,769

number of participants with a clinically meaningful reduction in HbA1c).
0.5% at the participant level, from baseline compared with end of study (n=539).
)915] +2.15. Note that a clinically meaningful reduction refers to whether the
ıal rather than population level. It differs from statistical significance, which
fore adopts a conservative approach to estimating the ICER, as even small
'els.
HMRs were the only cost item included.

Table 8. Incremental cost effectiveness ratio for reduction in potential prescribing omiss

	Cost	Incremental cost	Effectiveness PPOs (n)
Intervention	$729,237	$714,959	181
Comparator	$14,278[2]		76

Abbreviations:
AoU = Assessment of Underutilisation
ICER = Incremental Cost Effectiveness Ratio
PPO = Potential Prescribing Omission

Notes:
1 Reduction in the number of participants with a potential prescribing omission.
2 Cost reflects health system costs in the pre-intervention period; HMRs were the only co

sions in participants assessed for the underutilisation of medications (AoU)

Incremental effectiveness[1]	ICER
105	$6,809

st item included.

Table 8a. Distribution of lifetime QALY gains by changes in HbA1c for participants with T2DM

Change in HbA1c (%)	No. of participants	Lifetime QALY gains
<1%	401	0
1% to 3%	111	71.27
>3%	27	30.05
Total	**539**	**101.32**

Table 9. Key drivers of the economic evaluation

Description	Method/Value
Increase in number of HMRs	1.33 of number completed by integrated pharmacists during trial period
Increase in time savings for GPs	10% (instead of 5%)

Impact
Low, favours comparator
Low; favours intervention

Table 10

Details on calculation invovled in extending the IPAC intervention to all ACCHSs - see attached document 'Table 10 Financial implications of extending the IPAC intervention to all ACCHS

Table 11 Financial implications of extending the IPAC intervention to all ACCHS for more equitable use of PBS medicines and Home Medications Review

PBS medicines

	Source	Year 1	Year 2	Year 3	Year 4	Year 5
Number of active clients consented/seen by IPAC pharmacists	1	11000	11000	11000	11000	11000
Average net cost of PBS medicines (=$553849/1456) for 326 days	2	$380.39	$380.39	$380.39	$380.39	$380.39
Net cost of additional PBS medicines due to IPAC pharmacists		$4,684,865	$4,684,865	$4,684,865	$4,684,865	$4,684,865

1. Based on 2.6% of total number of active clients across all ACCHS (n=409,646). Figure of 10,650 rounded up o 11,000
2. Section D. Note net cost refers to cost of PBS medicines started less those stopped.

HMRs

	Source	Year 1	Year 2	Year 3	Year 4	Year 5
Number of FTE pharmacists during IPAC intervention	1	12.3	12.3	12.3	12.3	12.3
Number of pharmacists in rollout to all ACCHs	1	78	78	78	78	78
Additional no. of HMRs during IPAC trial	1	456	456	456	456	456
Total no. of additional HMRs due to IPAC pharmacisrs	1	2892	2892	2892	2892	2892
Unit cost of HMR	1	157.3	157.3	157.3	157.3	157.3
Total cost of additional HMRs due to IPAC pharmacists		$454,912	$454,912	$454,912	$454,912	$454,912

1. Section D.

Table 12

Data taken directly form Tables 10 and 11.

Table 13

Data taken directly form Tables 11.

Table 14

Financial implications for government budgets from a potential reduction in hospital costs

Items	Source	Utilisation of hospital services		Estimated reduction in utilisation of hospital services	
		(n)	($)	(n)	($)
ACCHS clients with chronic disease	1	11,000	- -		-
ASSUMING A 10% REDUCTION					
No. of hospital admissions per 100000 popn with chronic disease (excl dialysis)	2	1928.1			
No. of ED presentations per 1000 popn with chronic disease (excl dialysis)	3	672.2			
No. of hospital admissions for chronic conditions under IPAC roll out	4	212	1,189,108	21	118,911
ED presentations	4	7394	5,146,224	739	514,622
Total		-	**6,335,325**	-	**633,533**
ASSUMING A 20% REDUCTION					
Hospital admissions for chronic conditions	4	212	1,189,108	42	237,822
ED presentations	4	7394	5,146,224	1479	1,029,245
Total		-	**6,335,325**	-	**1,267,067**
ASSUMING A 30% REDUCTION					
Hospital admissions for chronic conditions	4	212	1,189,108	64	356,732
ED presentations	4	7,394	5,146,224	2218	1,543,867
Total		-	**6,335,325**	-	**1,900,599**

1. Based on 2.6% of total number of active clients across all ACCHS (n=409,646). Figure of 10,650 rounded up o 11,000

2. Data on number of admissions estimated and ED presentations estimated from: PHIDU. Aboriginal and Torres Strait Islander social health atlas of Australia. ttp://phidu.torrens.edu.au/social-health-atlases/data.

3. Estimates of the rate of hospital utilisation by the Indigenous Aboriginal and Torres Strait Islander Australian population applied to ACCHS clients reviewed by an integrated pharmacist, including hospital admissions for chronic disease (but excluding same day dialysis admissions for renal disease.(Independent Hospital Pricing Authority. Unit costs from: National hospital cost data collection, AR-DRG cost weight tables v8.0x, round 21 (Financial year2016-17).

Table 10 – Financial implications of extending the IPAC intervention to all ACCHS

Methodology for Model for extending a program embedding pharmacists in all Aboriginal Community Controlled Health Services (ACCHSs) in Australia.

The IPAC Project has delivered significant benefits to the 18 participating ACCHSs. It is proposed that this model be extended to all ACCHSs across Australia. The IPAC Project had a clear definition of ACCHS pre-requisites (inclusion criteria) based primarily on the *research* requirements through the Pharmacy Trial Program (PTP). The ACCHS inclusion criteria were not primarily related to the implementation of a national program (1). A fundamental premise of the project was that the IPAC intervention would be generalisable to all ACCHSs. Additionally, the PTP Principle "Applicability and Context" requires projects consider national implementation. The difference between mainstream and government-run AHSs compared to ACCHSs is well documented (2), and IPAC did not investigate the intervention in an AHS or mainstream environment. For these reasons, the model outlined below has been costed for all 143 ACCHSs across Australia. Further rationale and assumptions used for this modelling are described below.

Pharmacists' Salary

Due to the study design and nature of the PTP, the IPAC Project allocated costs for the salary of the pharmacist plus on costs only. Using the IPAC Project methodology for allocation of pharmacist FTE and salary, together with AIHW statistics related to attendance of clients at Aboriginal Primary Health Services (3), the following funding model for salary has been proposed. The approach, as in IPAC, was to allocate a baseline 0.2FTE to each ACCHS then a further allocation of pharmacist FTE according to ACCHSs' client numbers.

Size of the patient population being serviced by the ACCHS is also a factor. Wakerman et al (4) found that per capita health care costs increase with decreasing population, independent of remoteness. For this reason, the IPAC model and this proposed model provides a baseline 0.2FTE for all ACCHSs, regardless of their size, before allowing for the estimated population. This means that the per capita cost for smaller ACCHSs is higher than for larger ACCHOs. It also ensures that there is a minimum commitment of time for pharmacists in very small services (who may otherwise be allocated less than 0.2FTE) to allow regular contact, maximise integration into the ACCHS and to build rapport with staff.

The Workforce Incentive Payment (WIP) is a federal program that provides a lump payment of up to $125,000 plus a remote loading to general practices and ACCHSs for use to employ nurses, AHPs, AHWs allied health professionals and, since February 2020, pharmacists (5). However, a survey of IPAC ACCHSs suggests that the majority of ACCHSs already use the maximum funds available for nurses, AHPs or AHWs. Therefore, these ACCHSs cannot access WIP funds for pharmacists without displacing other clinical staff and thus is not a viable option for funding an integrated pharmacist.

After modelling the actual costs of salary for IPAC it was observed that the estimated total of pharmacist FTE and salary produced by this proposed model are quite consistent with the numbers which would be generated under the Workforce Incentive Program (WIP) Practice Stream model, assuming 1 Standard Whole Patient Equivalent (SWPE) = 1 patient. The WIP salary figure of $75,000 per FTE pharmacist for up to 5,000 SWPE reflects the salary including oncosts allowed in IPAC of $125,000 per 8,295 patients. Thus this figure was used in calculations.

The WIP model also caps the payment at $125,000 per practice/ACCHS. This has not been done in the proposed pharmacist model where large ACCHSs would be eligible for more than the maximum allocation. The IPAC model allocated more than 1 FTE pharmacist to 2 large urban practices with high patient numbers and results reflect a proportionate increase in numbers of services delivered.

Infrastructure support such as office facilities, computer access, transport, travel and accommodation for remote sites as well as salaries for people assisting the pharmacist were provided in-kind by the IPAC hosting ACCHS and could not be consistently costed. Thus, it is not included in this model but, for sustainability, may need to be in future negotiations.

Remoteness is another factor to be considered with studies demonstrating that health costs increase with remoteness.

Rural loadings per WIP – Practice Stream have been used in this model. These are:

Modified Monash Method Category	% loading
MM1	0
MM2	0
MM3	20
MM4	30
MM5	30
MM6	50
MM7	50

Proposed Integrated Model using IPAC methodology

	Total clients attending Aboriginal Primary Health Services	Regular clients accessing ACCHSs, assuming constant proportion 85%	Total number of Aboriginal Primary Health Services	Approx number of ACCHSs in each region	Baseline 0.2 FTE per ACCHS	Proposed pharmacist FTE	Baseline FTE plus proposed pharmacist FTE	Proposed % salary loading	Pharmacist Salary
Major Cities of Australia	97473	82,657	23	16	3.2	10.0	13.2	0	$ 1,645,586.26
Inner Regional Australia	95733	81,182	40	29	5.6	9.8	15.4	0	$ 1,923,351.18
Outer Regional Australia	117294	99,465	45	32	6.4	12.0	18.4	20	$ 2,758,649.40
Remote Australia	82259	69,756	26	18	3.6	8.4	12.0	30	$ 1,951,520.82
Very Remote Australia	90314	76,586	64	45	9.2	9.2	18.4	50	$ 3,456,154.43
Total	**483073**	**409,646**	**198**	**140**	**28**	**49.4**	**77.4**		**$ 11,735,262.09**

Other Assumptions:

1. The AIHW report combines ACCHS and state/territory funded primary Health Services. Therefore the number of ACCHSs in each region was not directly available. More precise data is being pursued, but these data illustrate approximate values effectively. Figures in the table were based

on the ratio of total ACCHSs to total Aboriginal Primary Health Services from AIHW report for each category. However, this may skew costs as health services in remote areas may be more often operated under state/territory governance.

2. The proposed pharmacist FTE was based on 1FTE pharmacist per 8295 client population as per IPAC Project methodology. This is irrespective of age or chronic disease. It is unclear how this relates to the WIP formula of 1 FTE per 5000 SWPE.
3. The salary loading for remoteness is based on WIP guidelines which uses the MMM category of remoteness (7 layers). The AIHW report used for estimated populations uses the ASGC-RA system (5 layers). Associations between classes are not straight forward. Therefore, assignment to class for this calculation may not be precise and is conservative, as some remote locations may be classified at a lower RA level.
4. The Total national cost quoted above is a proposed maximum figure, that assumes that all ACCHSs would wish to participate in the IPAC program and can access to a suitable pharmacist/s.

Training and support for integrated pharmacists

Pharmacists integrated within ACCHSs work with complex patients, often with multiple chronic diseases, necessitating an understanding of social determinants of health and the public health challenges related to Aboriginal and Torres Strait Islander peoples. Training therefore needs to prepare pharmacists to work within ACCHS settings to deliver a diverse range of professional services within their scope of practice in a culturally-responsive manner.

While the comprehensive induction training program developed for use in the IPAC Project included some elements specific to the project, a large proportion of its content could be considered for incorporation into a future training program for pharmacists upon broader rollout of integrated pharmacist services to ACCHSs across Australia. Such a training program could be modelled on PSA's existing *General Practice Pharmacist Foundation Training*[1] course, a multi-module online course intended to prepare pharmacists to work in a general practice setting; this concept could then be tailored to the ACCHS context.

Beyond training, the provision of ongoing support, along with the creation of a community of practice for pharmacists working with Aboriginal and Torres Strait Islander peoples, will enable sharing of sector knowledge and expertise with the aim of increased uptake, up-skilling and retention of pharmacists working in the ACCHS sector. Support for integrated pharmacists may be provided by various means as demonstrated in the IPAC Project, and should be multi-modal to take into account accessibility, ease of utilisation and responsiveness.

An estimate of the cost of training and support for integrated pharmacists is included in Table 1.

[1] Pharmaceutical Society of Australia. (2019). *General Practice Pharmacist Foundation Training*

Table 1 - Estimate of cost for training and support for integrated pharmacists

	Year 1	Year 2	Year 3	Year 4	Year 5
Creation of online training course	$530,000				
Facilitation of mentor, clinical and other support to pharmacists working (or intending to work) in the AHS sector	$529,000	$529,000	$529,00	$396,750	$396,750
Creation and maintenance of a community of practice for integrated practice pharmacists in the AHS sector	$62,000	$62,000	$62,000	$62,000	$62,000
Ongoing support for the PSA/NACCHO ACCHO Pharmacist Leadership Group	$30,000	$30,000	$30,000	$30,000	$30,000
Total Program Expenses	**$1,151,000**	**$621,000**	**621,000**	**488,750**	**488,750**

Program Support for ACCHSs

The novelty of employing an integrated pharmacist to many health services has had a considerable implementation burden on ACCHSs and pharmacists alike. This is evidenced by the gradual uptake of intervention activities within the IPAC Project and through findings in the Project's qualitative evaluation. Substantive and considered program support for pharmacists and ACCHSs' staff is needed as service providers develop workplans, understand roles and adapt to new healthcare activities and workflow. There is a risk that integrating pharmacists into ACCHSs without adequate support may limit uptake and effectiveness of an integrated pharmacist program.

Tested support methods for medicines-related programs within ACCHSs already exist. The Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander peoples (QUMAX) program has run effectively within a clearly defined set of program rules and support measures for over 10 years. Several reviews in this period have validated the program's effectiveness (6-8). The QUMAX program ACCHS support involves 1 FTE dedicated support staff member (including associated management and overheads costs) and provisions for 1 annual workshop and for occasional ACCHS site visits by support staff. We therefore propose an implementation of a support package that combines metrics and methods from the QUMAX program with those used in the IPAC Project Establishment and Implementation Phases, to ensure an ACCHS integrated pharmacist program is implemented as effectively and efficiently as possible.

The following proposed budget represents an estimate of the costs of a similar program to the QUMAX and the IPAC support programs, with support from NACCHO for health services and support from PSA for pharmacists. This provides for an average of 2 FTE project officers per year over the course of 5 years to support implementation of the program. The role of the support program will include:

- Work with ACCHS, pharmacists and the funding body to implement and revise/improve the Program

- Oversee and support annual workplans developed by ACCHSs, consistent with the model used for QUMAX and s100 support allowance. The Workplan would be consistent with the ideals of the program and the funding algorithm developed by the fund holder
- Provide support to ACCHSs and integrated pharmacists in optimisation of outcomes for clients via the Program
- Inform and develop Program materials and/or resources for pharmacists, consumers and participating ACCHSs as required
- Jointly develop the annual national meeting of ACCHSs and pharmacists
- Enable and advise on data collection and monitoring of program delivery

The package below is to be delivered over a 5-year period. The timing of funding for this program is skewed towards the earlier stages due to the novelty of this program; uptake for some ACCHSs may be delayed without investment in early implementation and communication as ACCHS identify the program and are enrolled, and then pharmacists are recruited over time. This model is complementary to PSA's *Support for Pharmacists Report March 2020* which references the following methods: Phone and email support, Online resources repository, Facilitated teleconferences, Discussion forum, Social media and Mentor support. These methods could be incorporated into the Salary, On-costs, IT and Project Publications & Resources budget items below.

Proposed Costs per annum of Program Support

	Average per year	Year 1	Year 2	Year 3	Year 4	Year 5
Project officers FTE	*(2.0 FTE)*	(2.5 FTE)	(2.5 FTE)	(2 FTE)	(1.5 FTE)	(1.5 FTE)
Salary – project officers	*250,000*	312,500	312,500	250,000	187,500	187,500
Salary on costs (25% of salary) + IT, management fee	*80,000*	100,000	100,000	80,000	60,000	60,000
Travel (project officers + meeting travel)	*50,000*	75,000	75,000	50,000	25,000	25,000
Annual Meeting Expenses (i.e. annual workshop)	*60,000*	60,000	60,000	60,000	60,000	60,000
Project Publications & Resources	*50,000*	100,000	75,000	50,000	25,000	0
Total Program Expenses	**$490,000**	**$647,500**	**$622,500**	**$490,000**	**$357,500**	**$332,500**

Program Monitoring and Evaluation

We recommend JCU be engaged to undertake ongoing evaluation of the proposed service. During the IPAC project, James Cook University (JCU) College of Medicine and Dentistry led the evaluation of the intervention. The evaluation comprised analysis of a range of pre and post-measures including prescribing and biomedical indices, medication adherence, and self-assessed health status; a cost-effectiveness

analysis; and qualitative evaluation. Evaluation of the proposed service will not need to be as extensive as that undertaken in the trial, however, ongoing monitoring and assessment is essential to ensure that the program is meeting its stated objectives, identify any issues affecting implementation, and address these in a timely manner. An effective evaluation system is required to monitor future programs. It is proposed that clinical performance continue to be measured as a holistic health program using the existing national key performance indicators (nKPIs) as reported by ACCHSs to the Australian Government Department of Health. The specific impact of integrated pharmacists would not be able to be differentiated from the impact of the service as a whole. The IPAC project has already evaluated the specific impact of integrated pharmacists in ACCHSs.

JCU will collaborate with the Australian Government Department of Health, NACCHO, the PSA and other stakeholders to design an evaluation framework and implement resulting activities. The provision of regular output reports will provide stakeholders with evidence that activities are being completed, help to target support within services where needed, provide data to support health promotion, and assist the community pharmacy sector to support collaborative activity.

Output reports will be based on pharmacist activity data. A tool developed in the IPAC project to collect data for this purpose was the pharmacist logbook. The JCU Team engaged the services of an IT consultant and oversaw the development and implementation of a bespoke electronic logbook to collect data on pharmacist activity. JCU analysed data and provided high-level monthly reports to the project operational team on the pharmacists' activity to facilitate monitoring of progress towards selected targets, and support the effective and efficient implementation of the role. The logbook used in the trial will be adapted and tailored to report on key pharmacist activity measures (such as medication reviews, follow-up assessments, contact with community pharmacy, etc), as agreed to by the business rules for the program.

Other evaluation strategies including surveys and qualitative activities undertaken at key points in time will facilitate formal feedback from stakeholders and support ongoing quality improvement of the program. Surveys will be implemented online and interviews with ACCHS staff, pharmacists and stakeholders conducted by Zoom/teleconference at one or two points in time over the proposed 5-year duration.

JCUs responsibilities will include:

- Manage the administrative requirements for the project, and for the College;
- Work with partners to identify key activity measures and design an evaluation framework;
- Develop data collection tools guided by the evaluation framework;
- Coordinate surveys and qualitative activities as required;
- Coordinate contractual arrangements and liaise with the IT consultant to adapt and develop the logbook;
- Coordinate data management including collection, transfer and extraction, and storage;
- Manage all data processing including preparation of datasets for analysis;
- Provide biostatistical support including all statistical analysis and preparation of output reports;
- Provide data custodian services including data integrity monitoring, security, quality assurance;
- Coordinate ethics approval and requirements for any research related to evaluating the proposed service;
- Prepare and deliver data reports for team members and project partners as required.

Table x outlines the proposed budget required by JCU including 1.5 FTE project officer time to fulfil this role. In addition, the services of an IT consultant will be required to tailor the logbook and facilitate access to the tool for relevant stakeholders.

Table x. JCU proposed budget for evaluation of the proposed service.

Expenses	Year 1	Years 2 - 5 (per annum)
1.5 FTE Project Officer/Biostatistician (including on-costs)	$210,000	$210,000
Overheads (35% of salaries)	$73,500	$73,500
1 month (160 hours) logbook adaptation, development and setup ($110/hour ex GST x 160 hours)	$17,600	
Logbook hosting ($60/month ex GST)	$720	$720
1 day per month (8 hours) logbook ongoing maintenance ($110/hour ex GST x 8 hrs/month)	$10,560	$10,560
Total (ex GST)	**$312,380**	**$294,780**

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INTEGRATED PHARMACISTS WITHIN ACCHSs: SUPPORT FOR PRACTICE-BASED ACTIVITIES

REPORT TO THE PHARMACEUTICAL SOCIETY OF AUSTRALIA FOR THE IPAC PROJECT

Final Report, April 2020.

Prepared by: Smith D, Couzos S, Biros E. College of Medicine and Dentistry, James Cook University, on behalf of the IPAC Project Team.

Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project.

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The authors also acknowledge the Project Partners and Project Team members: Ms Hannah Loller, Ms Megan Tremlett, Mr Mike Stephens, Ms Alice Nugent, Ms Fran Vaughan, Adjunct Professor Petra Buttner, the Affiliates of the National Aboriginal Community Controlled Organisation, the participating ACCHSs, IPAC pharmacists, and the IPAC Steering Committee members.

Abstract

Objective

To measure and describe the practice-based activities of pharmacists integrated within Aboriginal Community Controlled Services (ACCHSs). Integrated pharmacists delivered ten core clinical, non-dispensing roles targeting Aboriginal and Torres Strait Islander adult patients with chronic disease, health care staff and systems support (the IPAC project).

Design and participants

Eighteen ACCHSs across multiple sites in Queensland, Northern Territory and Victoria participated in a non-randomised, prospective, pre and post quasi-experimental community-based, and pragmatic study that integrated registered non-dispensing pharmacists within ACCHSs. Pharmacists delivered the ten core roles including medication management reviews, assessments of appropriateness and adherence, education and preventive health advice, participated in team-based collaborations and stakeholder liaison, conducted drug utilisation reviews and supported transitional care. Activity data was entered into a bespoke electronic pharmacist logbook to record core activities related to participants, healthcare providers, and health service systems. De-identified patient-related data was entered only for IPAC consented participants. The logbook had dual functionality for data entry and reporting. Raw activity data was downloaded from the logbook into Microsoft Excel and analysed using pivot tables with content analysis of free text questions to categorise and count responses.

Results

Twenty-six integrated pharmacists provided an aggregated 12.3 full-time equivalent (FTE) services in 18 ACCHSs, for up to 15 months, from the 2nd August 2018 to 31st October 2019. Patient-related activity included at least two self-reported patient medication adherence response surveys (N-MARS) for 1,127 participants, paired Medication Appropriateness Index (MAI) audits for 357 participants, and paired Assessments of Underutilisation (AoUs) for 353 MAI participants. A total of 639 Home Medicines Reviews (HMRs), 757 other comprehensive medication management reviews (non-HMRs), and 1,548 follow-up assessments to either a HMR or non-HMR, were also conducted. Activities provided for healthcare providers or systems-related work included provision of medicines information on 1,715 occasions, 358 occasions of formal education and training services, 47 completed stakeholder liaison plans, 3,233 contacts with community pharmacists, 1,901 occasions of transitional care services, and 26 drug utilisation reviews. Approximately 62.5% of the integrated pharmacists' time recorded in the logbook was spent on patient-related activities. .

Conclusion

Integrated pharmacists delivered the ten core roles as defined in the IPAC project exhibiting a high level of activity as documented in the logbook. Extensive collaboration and communication with other healthcare providers was evident through team-based collaboration, transitional care for participants, the development and implementation of stakeholder liaison plans and extensive contact with community pharmacy. Integrated pharmacists were pivotal as a point of contact for stakeholders involved in medicines-related care such as community pharmacists, and staff in local hospitals, rehabilitation and dialysis units. Pharmacists also provided medicines-related information, education and advice. Drug utilisation reviews and medication management reviews facilitated improvements in prescribing quality and other supports for participants. Analysis of these activities in the IPAC project provided evidence that delivery of non-dispensing pharmacist services was feasible within ACCHS settings, and contributed to the integration between the pharmacist and other health care staff, as well as enhancing communication and collaboration with community pharmacy

and other stakeholders. These findings are generalizable to other Aboriginal Health Services in urban, regional and remote settings.

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Introduction

The integration of pharmacists within healthcare teams has been found to enhance quality prescribing, biomedical outcomes, and to reduce hospitalisation. Pharmacists are increasingly becoming integrated into general practices internationally and in Australia. There is evidence that the delivery of multifaceted interventions and interprofessional collaboration through face-to-face communication is most effective., A recent study undertaken in Australia found the role of practice pharmacists (defined as those integrated within mainstream general practices), included undertaking Home Medicines Reviews (HMRs) and medication reconciliation, providing medicines information, patient counselling, monitoring medication adherence, and providing advice on complementary and alternative medicines. In addition, education for staff and patients was provided, as well as medication use evaluations (internal audits of prescribing patterns of specific medications), support for clinical audits and the transition of patients from hospital back into the community, and the supply of medication only in remote Aboriginal Health services. The study found that medication reviews conducted by the practice pharmacists were highly valued and led to better outcomes in relation to addressing inappropriate prescribing and patient adherence. Other studies have also reported that pharmacists in general practices conduct a variety of clinical and non-clinical roles related to medicines.

Whilst co-location of pharmacists within general practice has enabled greater communication, collaboration and relationship building among healthcare providers, there is little evidence that this intervention has been appropriately evaluated in Aboriginal health settings before. Other studies have shown there is an association between the degree of integration and benefits for patient-specific pharmacist services (for patients with co-morbidity). This is consistent with evidence that shows that collaborative care optimises the management of patients with chronic disease as in the 'chronic disease care model'. Collaborative and holistic care is also a hallmark of the Aboriginal community controlled health service (ACCHS) model of care.

The *Integrating Pharmacists within ACCHSs to improve Chronic Disease Management* (IPAC) Project was developed in partnership between the National Aboriginal Community Controlled Health Organisation (NACCHO), the Pharmaceutical Society of Australia (PSA) and the James Cook University (JCU) School of Medicine and Dentistry. It commenced in 2018 and explored if the integration of a non-dispensing pharmacist within ACCHSs led to improvements in the quality of the care received by Aboriginal and Torres Strait Islander adults with chronic diseases. It was anticipated that pharmacists integrated within these settings would facilitate increased access to medication-related expertise and assessments, which when coupled with increased engagement with participants, staff and other stakeholders, would result in improved services and quality use of medicines as outlined in the proposed the theory of change for the IPAC Project (Appendix A). This descriptive analysis reports on the range of activities undertaken by integrated pharmacists that primarily targeted healthcare providers and primary healthcare service systems during the IPAC project.

Methods

Study setting and Intervention

The IPAC project was a community-based, participatory, pragmatic, non-randomised, prospective, pre and post quasi-experimental study implemented in three jurisdictions: Victoria, Queensland and the Northern Territory (Trial Registration Number and Register: ACTRN12618002002268). Registered non-dispensing pharmacists were integrated within the primary health care (PHC) teams of 18 ACCHSs for up to a 15-month period with data collected between 2nd August 2018 and 31st October 2019. The integrated pharmacists delivered ten core roles through a coordinated, collaborative and integrated approach to improve the quality of care of adult participants with chronic diseases or at high risk of developing medication-related problems (e.g. polypharmacy).

Activities targeting patients included the assessment of medication management through medication management reviews (including HMRs and comprehensive reviews that did not fulfil all HMR program criteria that were designated as non-HMRs), medication adherence and appropriateness, medication-related problems, improving participants' medication knowledge and giving preventive health advice. Pharmacists at each ACCHS undertook an audit of medication appropriateness and an assessment of underutilisation, for a sample of participants at the rate of 30 participants per one full time equivalent (FTE) pro rata. Pharmacists also delivered participants with education and preventive health activities.

Activities targeting healthcare providers and systems included conducting education sessions, responding to medication-related queries, reviewing prescribing and mentoring new prescribers, participating in case conferences, undertaking drug utilisation reviews, and liaising with community pharmacies and other stakeholders to ensure continuity of care and transitional care that supported participants discharged from hospital. The Logic Model for the Evaluation outlines the roles and the expected outputs and outcomes from each role (see Appendix B).

In the initial months of the project, the integrated pharmacists focussed on establishing and building relationships, integrating into the primary health care team, and recruiting participants. During this time, pharmacists also conducted medication management reviews and baseline assessments of medication appropriateness and adherence. The remainder of the intervention period focused on participant follow-up and practice-based activities. Pharmacists received support from ACCHSs and staff, in particular Aboriginal Health Workers. They had access to clinical information systems and consulting rooms within the clinic, and their role was promoted to clients of the ACCHS.

A full description of the intervention, recruitment and induction for pharmacists and ACCHSs, and participant consent processes are described elsewhere. The evaluation of patient-related assessments including medication appropriate index audits, assessments of medication underutilisation, medication reviews, and self-reported patient adherence have been reported elsewhere.

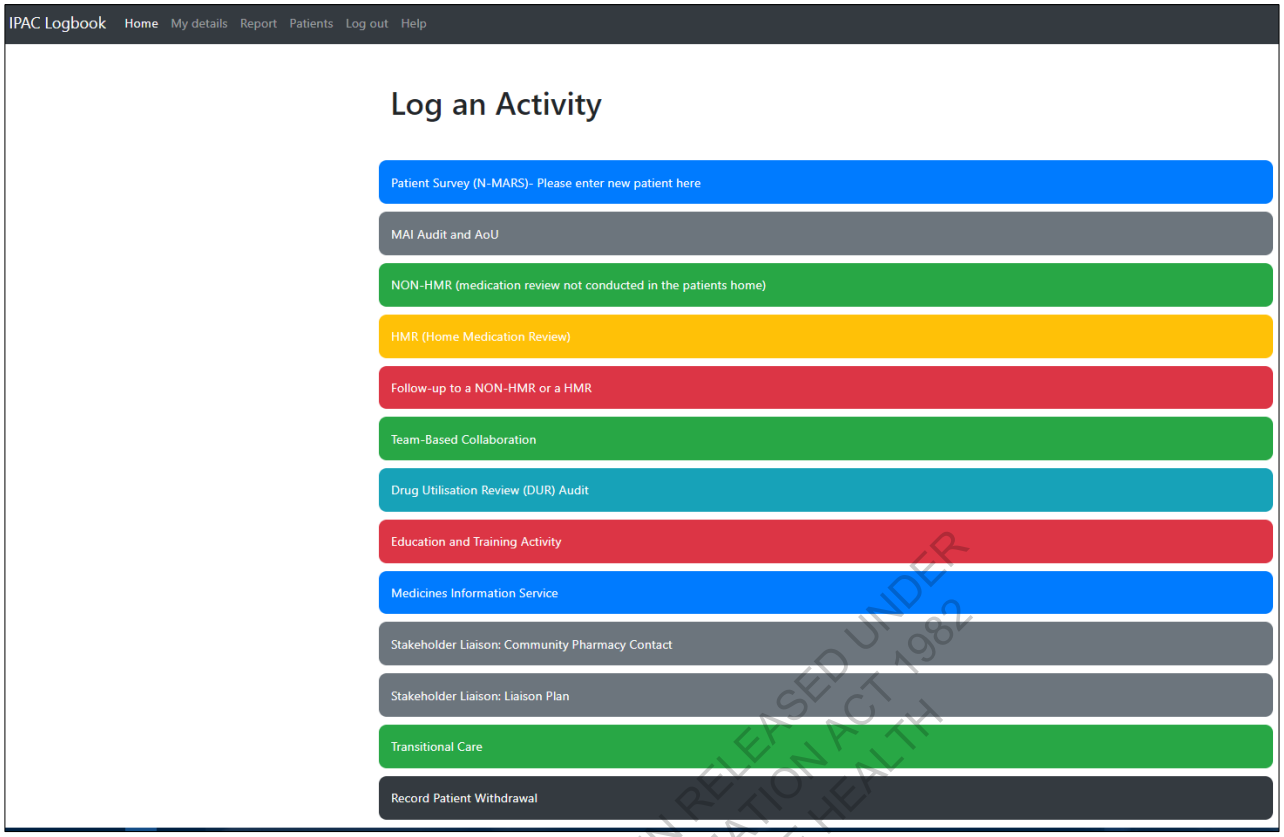
IPAC Pharmacist training

The PSA recruited 26 registered pharmacists to work within the participating ACCHSs. Pharmacists were employed at a minimum of 0.2 full -time equivalent (FTE) up to full time (1.0 FTE) and participated in an induction program that included cultural safety training prior to commencing in the ACCHSs. The majority of pharmacists participated in a two-day program in a centralised location covering the project objectives, cultural safety, the ten core roles, teamwork processes, and data recording requirements for the evaluation. The program was supplemented by online learning modules. Pharmacists who commenced later in the project participated in individualised programs addressing the same topics. Ongoing support was provided for the pharmacists by the PSA Project Coordinators throughout the intervention period.

Pharmacist Logbook

The integrated pharmacists recorded data on all ten core roles in a bespoke electronic pharmacist logbook. The logbook was a password protected, electronic database, accessible from any internet-connected device. It was designed specifically for the project and had dual functionality for data entry and reporting. Each core role had its own 'questionnaire' in the logbook to record all required data for that specific activity. An additional questionnaire recorded details of participants withdrawn from the study. Figure 1 depicts the logbook home page which simply provides the menu of questionnaires for each core role.The logbook design was optimised to make data collection and entry useful and efficient. The use of 'select-from' lists and multiple choice questions was maximised were possible and free text fields only used where necessary. As part of certain core role questionnaires, pharmacists were able to upload a PDF document to support their activity entry.

Figure 1. Pharmacist logbook home page.



Logbook system administration was managed by a JCU administrator and data custodian. Security was paramount and all users of the logbook had to be approved by the administrator, who could manage the creation and deactivation of accounts. Pharmacists were only able to access the system when the PSA had advised JCU of their commencement and details. Individual accounts were set up and pharmacists set their own password to ensure security and integrity of the system. Using a permissions-based hierarchy meant that each pharmacist could only see their own data, whereas administrators were able to run overall data reports and view the activity of each pharmacist.

The JCU administrator, with the permission and support of the logbook software developer, created a guidebook with step by step instructions and screenshots for pharmacists to help them navigate the system. Pharmacists were expected to enter data on their activity by the end of each IPAC project working day.

Raw data was downloaded from the logbook into Microsoft Excel. Descriptive data analysis was undertaken using pivot tables. A simple content analysis and counting responses categorized into themes was conducted for free text questions. To facilitate the monitoring of pharmacist activity, the JCU Team analysed high level quantitative logbook data and provided monthly reports to the project operational team on the pharmacists' levels of activity for each of the 10 core roles, including selected project targets, during the implementation phase and for the duration of the project.

GRHANITE^{TM} data

In order to supplement information on pharmacists' team-based care activities from the logbook, certain MBS claims data extracted from health services clinical information systems was also examined. The MBS items relevant to team-based care that were examined included: 715 (Aboriginal and Torres Strait Islander health assessment); 721 (chronic disease care plan); combined 721, 723 and 732 (chronic disease care plan, team care arrangements (TCA), and review of a care plan or TCA) respectively; combined 735, 739, 743 (organizing and coordinating a case conference); combined 747, 750, 758 (participation in a case conference; and 10987, 10997 (follow-up service to item 715 and 721 that includes a medication adherence check undertaken by a practice nurse or an Aboriginal and Torres Strait Islander health practitioner). MBS items were combined as indicated due to relatively low numbers of claims for these services based on national claims data.

Deidentified MBS utilization indices were extracted from CISs using an electronic tool called GRHANITE^{TM} that required remote installation and regular extraction from IPAC sites for the term of the project. GRHANITE extracted data and copied it to a JCU databank employing internationally recognised point-to-point encryption (P2PE) mechanisms to protect data in transit. MBS claims data was extracted from the JCU SQL Server database using the Navicat 15 for SQL Server (PremiumSoft) database management tool, whilst HMR, non-HMR and MRP data was extracted from the pharmacist logbook as Microsoft Excel files, and subsequently analysed using a number of statistical tools including the SPSS Statistics Premium version 24 (IBM) statistical package, Stata/MP 13.0 (StataCorp LP), and Microsoft Office 2016 (Microsoft). Nominal variables are presented as absolute and relative frequencies. Depending on their distribution, continuous variables are presented as mean and standard deviation (SD) or median and inter-quartile range (IQR), as indicated accordingly. The event rates of MBS item claims were calculated for pre and post intervention as the number of participants with claims (or the number of claims) per 100 person-years of observation. The study design of IPAC involved cluster sampling using ACCHSs as the primary sampling units. As a consequence, statistical analyses were cluster-adjusted for the design effect of ACCHSs. P-values for comparisons between baseline and end of the study for changes in nominal variables (paired data) were determined using conditional logistic regression analyses that were cluster-adjusted for ACCHSs. P-values for changes in numerical variables for participants (paired data) were derived from the cluster-adjusted confidence interval (ACCHS cluster) of the differences as this is equivalent to a paired t-test. Statistical significance was assumed at the conventional 5% level.

The number of MBS claims in the 12 months prior to participant enrolment was defined as 'baseline', whilst the number of claims from enrolment until the end of the study (31st October 2019) was defined as the intervention period or follow-up period.

Core roles targeting healthcare providers and health service systems

Team-Based Collaboration

The pharmacists were integrated within the ACCHS model of care as a member of the PHC team to improve the chronic disease management of participants. Integration meant that pharmacists had identified positions and core roles, shared access to clinical information systems, provided continuous clinical care to participants, received administrative and other supports from primary health care staff, and adhered to the governance, cultural, and clinical protocols within ACCHSs as part of their shared vision. Pharmacists' recorded details of their involvement in team-based care activities in an electronic logbook, such as the type of team member or stakeholder were involved in the collaborative activity, the duration of the activity and whether or not it involved an IPAC consented participant.

Medicines Information Service

Integrated pharmacists' provided medicines-related information to clinicians and other staff within the ACCHSs including responding to Pharmaceutical Benefits Scheme (PBS) queries, information requests regarding dose titration, interactions, new and emerging drugs, drugs in stock and ad-hoc medicine queries. Data recorded in the logbook included the recipient of the information, how the request was received, the type of information provided and the clinical reference, and the time taken to complete the service. Evidence of an outcome was recorded in situations where the pharmacist was aware that the GP or other clinician had made a change to the participants therapy based upon their advice or recommendations.

Education and Training

Medication-related education sessions were provided by the integrated pharmacists for both participants and healthcare providers. The pharmacists also participated in preventive health promotion and community events. Details recorded in the logbook included the type of activity, the format in which it was provided, duration and examples of materials or resources which could be uploaded. During their training, pharmacists were encouraged to consider the health literacy of recipients, use culturally appropriate resources and co-design training with other staff members to ensure relevance.

Stakeholder Liaison Plans

A written stakeholder liaison plan aimed to support the development of relationships and networks between the ACCHS and community pharmacies, and other relevant service providers (such as local hospitals or aged care facilities) in order to facilitate communication and collaboration. It was anticipated that enhancement of communication processes with stakeholders would continue to have benefit and relevance to the ACCHSs even after completion of the project. Pharmacists were expected to develop one written plan for communication between their ACCHS and each local community pharmacy/ies, and any other relevant stakeholders. Data collected in the logbook included the identification of staff involved in the co-design of

the plan, the key stakeholders, whether the plan had approval of the ACCHS CEO and the time take to develop the plan. A template was provided for the plan and when completed was uploaded into the logbook (see Appendix C). Pharmacists were also able to note or upload documentation providing evidence of any outcomes.

Contacts with Community Pharmacy

In addition to the development of the stakeholder liaison plans, integrated pharmacists recorded details of interactions with community pharmacy in the logbook including the reason for contact, whether contact was initiated by the IPAC or community pharmacist, and the method of contact used.

Transitional Care

The transitional care core role aimed to optimize medication management for participants across the continuum of care, by relaying relevant information and improving the communication of discharge summaries for medicines reconciliation. Integrated pharmacists reported details of each occasion of transitional care in which they participated including the agency they engaged with, the reason and mode of contact, and the duration of the activity.

Drug Utilisation Reviews

Integrated pharmacists also completed one or more drug utilisation reviews (DUR) at their respective ACCHSs. The World Health Organisation defines a drug utilisation review (or drug utilisation evaluation) as 'a system of ongoing, systematic, criteria-based evaluation of drug use that will help ensure that medicines are used appropriately'. DURs are a comprehensive and cyclical process of review, evaluation, and intervention that play a key role in influencing and improving prescribing, and the quality use of medicines. Pharmacist training on DURs required reviews to be based on a priority issue nominated by the ACCHS. Best practice evidence or guidelines were to be used to support the DUR and a template was provided to pharmacists to assist the reporting process (Appendix D). Pharmacists uploaded the DUR report into the logbook, in addition to providing details about the initiator of the review, duration, and measures used to assess progress with this quality assurance activity within the ACCHS.

Ethics approval

Ethics approval for the project was received from four ethics committees in the three jurisdictions including St Vincent's Hospital Melbourne (SVHM) Human Research Ethics Committee (HREC), Victoria (HREC/17/SVHM/280), James Cook University HREC (mutual recognition of SVHM HREC, approval HREC/H7348), Menzies School of Health Research (HREC/2018-3072) and the Central Australian HREC (HREC/CA-18-3085).

Results

Activity data was recorded in the pharmacist logbook for all ten core roles from the commencement of the first pharmacist in their respective ACCHS on 2nd August 2018 to the data close-off date of 31st October 2019. Activities were conducted by the integrated pharmacists who worked at the aggregated rate of 12.3 FTE, across 18 ACCHSs for the duration of the intervention.

Pharmacists in the IPAC project recruited a total of 1,733 patients of which 1,456 had pre and post data and were included for analysis. Patient-related activity conducted by the pharmacists included a total of 789 through MAI audits and AoUs and 2,759 patient surveys (N-MARS) including baseline and end-point assessments (Table 1). A total of 639 HMRs, 757 non-HMRs, and 1,548 follow-up assessments to either a HMR or non-HMR were conducted with participants. Some participants received more than one medication management review and/or follow-up assessment. Analysis of these patient-related assessments and activities are reported elsewhere.

With regard to activities that targeted healthcare providers and primary healthcare service systems, medicines information was provided to staff on 1,715 occasions, 358 education sessions were delivered to staff and participants, and 26 drug utilisation reviews and 47 stakeholder liaison plans were completed. During the project period, a total of 3,233 contacts with community pharmacists were recorded, along with 1,901 occasions of transitional care and 3,165 team-based collaboration activities (Table 1).

Table 1: Overview of pharmacist activity recorded in the logbook between 02/08/2018 and 31/10/2019.

Pharmacist Core Role	Number of activities
Self-reported medication adherence survey (N-MARS) *	2,759
Medication Appropriateness Index (MAI) Audits / Assessment of Underutilisation *	789
Home Medicines Reviews (HMRs) *	639
Non-HMRs *	757
Follow-up to a HMR or Non-HMR *	1,548
Team Based Collaboration (1,082 related to IPAC participants)	3,165
Medicines Information	1,715
Education & Training	358
Drug Utilisation Reviews	26
Stakeholder Liaison Plans	47
Stakeholder Liaison – Community Pharmacy Contact	3,233
Transitional Care	1,901

Source: Logbook
* See separate reports for further details.
N-MARS = NACCHO Medication Adherence Readiness Scale; HMR = Home medicines review

Team-Based Collaboration

Integrated pharmacists participated in a total of 3,165 team-based collaboration activities (Table 2). General practitioners (GPs) were involved in 63.6% (n=2,013) of these activities together with pharmacists. Registered nurses were involved in 44.4% (n=1,406) of these activities, Aboriginal Health Workers in 33.9% (n=1,072) and 20.5% (n=649) involved other pharmacists. 'Others' involved in team-based activities were most commonly staff such as wellbeing workers, diabetes educators, care coordinators, clinic managers and administration staff.

The total time taken for all 3,165 team-based collaboration activities was 115,500 minutes or 1,925 hours. The median duration of each team-based activity was reported to be 30 minutes (range 15 minutes to 180 minutes).

Table 2: The number of integrated pharmacists' team-based activities, and the types of staff or external agencies involved.

Team members role	Number of team-based activities that involved this staff member (n=3,165) * N (%)
General Practitioners	2,013 (63.6%)
Registered Nurses	1,406 (44.4%)
Aboriginal Health Worker	1,072 (33.9%)
Other pharmacists	649 (20.5%)
Others***	398 (12.6%)
Allied Health Staff	566 (17.9%)
Community Agencies**	213 (6.7%)
Community Member	205 (6.5%)
Specialists	130 (4.1%)
Chief Executive Officers	114 (3.6%)

Source: Logbook

* Activities involved multiple team members, and individual activities by role exceeds the total number of activities reported.

** Examples of community agencies included hospital admissions risk program, Mission Australia, disability services, community housing, probation officers etc.

*** 'Other' participants included other health services staff such as well-being workers, diabetes educators, care coordinators, clinic managers and administrative staff.

Of the 3,165 team-based collaboration activities, 34.2% (n=1,082) involved IPAC consented participants. Some participants were recipients of multiple team-based collaborative activities. The remainder of the team-based collaborative activities recorded in the logbook did not pertain to specific IPAC participants (65.8%, n=2,083). The purpose of each team-based collaboration was not recorded, however feedback received from the PSA coordinators suggests that these activities may have included:

- Participation in discussions with clinicians and multidisciplinary case conferences, irrespective of whether the service was claimed/claimable by GPs under the Medicare Benefits Schedule (MBS);
- Working with ACCHS staff (e.g. clinic manager) to improve the pharmacist integration in the clinic;

- Assistance with clinical governance activities, e.g. medicine-related policies, programs and procedures, drug imprest management;
- Assistance with medicines-related responses to, and management of, localised events of high public health significance, e.g. outbreaks of acute post-streptococcal glomerulonephritis;
- Participation in team meetings e.g. the 'morning huddle', and staff meetings;
- Support for, and participation in, preventive health and chronic disease activities e.g. National Stroke Week, Diabetes Day;
- Support for activities to improve cardiovascular risk assessment (e.g. recording smoking status in patient records); and
- Participation in ACCHS-coordinated patient group meetings such as Men's Group meetings, diabetes 'yarning' groups, Elders' group gatherings.

The number of participants with the MBS item claims relevant to team-based care, and the total number of claims for these items, are shown in *Supplementary Tables A-L*. Despite pharmacists recording a large number of team-based activities in the logbook, no statistically significant change in health service utilization was observed with any of the team-based care relevant MBS item numbers when event rates were examined per 100 person-years and cluster adjusted.

This suggests that MBS claims for these activities remain outside the control of the pharmacists. Initiating an MBS claim is a health service responsibility and is a legal action that is dependent on the relevant staff member such as practice nurses or general practitioners who have authority to make these MBS claims. Moreover, MBS rules stipulate the frequency of repeat services so that for example, MBS item 715 can only be claimed once in a 9 month period, so if participants already had a 715 MBS item claimed at baseline (this applied to 61% of participants), a subsequent claim may be clinically unnecessary or the claim may be ineligible. These reasons are likely to explain why health service claims for team-based care relevant MBS items did not change for participants during the intervention period.

Medicines Information Service

Medicines information was provided by the integrated pharmacists on 1,715 occasions (Table 3). Some pharmacists recorded activities relating to the provision of information exclusively to community members (n=94) but this was excluded from the analysis as the medicines information role was intended to target healthcare providers. On some occasions there were multiple recipients of information. The majority of medicines information services were provided to GPs (66.1%, n=1,133), followed by just under a third of services that involved registered nurses (30.3%, n=520). The median duration of time for provision of a medicines information service was 15 minutes (n=1,290). Duration ranged from 5 minutes to 180 minutes.

Table 3: The type of health service staff receiving medicines-related information from integrated pharmacists.

Staff member supported*	Number of services (n=1,715) N (%)
GPs	1,133 (66.1%)
Registered Nurses	520 (30.3%)
Aboriginal Health Workers	215 (12.5%)
Others**	96 (5.7%)
Community members (with another staff member)	73 (9.7%)
Specialists	14 (0.8%)
Chief Executive Officers	8 (0.5%)
Tobacco Control Officers	5 (0.3%)

Source: Logbook
* May have been multiple recipients of the one service.
** Other recipients included hospital and community pharmacists, nursing staff, diabetes educators and other allied health staff, dental staff, care coordinator, students, and administration staff, etc.

Medicines information was provided by integrated pharmacists to health service staff on a range of topics (Table 4). Of the specified topics listed, the most common was '*treatment options for a specific condition'* for 26.1% (n=447) of all medicines information services provided. Other common reasons for providing medicines-related information was to inform health services staff of drug availability on the PBS (13.4%, n=230), and dose titration advice (10.9%, n=187).

'O*ther*' types of information provided to staff members made up 29.0% (n=498) of medicines information services. Just over a third of these involved queries about specific medicines. The remainder addressed queries on medication reviews for non-IPAC patients; adverse effects; non-clinical aspects of medicines such as disposal, storage, dispensing, claiming; access to medications and pricing details; options or advice for participants; documentation requiring update; accessing programs and resources; legislation; and vaccines.

Integrated pharmacists reported whether or not they were aware if there was any evidence of an outcome (changes made in patient management) based upon their advice or recommendations. Pharmacists were able to report that an outcome was achieved following the provision of information relating to 'PBS prescribing restrictions' on 37.1% of occasions (36/97). Outcomes were also evident for 35.6% of queries relating to 'medicines access' (67/188), 33.5% of 'drug availability of the PBS' (77/230) and 33.1% in relation to 'dose titration' (60/167).

Table 4: Type of information about medicines provided to staff by integrated pharmacists by the number of occasions this advice was provided.

Type of information provided *	Number of occasions that advice was provided to all staff (n=1,715) N (%)	Evidence of an outcome N (%)
Other **	498 (29.0%)	143 (28.7%)
Treatment options for a specific condition	447 (26.1%)	126 (28.2%)
Drug availability on the PBS	230 (13.4%)	77 (33.5%)
Medicines access	188 (11.0%)	67 (35.6%)
Dose titration	187 (10.9%)	60 (32.1%)
Drug interactions	131 (7.6%)	30 (22.9%)
PBS prescribing restrictions	97 (5.7%)	36 (37.1%)
New and emerging drugs	70 (4.1%)	13 (18.6%)
Pricing	65 (3.8%)	20 (30.8%)
Pregnancy/breastfeeding considerations	33 (1.9%)	5 (15.2%)
Point of care testing	17 (1.0%)	1 (5.9%)

Source: Logbook

* More than one type of information may have been provided on an occasion.

** 'Other' types of information provided involved queries regarded specific medicines; medication reviews for non-IPAC patients; adverse effects; non-clinical aspects of medicines such as disposal, storage, dispensing, claiming; access to medications and pricing details; options or advice for patients; documentation requiring updates; accessing programs and resources; legislation queries; and vaccines.

Education and Training

Integrated pharmacists provided education and training on 358 separate occasions (Table 5). The median time taken by pharmacists for the delivery of all education and training activities was 45 minutes.

In addition to the provision of written information and workshops, pharmacists also reported being involved in 'other' education and training activities such as giving information to participants verbally to support them with their medications and device techniques, informal education to staff on procedures, advice on specific medicines, IPAC project briefings, and participation in community health promotion activities and cultural events. Pharmacists indicated multiple types of education were delivered on 22 occasions (6.1%).

Table 5: Type of education and training provided to staff and patients within IPAC sites by the number of occasions.

Type of education and training provided by pharmacists	Number of occasions (n=358) N (%)	Median time/activity (range)
Written information:		
for patients	77 (21.5%)	30 mins (15 mins – 180 mins)
for staff	42 (11.7%)	30 mins (15 mins – 120 mins)
Workshops:		
pharmacist conducted	84 (23.5%)	45 mins (15 mins – 180 mins)
pharmacist participated	55 (15.4%)	60 mins (30 mins – 180 mins)
Other *	122 (32.1%)	45 mins (15 mins – 180 mins)

Source: Logbook

* Other activities included giving information to patients verbally to support them with their medications and device techniques; informal education to staff on procedures, specific medicines; induction about the IPAC project; and participation in community health promotion activities and cultural events.

Written information for patients

Written information was provided to participants on 77 occasions (Table 6). Patients may have received more than one type of information during an occasion. The median time pharmacists spent preparing information for patients was 30 minutes, ranging from 15 minutes to 180 minutes. Patients were most commonly provided with information on *'how to take their medicine'* (74.0%, n=57) and *'why it is important to take the medicine'* (31.2%, n=24).

Table 6: Type of written information provided to patients within IPAC services about medicines, by the number of occasions.

Type of written information provided to patients	Number of occasions (n=77) N (%)
How to take the medicine	57 (74.0%)
Why it is important to take the medicine	24 (31.2%)
Adverse effects of medicines	20 (26.0%)
Other *	18 (23.4%)
Storage of medicines	7 (9.1%)

Source: Logbook

* Other types of written information provided to patients included details about their medications, advice on diet and lifestyle, information on specific diseases (e.g. diabetes, kidney disease, eczema); and how to use devices such as blood sugar monitors and dose administration aids.

Written information for staff

Written information was provided to staff, by pharmacists on a total of 42 occasions (Table 7). Information was most commonly provided to GPs and AHWs, both comprising 59.5% of occasions. The median time pharmacists spent preparing information for staff was 30 minutes, ranging from 15 minutes to 120 minutes.

'Others' to whom information was provided included clinic managers, allied health, administration staff and students. The topic of the information provided to staff was not collected.

Table 7: Type of staff receiving written information about medicines.

Type of staff receiving written information about medicines	Number of occasions staff received written information (n=42) N (%)
General Practitioners	25 (59.5%)
Aboriginal Health Workers	25 (59.5%)
Registered nurses	16 (38.1%)
Other *	10 (23.8%)
Specialists	3 (7.1%)
Chief Executive Officers	2 (4.8%)
Tobacco control officers	1 (2.4%)

Source: Logbook

* Others to whom information was provided included clinic managers, allied health, administration staff and students.

Workshops conducted by the integrated pharmacist

The type of health services staff attending the 84 workshops conducted by the integrated pharmacist are shown in Table 8. Registered nurses attended 57 of the 84 workshops (67.9%) conducted by integrated pharmacists. The next most prevalent attendees were Aboriginal Health Workers (64.3%, n=54) and GPs (50.0%, n=42). There were a total of 600 attendees in these workshops including members of the Aboriginal and Torres Strait Islander community. Multiple staff members may have participated in each workshop. The median duration of workshops conducted by the integrated pharmacist was 45 minutes, ranging from 15 minutes to 180 minutes.

Table 8: Type of staff participating in workshops <u>conducted</u> by the integrated pharmacists, by the number of workshops.

Participants Roles	Number of workshops attended (n=84) N (%)	Number of participants involved (n=600) N (%)
Registered Nurses	57 (67.9%)	168 (28.0%)
Aboriginal Health Workers	54 (64.3%)	156 (26.0%)
General Practitioners	42 (50.0%)	132 (22.0%)
Others *(details not collected)*	19 (22.6%)	63 (10.5%)
Community members	9 (10.7)	67 (11.2%)
Pharmacists (other)	8 (9.5%)	9 (1.5%)
Tobacco Control Officers	2 (2.4%)	2 (0.3%)
Specialists	1 (1.2%)	2 (0.3%)
CEOs	1 (1.2%)	1 (0.2%)

Source: Logbook

Workshop topics were broad ranging and were categorized into the following topic areas: diseases and related medications; use of devices and techniques for administration; quality and safety with medications; systems such as cold chain processes; accessing 'GoShare' (online consumer education resources) and managing script requests; lifestyle advice and support groups; and information about the IPAC project. The majority of sessions on diseases and related medications focused on diabetes, cardiac conditions, and chronic pain management. Sessions on use of devices and techniques covered asthma inhalers, use of dose administration aids, and insulin injection techniques.

Workshops in which the integrated pharmacist participated

Integrated pharmacists attended 55 workshops along with other health services staff. The roles of attendees who participated is shown are shown in Table 9. The median duration of workshops in which the integrated pharmacist participated was 60 minutes, ranging from 30 minutes to 180 minutes. Registered nurses were represented at most of the workshops (67.3%, n=37). A total of 583 staff were involved in these workshops. Registered nurses, AHWs, GPs, allied health and other staff also attended these workshop. Details on the roles of 'other' participants were not collected. However, some integrated pharmacists reported other participants were from external agencies and they were not aware of their roles (personal communication).

Table 9: Type of staff participating in workshops also attended by integrated pharmacists, by the number of workshops.

Participants Roles	Number of workshops attended (n=55) N (%)	Number of participants involved (n=583) N (%)
Registered Nurses	37 (67.3%)	114 (19.6%)
GPs	35 (63.6%)	88 (15.1%)
AHWs	35 (63.6%)	121 (20.8%)
Others *	22 (40.0%)	203 (34.8%)
Allied health	16 (29.1%)	34 (5.8%)
CEOs	6 (10.9%)	6 (1.0%)
Pharmacists (other)	4 (7.3%)	13 (2.2%)
Tobacco Control Officers	2 (3.6%)	2 (0.3%)
Specialists	2 (3.6%)	2 (0.3%)

Source: Logbook

* Others attendees roles were not collected.

The topics of the workshops in which the integrated pharmacist participated with other staff generally related to: professional development on a broad range of clinical topics; training on information systems (e.g. GoShare, Communicare and Quality Use of Medicines Maximised for Aboriginal and Torres Strait Islander People [QUMAX]); other projects and programs (e.g. NDIS, Sistaquit, bowel screening); or were for local cultural training.

Stakeholder Liaison Plans

The integrated pharmacists completed 47 stakeholder liaison plans during the project period. Of these plans, 22 (46.8%) were completed for one ACCHS in an urban area that dealt with several stakeholders. Two ACCHSs did not complete such plans: one ACCHS opted to exclude this core role as it was not a priority for them as identified by the NACCHO project coordinator during development of the pharmacist work plan for this ACCHS; and the pharmacist at the other service commenced a plan but did not complete it prior to resigning from the project role approximately half way through their contract due to unforeseen changes in workforce capacity at the community pharmacy where the pharmacist also worked.

Of all plans completed, 95.7% were co-designed with other health services staff (n=45) (Table 10). Multiple staff members were involved in the co-design. *'Other'* staff members were reported most commonly as being involved in the design of plans (68.9%, n=31) and were identified as the clinic or practice manager, or senior medical administration staff. GPs were also involved in over half of the plans (55.6%, n=25). The reason given for the two remaining plans not being co-designed was that it was '*not a priority*' for staff.

Table 10: ACCHS staff involved in co-design of stakeholder liaison plans.

ACCHS staff involved in co-design of stakeholder liaison plans	**Total number of plans (n=47) N (%)**
Yes	45 (95.7%)
No	2 (4.3%)
Role of staff involved in the design of plans: *	**Number of plans co-designed (n=45) N (%)**
Other **	31/45 (68.9%)
General Practitioners	25/45 (55.6%)
Aboriginal Health Workers	21/45 (46.7%)
Registered Nurses	20/45 (44.4%)
Pharmacists Other	9/45 (20.0%)
Chief Executive Officers	3/45 (6.7%)
Allied Health Staff	1/45 (2.2%)
Specialists	0
Tobacco Control Officers	0

Source: Logbook
*Multiple staff may have been involved in the plans.
** Other staff engaged in the co-design of plans include clinic manager, practice manager, senior medical administrative staff, etc.

The majority of plans were implemented collaboratively with staff from community pharmacies (80.9%, n=38), followed by hospitals (17.0%, n=8, Table 11). Other stakeholders with whom plans were implemented, were staff from two dialysis units and a rehabilitation unit.

Table 11: Stakeholders involved in implementation of liaison plans.

Stakeholders *	Total number of plans (n=47) N (%)
Community pharmacy	38 (80.9%)
Hospitals/s	8 (17.0%)
Other **	3 (6.4%)
Other General Practice services	0
Tertiary [healthcare providers]	0
Aged care facilities (private or other, such as run by ACCHS)	0

Source: Logbook
*Multiple stakeholders may have been involved in the plans.
** 'Other' stakeholders included staff from two dialysis units and a rehabilitation unit

An analysis of the plans uploaded into the logbook was undertaken. Five pharmacists did not use the template provided or did not answer all components in the template. On 42 plans, pharmacists documented the type of medication related services provided by stakeholders to ACCHSs. Pharmacists identified 64.3% of medication-related services were from dispensing pharmacists (n=27, Table 12). 'Other' such services were provided by 21 stakeholders (50.0%) including provision of dose administration aids (DAAs), Opioid Replacement Therapy (ORT), a Return Unwanted Medicines (RUM) type pharmacy, or dialysis services, whilst 20 stakeholders were involved in QUMAX arrangements with the service (47.6%).

All but one of the service providers preferred contact by email (97.6%, n=41), however the majority were also open to contact by phone (90.5%, n=38). Fax was an acceptable method of contact for 38.1% (n=16) of providers and 33.3% (n=14) were receptive to face to face contact.

Table 12: The type of medication related services provided by stakeholders to ACCHSs, and the preferred method of contact.

Type of medication related services provided to ACCHSs by stakeholders	Total responses (n=42) n (%)
Dispensing pharmacist	27 (64.3%)
Other *	21 (50.0%)
QUMAX program arrangements	20 (47.6%)
Local hospital	8 (19.0%)
S100 provider	7 (16.7%)
S100 support provider	4 (9.5%)
HMR provider	1 (2.4%)
Tertiary referral centre	1 (2.4%)
Preferred method of contact	**Total responses (n=42) n (%)**
Email	41 (97.6%)
Phone	38 (90.5%)
Fax	16 (38.1%)
Face to face	14 (33.3%)
Letter	1 (2.4%)
IT Helpdesk Ticketing System	1 (2.4%)

Source: Logbook
HMR= Home Medicines Review
IT= Information Technology
QUMAX= Quality Use of Medicines Maximised for Aboriginal Community Controlled Health Services.
S100= Section 100 of the National Health Act (1953) for the supply of medicines for remote area Aboriginal health services.
* Other responses were the agency that provided DAAs (blister packs, MPS), Opioid Replacement Therapy, a Return Unwanted Medicines (RUM) pharmacy or provided dialysis services.

Table 13 outlines the time it took for integrated pharmacists to develop the stakeholder liaison plans, with the median time being up to 5 hours. Duration ranged from approximately 1 hour (60 minutes) to 20 hours (1,200 minutes).

Table 13: Time taken to develop the stakeholder liaison plans.

Duration	Number of plans (n=47) N (%)
0-5 hours	25 (53.2%)
6-10 hours	21 (44.7%)
11-15 hours	0 (0.0%)
16-20 hours	1 (2.1%)

Source: Logbook

Improvement areas to support better stakeholder liaison

The plans (n=47) were analysed to identify the suggested improvements in liaison or workflow between the stakeholder and the ACCHS. Two-thirds of the plans noted improvements were needed for procedures to supply DAAs and for ordering medications for the health service imprest stock. Just over half of plans identified the need for a designated contact person within the service to respond to queries. This is because

stakeholders in the past had reported difficulties contacting doctors within the ACCHSs. Other suggested areas for improvement were better communication about funding schemes (Closing the Gap [CTG] and QUMAX); clearer communication about medication changes; faster communication after patient discharge from hospital; and improvements in the quality use of medicines.

Strategies and actions to support better stakeholder liaison

Over three-quarters of plans noted that a communication strategy had been implemented to address these issues. The strategies supported visits or meetings between stakeholders and other means of regular communication. The identification of a designated contact within the ACCHS to respond to queries was identified in just over half of the plans, and the development or update of resources such as contact lists and medical records was an action identified by pharmacists in just under half of the plans. Other strategies identified included ensuring relevant people were included on communication lists (for example for discharge summaries); and the establishment or updating of templates (for example, to guide communication regarding changes in blister packs), or agreements.

Evidence of an outcome

Integrated pharmacists felt their actions had led to an improvement in workflow for ACCHS staff and communication and collaboration with stakeholders as documented on just over three-quarters of the plans (36/47). While for the majority, no written evidence to support these claims was provided, pharmacists cited examples of improvements such as better engagement between the clinic and community pharmacy, fewer errors with medication supply, ordering of medications for imprest stocks was more efficient, queries were addressed in a timely manner, and issues were resolved quickly.

Verbal feedback noted from ACCHS staff was positive:

> *"Having the IPAC pharmacist in the clinic regularly has enhanced communication and services from [community pharmacy] to [ACCHS]".*

> *"Having the IPAC pharmacist onsite has been extremely beneficial for staff and patient's medication queries and for being the first point of contact with hospitals, other pharmacists and agencies outside the clinic."*

> *"Outcomes especially for patients with chronic conditions have been greatly enhanced with better medicines management and a better working relationship between [ACCHS] and [community pharmacy]."*

The integrated pharmacists noted GPs appreciated them facilitating access to information and resources. Moreover, ACCHS staff expressed uncertainty about how medication related support would be managed once the IPAC project had ceased.

Thirty-four of the 47 stakeholder liaison documents noted that feedback had been received from stakeholders. Approximately half of the received feedback indicated there was better engagement between the stakeholder and the ACCHS, and that the flow of information regarding processes and medications had improved. Queries were also answered. Many community pharmacists reported that communication with ACCHSs had improved significantly with the integrated pharmacist as their main point of contact. Some stakeholders (n=7) reported improvement in communication about medications and support for patients resulting in improved medication adherence:

> *"Communication improved safety and patients' adherence; the role of the [IPAC] pharmacist can only continue to improve patients' outcomes."*

Five stakeholders also commented that collaboration had resulted in improved quality use of medicines. One stakeholder commented that while the situation had improved greatly and they were satisfied, they still had some concerns regarding whether doctors were actually seeing patients for repeat prescriptions:

> *"[I'm] happy with improvements to processes that onsite [IPAC] pharmacists have facilitated, [but] still concerned about the somewhat lack of accountability regarding patients attending appointments with doctors for scripts, but [things have] greatly improved."*

Stakeholder Liaison (Contact with Community Pharmacy)

During the project, the integrated pharmacists recorded 3,233 contacts with community pharmacy (Table 14). It was noted that one service in an urban location reported 31.4% (n=1,015) of all the occasions of contact with local community pharmacies. Approximately 69.6% of community pharmacy contacts (n=2,249) were initiated by the integrated pharmacist.

Table 14: Liaison with community pharmacy and the instigator of the contact.

Instigator of contact with community pharmacy	Number of activities (n= 3,233) N (%)
Integrated Pharmacist	2,249 (69.6%)
Community pharmacist	984 (30.4%)

Source: Logbook

The primary reason for contact between the community pharmacy and the integrated pharmacist was for *'dose administration aid preparation and supply'* (n=1,544, 47.8%). This was followed by *'dispensing of medications'* (n=724, 22.4%) as shown in Table 15.

'Other' reasons for contact were stated for 12.7% (n=410) of occasions of contact. Free text responses were categorised and counted as shown in Table 16. The most common 'other' reason for contact between the integrated pharmacist and community pharmacy was *'medication reconciliation, queries, changes to packs, or to correct DAA errors' (n=150).*

Table 15: Reasons for contact between the integrated pharmacist and the community pharmacist.

Reason*	**Number of activities (n= 3,233) N (%)**
Dose-administration aid preparation and supply	1,544 (47.8%)
Dispensing of medicines	724 (22.4%)
Other **	410 (12.7%)
Participation in Home medicines reviews	266 (8.2%)
Assistance with script collection	252 (7.8%)
For delivery of medicines to the clinic	237 (7.3%)
Onsite medicines stock control	163 (5.0%)
Discuss discharge medications	140 (4.3%)
Request to source a particular medication	137 (4.2%)
Response to queries about medication related information	127 (3.9%)
For home delivery of medicines to patients	85 (2.6%)
Pricing advice	78 (2.4%)
Notify CTG script eligibility	39 (1.2%)
Patient referral for Home medicines review	18 (0.6%)
To give educational sessions to staff within the clinic	3 (0.1%)

Source: Logbook
CTG = close the gap.
** Multiple reasons may have been recorded for each stakeholder liaison contact.*
*** Other reasons – see Table 16.*

Table 16: 'Other' reasons for contact between the integrated pharmacist and the community pharmacist.

Other reasons for contact	Number of 'other' reasons (n=409) N (%)
Medication reconciliation, queries, changes to packs, correct DAA errors	150/409 (36.7%)
Financial queries including QUMAX, 6CPA claims	51/409 (12.5%)
Information on DAA collection by patients and owing scripts *	47/409 (11.5%)
Patient-related issues e.g. lost scripts, advise deceased, access resources	41/409 (10.0%)
General queries about medications e.g. Disposal, storage, dispensing history	37/409 (9.0%)
Access to medication and stock supplies	27/409 (6.6%)
IPAC project related queries	13/409 (3.2%)
Miscellaneous	12/409 (2.9%)
Admin or communication procedures	12/409 (2.9%)
Education or accessing resources e.g. Sample DAAs	11/409 (2.7%)
Information on other programs (NDSS, ACCHS programs)	5/409 (1.2%)
Updating documentation re allergies, adverse effects	3/409 (0.7%)

Source: Logbook
6CPA= 6th Community Pharmacy Agreement
ACCHS= Aboriginal community controlled health service
DAA= dose administration aid
NDSS= National Diabetes Services Scheme
QUMAX= Quality Use of Medicines Maximised for Aboriginal Community Controlled Health Services.
* Owing scripts are where medications are dispensed to the patient before the pharmacy has received the actual prescription.

Transitional Care

The total number of transitional care activities that integrated pharmacists participated in was 1,901 (Table 17). The median duration of this activity was 15 minutes, ranging from 15 minutes to 180 minutes. The majority of these activities involved liaison with community pharmacy (42.3%, n=804) or liaison with hospital staff (38.6%, n=733). This was followed by contact with staff from tertiary referral centres (9.4%, n=178). 'Other' agencies that integrated pharmacists liaised with included external HMR providers, community agencies, other ACCHSs or programs, nurse navigators (hospital-based coordinators of care for complex patients) and other health care providers such as specialist clinicians or services.

Table 17: Agencies engaged by the integrated pharmacists to support the transitional care of patients during IPAC study period.

Type of agency	Number of transitional care activities (n=1,901) N (%)
Community Pharmacy	804 (42.3%)
Hospital	733 (38.6%)
Tertiary referral centre (e.g. renal unit)	178 (9.4%)
Other*	115 (6.0%)
External general practice	40 (2.1%)
Aged care facility	31 (1.6%)

Source: Logbook
* 'Other' agencies included external HMR providers, community agencies, other ACCHSs or programs, nurse navigators and other health care providers such as specialists or services, etc.

Integrated pharmacists supported the transitional care for patients by engaging with the aforementioned agencies in order to facilitate a range of medication-related outcomes (Table 18). The most common reason for which integrated pharmacists contacted these agencies was for *'medicines reconciliation'*. This accounted for approximately a third of all interactions across the various agencies. '*Dose-administration aid preparation and supply'* was the next most common reason given to support the transitional care of patients and comprised 30.7% (n=487) of all transitional care contacts with community pharmacy. The need to discuss the patients discharge medications was the next most common reason for transitional care activity necessitating liaison with hospital staff (28.1%, n=317).

Table 18: Reasons for the integrated pharmacists contacting agencies for the transitional care of patients.

Reasons for contact *	Type of agency contacted and number of transitional care activities (n=1,901)				
	Hospitals n=1,127 N (%)	External general practice n=63 N (%)	Tertiary referral centre (e.g. renal unit) n=340 N (%)	Aged care facility n=52 N (%)	Community Pharmacy n=1,584 n (%)
Medicines reconciliation	385 (34.2%)	17 (27.0%)	128 (37.6%)	19 (36.5%)	528(33.3%)
Dose-administration aid preparation and supply	110 (9.8%)	9 (14.3%)	57 (16.8%)	12 (23.1%)	487 (30.7%)
Dispensing of medicines	84 (7.5%)	5 (7.9%)	28 (8.2%)	4 (7.7%)	196 (12.4%)
Assistance with script collection	48 (4.3%)	1 (1.6%)	31 (9.1%)	2 (3.8%)	114 (7.2%)
Other**	74 (6.6%)	2 (3.2%)	21 (6.2%)	5 (9.6%)	62 (3.9%)
Participation in Home medicines reviews	11 (1.0%)	9 (14.3%)	9 (2.6%)	3 (5.8%)	59 (3.7%)
Home delivery of medicines to patients	6 (0.5%)	2 (3.2%)	0 (0.0%)	0 (0.0%)	50 (3.2%)
Discuss discharge medications	317 (28.1%)	5 (7.9%)	38 (11.2%)	4 (7.7%)	45(2.8%)
Delivery of medicines to the clinic	11 (1.0%)	0 (0.0%)	4 (1.2%)	1 (1.9%)	11 (0.7%)
Response to queries re medication related info	31 (2.8%)	6 (9.5%)	9 (2.6%)	1 (1.9%)	8 (0.5%)
Medication pricing advice	3 (0.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	7 (0.4%)
Onsite medicines stock control	1 (1.0%)	0 (0.0%)	0 (0.0%)	1 (1.9%)	5 (0.3%)
Request to source a particular medication	9 (0.8%)	0 (0.0%)	3 (0.9%)	0 (0.0%)	5 (0.3%)
Notify CTG script eligibility	9 (0.8%)	1 (1.6%)	1 (0.3%)	0 (0.0%)	4 (0.3%)
Participation in team care arrangements	7 (0.6%)	0 (0.0%)	7 (2.1%)	0 (0.0%)	3 (0.2%)
Patient referral for Home Medicines Review	13 (1.2%)	1 (1.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Educational sessions to staff within the clinic	3 (0.3%)	5 (7.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Participation in care plan development	5 (0.4%)	0 (0.0%)	1 (0.3%)	0 (0.0%)	0 (%)
Participation in case conferences	0 (0.0%)	0 (0.0%)	1 (0.3%)	0 (0.0%)	0 (%)
Participation in clinic accreditation activity	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (%)
Participation in meetings	0 (0.0%)	0 (0.0%)	2 (0.6%)	0 (0.0%)	0 (%)

Source: Logbook
CTG = Close the gap.
*Multiple reasons per agency can be selected.
** 'Other' reasons given by pharmacists include liaising to confirm a patient's next appointment date; explaining the IPAC project; to prioritise a review of the patient; to encourage a specialist review; to confirm pathology results in relation to non-adherence; to organise home visits; to obtain a DAA etc.

Drug Utilisation Reviews

Twenty-six DURs were conducted by the integrated pharmacists, who initiated 57.7% (n=15) of the review topics (Table 19). Topics for the remaining reviews were initiated by GPs (30.8%, n=8) or a clinic manager (3.8%, n=1). On two occasions the topic was selected by multiple members of the clinical team (7.7%).

Table 19: Initiator of the topic of the drug utilisation review.

Review initiator	Number of plans (n=26) N (%)
Integrated Pharmacist	15 (57.7%)
Doctor	8 (30.8%)
Multiple members of the clinical team	2 (7.7%)
Other (clinic manager)	1 (3.8%)
Nurse	(0.0%)
Aboriginal Health Worker	(0.0%)
Community Pharmacist	(0.0%)

Source: Logbook

The length of time it took for the integrated pharmacists to complete the DUR varied (Table 20). Just under a third of reviews reportedly took 21 hours or over to complete (30.8%, n=8), and just under a quarter took between 6 and 10 hours (23.1%, n=6). The median time to conduct a review was 11 to 15 hours, ranging from approximately 1 hour (60 minutes) to over 21 hours (1,260 minutes).

Table 20: Time taken to conduct the drug utilisation review.

Time taken	Number of plans (n=26) N (%)
0-5 hours	3 (11.5%)
6-10 hours	6 (23.1%)
11-15 hours	4 (15.4%)
16-20 hours	5 (19.2%)
21+ hours	8 (30.8%)

Source: Logbook

DUR Topics and Outcomes

Topics for the DUR were predominantly chosen by the integrated pharmacists after considering relevant medicines-related issues at their respective ACCHSs. Input to topics was also provided by doctors and other clinicians at some sites. Examples of topics chosen for DURs included:

- Evaluation of angiotensin converting enzyme (ACEI) or angiotensin receptor blocking (ARB) therapy and statin use in high-risk patients with chronic kidney disease (CKD)
- Thyroid stimulating hormone (TSH) and thyroxine replacement therapy prescribing

- First line antibiotic use for skin infections based on local protocols
- Azithromycin use for the management of clients with bronchiectasis
- Benzodiazepines and opioids prescribed concomitantly
- Vitamin D prescribing and subsidy guidelines
- Estimated glomerular filtration rate (eGFR) versus metformin - is the dose appropriate?
- Pregabalin usage
- Patients on proton pump inhibitors (PPI) for more than one year

Following completion of the DUR, the integrated pharmacists recorded changes made at their respective ACCHSs as a result of their findings, the education they provided to staff and the recommendations made to improve quality use of medicines. Of the 26 DUR plans uploaded to the pharmacists' electronic logbook, 21 reflected a change while 5 indicated that the DUR was either ongoing or the outcome unknown due to the time remaining in the project. Some examples of outcomes were:

- The appointment of a co-coordinator targeting early intervention of high-risk patients with CKD
- Recalls added to client files to systematically review the thyroxine dose
- Revision of a skin infection clinical protocol
- Increased review of metformin dosage in patients with CKD
- New policy for the subsidy of colecalciferol including indications for testing of vitamin D status
- Reduction in the dose and number of pregabalin scripts written overall
- General Practitioners deprescribing PPIs where they were no longer indicated.

Some pharmacists conducted DURs within a short timeframe, with recommendations made but outcomes were unknown due to insufficient time remaining in the project. On some occasions 'handover' instructions were given to ACCHS staff to encourage follow-up over time beyond the completion of the project and the integrated pharmacists' tenure.

Ratio of Patient and Practice Activity

Pharmacists recorded a total of 541,545 minutes or approximately 9,026 hours spent delivering activities over the 15 month implementation phase of the project (Table 21). The ratio of pharmacist time spent delivering activities to patients versus practice-based activity was 62.5% to 37.5% respectively. Times were recorded in the logbook for the majority of the core roles. However, data on the time it took the pharmacists to conduct the patient survey (N-MARS) and stakeholder liaison with community pharmacies was estimated by the PSA project coordinators with imputation of the total time that was taken. Several limitations affecting this calculation are discussed.

Table 21: Frequency of IPAC pharmacist core activities and time taken to complete them.

Category	Activity	Total number of activities	Median time per activity (mins) (range)	Total time taken (mins)	Percent of all time
Patient-related	Patient survey (includes unpaired data) *	2,759	30 (range unknown)	82,770	
	Home medicines review (HMR)	639	105 (30-180 mins)	67,095	
	Non-HMR	757	75 (15-180 mins)	56,775	
	Follow-up to a HMR or non-HMR	1,548	30 (<15-180 mins)	46,440	
	MAI and AoU (includes unpaired data)	789	60 (15-180 mins)	47,340	
	Education and Training #	124	45 (15-180 mins)	5,580	
	Team-based collaboration #	1,082	30 (15-180 mins)	32,460	
	Sub-total	***7,698***		***338,460***	**62.5%**
Practice-related	Transitional care activity	1,901	15 (15-180 mins)	28,515	
	Education and Training #	234	45 (15-180 mins)	10,530	
	Team-based collaboration #	2,083	30 (15-180 mins)	62,490	
	Medicines Information Service	1,715	15 (15-180 mins)	25,725	
	Stakeholder liaison (community pharmacy) **	3,233	15 (range unknown)	48,495	
	Stakeholder Liaison Plan ##	47	150 (60-1,200 mins)	7,050	
	Drug utilisation reviews ##	26	780 (60-1,260 mins)	20,280	
	Sub-total	***9,239***		***203,085***	**37.5%**
Total		16,937		541,545	

Source: Logbook

HMR=Home medicines review; MAI=Medication appropriateness index; AoU=Assessment of Underutilisation

* Time taken for conduct of the patient survey was not recorded. Estimated by the PSA at 30 minutes duration.

** Time taken for liaison with community pharmacies was not recorded. Estimated by the PSA at 15 minutes duration.

Education and training and team-based collaborations were allocated by the reported target audiences. Approx. a third of education activities were patient-related through provision of written information and 'other' activities e.g. verbal support, assistance with devices such as asthma puffers, DAAs, insulin techniques. Team-based collaborations relating to IPAC patients were included as patient-related activity.

Middle value of median categories was used in calculations e.g. median time for stakeholder liaison plans was 0-5 hours - 2.5 hours was used. Median time for DURs was 11-15 hours - 13 hours was used.

Discussion

The IPAC project documented the comprehensive and large volume of activities undertaken by integrated pharmacists within ACCHS primary health care settings that contributed to improved prescribing quality, improved health service utilisation, and positive patient outcomes. This report summarises some of the core roles and quantifies and describes activities within these roles that comprised the intervention evaluated in the project. Whilst there was individual variation within and between services in the delivery of these core roles, this report represents the aggregated summary of all such activity across 18 ACCHSs. These activities supported adult Aboriginal and Torres Strait Islander participants with chronic disease as well as health service staff in ACCHSs. The evaluation of integrated pharmacists' activity regarding medication management and prescribing quality reviews, medication adherence assessments, preventive health activity, and health service utilisation in the IPAC project is presented elsewhere.

Communication and collaboration with health service staff and external stakeholders was an important function for integrated pharmacists. The types and extent of activity undertaken in the IPAC project provides evidence that supports other studies, where the integration of pharmacists within primary health care teams, enabled greater communication, collaboration and relationship building among healthcare providers, and internal and external stakeholders. Another study found communication between GPs and pharmacists increased over time, and resulted in more collaboration and trust, with pharmacists clarifying their role and becoming more integrated into the team. The integrated pharmacists provided clinicians and other health service staff with a medicines information service and education and training; supported the transitional care of patients; and participated in team-based collaborations with internal staff and external stakeholders. They also provided education and support for patients. The integrated pharmacists developed relationships, which strengthened over time and enabled collaborations to support the management of patients with chronic diseases in the IPAC project, as evidenced in other studies.

Integrated pharmacists provided significant continuous support to health services staff throughout the project as evidenced through 3,165 occasions of team-based collaboration. Pharmacists collaborated with a range of healthcare providers, community agencies, patients and members of the community to deliver enhanced medication-related services. Pharmacists were often integrated into team-based collaborations such as case conferences for individual patients. Case conferencing is an effective way for a patient with chronic disease to have their multidisciplinary needs met and involves a medical practitioner and at least two other health or community care providers to meet and discuss the care of the patient. The Medicare Benefits Schedule (MBS) supports case conferences and the schedule fee is 100% rebatable. Approximately one-third of the team-based collaborations reported by integrated pharmacists were patient-related and this activity included case conferencing. Pharmacists were however unable to influence the number of MBS claims for

case conferencing or other team-based collaborative activity within ACCHSs over a 12-month period for a number of possible reasons. MBS claims need to be generated by health staff other than integrated pharmacists as pharmacists are ineligible to make these claims. The MBS rules also limit the number of claims that can be made within the 12-month window of observation for the IPAC study. So, even though pharmacists reported a large number of team-based activities, MBS claims remained outside the control of pharmacists.

Qualitative evaluation of the IPAC project revealed that team-based collaborations resulted in benefits for health service staff by having access to a medicines expert who could input into patient care through formal case conferencing, or informal meetings and conversations that did not generate an MBS rebate. Informal opportunistic communication has been found by others to be the most effective method of discussing patient care as it can be timelier. Others have also reported that pharmacists working in these multi-disciplinary teams can share comprehensive drug information about medicines, ensure their safe and efficient use, promote adherence, and identify medication-related problems.

Most of the team-based collaborations reported by integrated pharmacists did not involve patients directly. Integrated pharmacists also participated in a range of formal and informal health service staff meetings, working groups on clinical governance activities, community health promotion events, patient support groups and other activities in response to local health issues. Being involved in a range of service-related activities enabled the IPAC pharmacist to develop relationships and integrate into the team and the health service.

Integrated pharmacists also supported ACCHS staff by directly providing information on medications. GPs in particular, received information on treatment options for specific conditions, drug availability on the PBS, and had their queries about specific medicines answered. Pharmacists reported that their advice influenced prescribing and that clinicians had made changes to patient therapy based on their recommendations. The provision of advice to GPs on PBS prescribing restrictions, medicines access and treatment options for specific conditions was thought to be especially helpful. In a separate IPAC analysis, clinical staff reported it was valuable having access to the integrated pharmacist who was a medicines expert and was able to provide ad hoc advice on medicines-related topics provided through 'corridor conversations' in addition to more formally through medication management reviews.

Medication-related education was also provided by integrated pharmacists through face-face workshops with healthcare staff. Pharmacists also developed written resources for health services staff, patients and community members with topics shaped by the needs of service staff and patients. Workshop topics related to diseases (such as for diabetes, cardiac conditions, and chronic pain management) and medication-use

(such as how to use devices like asthma inhalers, dose administration aids, and insulin injection techniques). Health systems improvement topics were also chosen such as the quality use of medications and systems to maintain the cold chain, use of IT, as well as information about the IPAC project. In a separate qualitative evaluation, health services staff reported increased levels of knowledge on clinical conditions and medication options as having arisen specifically from integrated pharmacists input into their clinical team meetings and by providing them with education sessions.

Patients value information tailored to their specific conditions. It was not surprising that the most common topic for the written information provided to patients by integrated pharmacists was 'how to take the medicine'. Verbal explanation of information provided to patients was also important as was the opportunity to demonstrate and teach patients how to use their devices effectively. Patients participating in the qualitative evaluation of the project reported being more adherent to taking their medicines as a result of having a better understanding of their conditions, including what their medicines were for, how they worked, and why they needed to take them, which was explained to them by the integrated pharmacist. GPs also reported that having a pharmacist as part of the health services team saved them time as the pharmacists were able to provide education to patients around their conditions and how their medications worked. The participation of pharmacists in education and training workshops with other health service staff, and in health promotion and community events may have helped to integrate the pharmacist in the PHC team and enhance cultural safety. It also may have helped to build trust and relationships with patients and the community, as noted in the qualitative evaluation of the IPAC project.

Collaboration between medical clinics and community pharmacy can be enhanced through better communication and work towards common shared goals. Such discussions offer staff the opportunity to understand how each other's organisations' operate, to establish rapport, and appreciate their respective expertise. Stakeholder liaison plans were utilised by IPAC pharmacists to encourage such collaboration, support communication and further develop relationships between the ACCHS and community pharmacies, and other local healthcare providers with whom the service worked. Enhanced collaboration aimed to improve information transfer and optimise the patient journey.

These written stakeholder liaison plans were co-designed most commonly with clinic or practice managers, senior medical administration staff and GPs. The majority of plans developed by the integrated pharmacists targeted community pharmacy, with others created for improving collaboration with staff from local hospitals or providers of dialysis and rehabilitation services. Community pharmacists already provided a range of services to the ACCHSs and their patients including dispensing of medicines, provision of DAAs, and participation in QUMAX arrangements. The plans therefore aimed to enhance existing collaborations between the stakeholder and the ACCHS. They aimed to improve communication, avoid unnecessary

duplication of services, and to take a structured approach to identifying issues as well as explore strategies to improve them.

Most of the plans involved dispensing pharmacists at the community pharmacies, and recommended improvements to procedures for supplying DAAs, and ordering medications and supplies for the ACCHS imprest stock. The need for a contact person within the service who was responsive to queries was noted in just over half of plans. Strategies to support regular ongoing communication were subsequently implemented, and contact-persons within the ACCHS were identified to better respond to queries (such as from community pharmacists).

Integrated pharmacists noted examples of improvements after implementation of these plans such as better engagement between the clinic and community pharmacy, fewer errors with medication supply, more efficient ordering of imprest stock medications, queries addressed in a timelier manner, and issues resolved more quickly. Feedback specifically on the implementation of the plan from stakeholders and ACCHS staff was positive and working relationships with stakeholders were further strengthened through the process. ACCHS staff felt communication and services from the other services providers had been enhanced, the pharmacist was the key contact and responded to queries about medicines, and outcomes for patients with chronic conditions had improved. Staff from the stakeholder organisations, particularly community pharmacists, agreed that communication had improved through having the integrated pharmacist as their main point of contact. Some stakeholders reported that better collaboration had resulted in enhanced medication reviews, improved quality use of medicines and more support for patients leading to better medication adherence.

In addition to the liaison plans, integrated pharmacists interacted with community pharmacists on a daily basis. There were more occasions of service logged for an interaction between the integrated pharmacists and community pharmacy than any other IPAC activity. Over two-thirds of the 3,233 logged contacts with community pharmacy were initiated by the integrated pharmacist. Nearly three-quarters of contacts related to communication on the preparation and supply of DAAs and medication dispensing. Community pharmacists also assisted with queries regarding a range of medicines-related topics including reconciliation, owing scripts, stock supplies, financial assistance and they received referrals from the integrated pharmacists and GP for Home Medicines Reviews. In the qualitative evaluation of the IPAC project, community pharmacists reported that IPAC pharmacists had helped with resolving medication-related problems for ACCHS clients, and had strengthened their relationship with the ACCHS. Community pharmacists also reported that the integrated pharmacist had facilitated communication between them and the GPs within the ACCHS. Similar findings with general practice pharmacists have also been reported. Improved

relationships between the clinic and the community pharmacy facilitate a better understanding between the organisations and subsequent patient outcomes.

The enhanced engagement between the ACCHS and community pharmacy was also evident with logged activity pertaining to transitional care. The most common agency engaged by integrated pharmacists for the transitional care support of patients was community pharmacy. Other health care providers, external to the health service, such as hospitals and renal units were also engaged in the ongoing care of patients across the care continuum. Combined community pharmacy and hospital contacts relating to transitional care made up 80% of the 1,901 transitional care activities logged by pharmacists. Medicines reconciliation was the main reason for such contact, explaining over a third of the interactions with staff from community pharmacy, hospitals, tertiary referral centres and aged care facilities. Just under a third of contacts with community pharmacy were in relation to DAA preparation and supply, and a quarter of contacts with hospital staff were in relation to discharge medications. This level of communication between the health service, hospitals and community pharmacy provides further evidence that effective collaboration between stakeholders is vital for optimal continuity of care for patients. Patient care is known to be adversely affected by the lack of communication and information transfer following discharge from hospital. An overseas study demonstrated that collaboration between hospitals and community pharmacists and coordination of discharge information was crucial to the continuity of care for patients. Medication discrepancies are common across transition of care. Medicines reconciliation is an important step towards improving patient safety at transitions of care particularly for Aboriginal and Torres Strait Islander people and those with complex medication regimens. A lack of communication between stakeholders was an issue identified by the integrated pharmacists in the qualitative evaluation of the IPAC project. The integrated pharmacists commonly served as a liaison between the health service and surrounding healthcare providers, including hospitals and their clinical units, and community pharmacists and were well-placed to improve transitions of care and medicines reconciliation for participants.

During the IPAC Project, integrated pharmacists also conducted DURs to optimise prescribing and increase the standard of care in ACCHSs. Over half of the reviews undertaken through the project were initiated by the integrated pharmacist. Reviews were a quality improvement activity and their completion resulted in prescribers making changes in the ways they used medicines. The selected topics varied across participating ACCHSs according to local priorities and context, which was evidenced by significant differences in the total time taken to conduct this activity. Numerous examples of positive outcomes to prescribing quality were reported such as deprescribing of PPIs, reduced prescriptions for pregabalin, as well as systems changes such as to practice protocols and staff deployment.

The completion of DURs is time consuming and can be complex. In another report, integrated pharmacists outlined the factors which affected the outcome of the DUR at their individual health services. Turnover of key ACCHS staff at some sites led to a delay in identification of a medicines-related DUR topic of relevance, while in other sites conflicting priorities and preferences of the health service for pharmacist activities meant that the DUR was started quite late in the project with inadequate time to meaningfully assess effectiveness. Project-related workload and unfamiliarity with reporting functions in the clinical information systems within the ACCHS were identified by some pharmacists as barriers to optimal completion of DURs. Medication shortages in some sites meant pharmacists were unable to accurately assess the impact of best practice recommendations made during the DUR cycle.

A core requirement from the funding body was that integrated pharmacists spend 75% of their time directed towards patient-level activities (defined as medication management reviews and assessments of adherence and appropriateness). Patient-level activities in this project comprised 62.5% of activities recorded including medication reviews and assessments, as well as direct service delivery to patients through education and preventive health care, and team-based collaborations identified as being patient-related (as defined in the Logic Model for Evaluation, Appendix B). This approximates the expected division of pharmacist roles, especially given that significant underreporting of actual patient-related activity occurred. For example, patient education and team-based collaboration activities (such as case conferences) although categorised for the purpose of the evaluation as practice-based activities, were critical to direct patient care as well as to the practice. Furthermore, transitional care occasions and a proportion of contacts with community pharmacy were also expected to have been related to the care of individual patients. However, the categorisation of this activity as purely practice-based also underestimated the proportion of time that pharmacists spent delivering patient-based care. In addition, time taken for patient-based activities may have been underestimated as the time able to be recorded in the logbook for these activities was limited to 180 minutes. In all, the activities undertaken by integrated pharmacists during the IPAC project closely approximated the division of core roles that were expected of them at the start of the project.

The IPAC pharmacists also focused considerably more activity on patient-based rather than practice -based activity when compared to reports of integrated pharmacists activity from other studies. A study involving a single pharmacist in a general practice setting, found pharmacist activity focused on completing medication reviews which comprised 47% of their time, whilst other patient contacts contributed an additional 1% of time. Another small Australian study tracked activity of three general practice pharmacists and found patient-related activities comprised an average of 30% of the pharmacists' time (19% medication management reviews and 11% patient education and counselling). Quality of practice activities made up 37% of pharmacist time (audits, medicines information, staff education), whilst administration work made up around 34% (including 10% for evaluation) of time. Whilst for the IPAC project, administration and evaluation

time was not recorded and factored into pharmacist activity, feedback from pharmacists during site visits conducted by the PSA project coordinators indicated that data entry took between 1-3 hours per day. Other activities undertaken that were not recorded included time spent with non-consented patients, and non-productive time, for example, for inter-clinic travel, coordinating clinic staff such as AHWs to accompany on HMRs, arranging a staff car for visits, and waiting for patients scheduled for appointments but do not attend. It also took some time at the commencement of the project for the pharmacists to settle in and ensure staff understood their role. Feedback from pharmacists throughout the qualitative evaluation provided further evidence of these challenges. It is important to note that whilst the project protocol defined 10 core roles for pharmacists which formed the foundation for the project and the evaluation, in line with community-based participatory research principles, each participating ACCHS also had the flexibility to utilise the services of the pharmacist according to service and client priorities at the local level.

Evidence collected in the qualitative evaluation of the IPAC project from GPs, other health services staff, community pharmacists, and the integrated pharmacists themselves, elaborated on the beneficial outcomes from improved stakeholder liaison, transitional care, and DURs. IPAC pharmacists identified that their integration into the PHC team was facilitated by a clear definition of their core roles. Participating in a broad range of clinical and non-clinical team activities, education and training, collaborating with stakeholders for transitional care and the development and implementation of stakeholder liaison plans, helped the pharmacists to build and maintain relationships and integrate in the primary health care team and the service. ACCHS staff felt communication and services from other stakeholders had been enhanced by integrating a pharmacist into the ACCHS. The integrated pharmacist often acted as the key contact and assisted the ACCHS to respond to queries about medicines. Having the pharmacist role embedded in the primary health care team and ACCHS more broadly had numerous benefits for staff and patients and impacted positively on the holistic services provided by ACCHS, which resulted in benefits for patients with chronic conditions directly and indirectly. Staff from the stakeholder organisations, particularly community pharmacists, agreed that communication had improved through having the integrated pharmacist as their main point of contact. Some stakeholders reported that better collaboration had resulted in enhanced medication reviews, improved quality use of medicines and more support for patients leading to better medication adherence.

Separate analyses support these assessments. Integrated pharmacist activities most likely explain the improvements in the quality of prescribing, increased patient access to medication management reviews and improved health service utilisation, improved medication adherence and self-assessed health status of patients, and clinical endpoint improvements as shown for the IPAC study. Improvements in prescribing quality significantly prevented potential prescribing omissions (PPOs) to high-value pharmacotherapies, and improved the appropriateness of medication prescribing. There was also a substantial increase in access to

medication management reviews (HMR and non-HMR), and follow-up to these reviews for Aboriginal and Torres Strait Islander adults with chronic disease.

The core roles implemented in the IPAC project could be included in the position description for a future expansion of integrated pharmacists working in Aboriginal primary health care settings. Similar to the recent Australian studies undertaken predominantly in mainstream settings,[11] the services provided by integrated pharmacists within ACCHSs were highly valued by health service staff, external stakeholders and patients. The IPAC project provided evidence that the implementation of similar non-dispensing pharmacy services were well received and valuable for Aboriginal peoples and Torres Strait Islanders attending ACCHSs in urban, regional and remote settings. This evidence supports the generalisability of implementation of the pharmacist core roles more broadly.

Limitations

The activities recorded in the logbook are a conservative measure of the actual activities undertaken by pharmacists. A few pharmacists reported that data entry was time-consuming and they had not entered data on every activity they had undertaken. Some pharmacists also reported initially there was a lack of clarity about where or how to enter certain information in the logbook for activities which did not clearly fit into one of the ten defined core roles. This may have led to some inconsistencies as to which 'questionnaire' each pharmacist selected to enter their data. This may explain why there are numerous free-text responses for some questions.

The time recorded by the pharmacists for undertaking some activities may have been underestimated as defined response options available in the logbook were capped at 180 minutes for the majority of roles. In particular the time spent on HMRs and non-HMRs recorded by pharmacists in the logbook, is likely to under-represent the total time taken for all aspects of the medication reviews, such as coordinating another member of staff (generally an Aboriginal Health Worker or Practitioner) to accompany them on the home visit, arranging ACCHS transport, locating patients in community, communicating with patients to schedule the home visit, accounting for cancellations or 'no shows'. The logbook did not capture pharmacist time spent on administration, non-clinical duties or data entry required for evaluation purposes.

Limitations to data entry may have also underestimated pharmacist reports of positive outcomes as logbook entries could not be edited once submitted. For example, some data on the outcomes of medication reviews, such as whether the prescriber accepted or declined recommendations made by the pharmacist, could not be recorded. Pharmacists were also not able to delete their own entries made in error, however pharmacists were able to advise the JCU Administrators where errors occurred and these were excluded from analysis.

Each pharmacist was established with an individual logbook account to ensure security of the system and confidentiality of patient data. However, at up to three ACCHSs where two pharmacists provided services for the IPAC project, challenges were experienced in monitoring services provided by the pharmacists to 'shared' patients, and identifying which patients needed follow-up. Alternative processes were put in place by these pharmacists, generally using excel spreadsheets, to track their combined interactions with patients.

Conclusion

The integrated pharmacist role within ACCHSs as part of the IPAC project was comprehensive, with a large range of services delivered to health service staff, external stakeholders, patients and the community. Core practice-based roles within these primary health settings included team-based collaboration, transitional care, the development and implementation of stakeholder liaison plans, and communication and contact with community pharmacy. Pharmacists provided a medicines-related information service, education and advice, and contributed to chronic disease care through case conferences, care planning, and other team-based activity.

Integrated pharmacists were found to have interacted with community pharmacists on a daily basis with more occasions logged for such interactions than any other IPAC activity. The most common agency engaged by integrated pharmacists for supporting the transitional care of patients was also community pharmacy for the purpose of reconciling medication lists. Integrated pharmacists were well-placed to improve medication safety at patient transitions of care. Stakeholder liaison plans were predominantly co-designed with clinic managers or senior staff and targeted local community pharmacies. These plans guided improvements to communication and knowledge transfer to optimise the patient journey. Relationships between stakeholders and the health service were reinforced and community pharmacists, in particular, agreed that communication had improved particularly through having the integrated pharmacist as their main point of contact. Some stakeholders reported that better collaboration had enhanced medication reviews, improved the quality use of medicines, and supported patients to improve their adherence to medications. Pharmacists conducted drug utilisation reviews which facilitated improvements in prescribing quality on a range of topics that were a priority for their respective health service.

The integrated pharmacists developed relationships with health service staff through team-based collaborations, which strengthened over time and facilitated their integration into the team and health service. Pharmacists participated in multidisciplinary case conferencing and provided input into care plans and the management of patients with chronic diseases. The provision of medicines information through medication reviews and informal conversations was valuable for clinical staff and increased their knowledge levels on clinical conditions and medication options. Education sessions and written medicines information provided opportunities to upskill and enhance the knowledge of Aboriginal Health Workers. Integrated pharmacists also supported patients through education most frequently on how to take their medicines. Verbal explanation of information provided to patients was important, as was the opportunity to demonstrate and teach patients how to use their devices effectively.

Qualitative evaluation of the IPAC project facilitated feedback from GPs, other health services staff, community pharmacists, and the integrated pharmacists themselves and provides context around these roles and their the impact. Health services staff identified that the pharmacists built and maintained relationships and integrated with the primary health care team and more broadly within ACCHSs. Education sessions and medicines information provided by the pharmacist was found valuable and knowledge levels of staff had increased as a result. ACCHS staff felt communication and services from external stakeholders had been enhanced by integrating a pharmacist into the ACCHS, such as relationships with community pharmacists. Patients reported being more adherent to taking their medicines as a result of having a better understanding of their conditions, including what their medicines were for, how they worked, and why they needed to take them, which was explained to them by the integrated pharmacist.

Approximately two-thirds of activities recorded by the integrated pharmacists directly impacted patients. However, the majority of other activities had benefits more broadly and were anticipated to benefit patients indirectly. Practice-based activities are likely to have contributed to improvements in prescribing quality, increased patient access to medication management reviews and improved health service utilisation, improved medication adherence and self-assessed health status of patients, and clinical endpoint improvements as shown in other reports for the IPAC study.

The core roles implemented by pharmacists in the IPAC project and the resulting benefits were highly valued by health service staff, external stakeholders and patients. The IPAC project provided evidence that the implementation of similar non-dispensing pharmacy services is generalizable to other Aboriginal Community Controlled Health Services in all settings. Future integrated pharmacist roles could include the practice-based activities described in this report.

Supplementary Tables

Table A. Total number of participants with MBS item 715 (Aboriginal and Torres Strait Islander health assessment) rebate claims.

	Baseline	Intervention period	p-value*
Number of participants with a completed item:			
None	564 /1456 (38.7%)	807 /1456 (55.4%)	
One	825 /1456 (56.7%)	572 /1456 (39.3%)	<0.001
Two	66 /1456 (4.5%)	76 /1456 (5.2%)	
More than two	1 /1456 (0.1%)	1 /1456 (0.1%)	
Total number of participants with at least one completed item	892 /1456 (61.3%)	649 /1456 (44.6%)	<0.001
Total person-days of observation**	531440	413723	<0.001
Number of participants with at least one completed item per 100 person-years [95% CI]*	61.3 [52.0-70.6]	57.3 [44.5-69.7]	0.590
Rate ratio of participants with at least one completed item per 100 person-years	1	0.93	

*P-value, cluster adjusted p-value for ACCHS. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table B. Total number of MBS item 715 (Aboriginal and Torres Strait Islander health assessment) rebate claims.

	Baseline	Intervention period	p-value*
Total number of completed items	960	727	
Number of completed item claims per patient	0.66	0.50	0.021
Total person-days of observation**	531 440	413 723	<0.001
Total number of completed items per 100 person-years [95% CI]*	65.9 [55.5-76.4]	64.1 [45.5-82.6]	0.833
Rate ratio of completed items per 100 person-years	1	0.97	

* P-value, cluster adjusted p-value for ACCHS and patients. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table C. Total number of participants with MBS item 721 (chronic disease care plan) rebate claims.

	Baseline	Intervention period	p-value*
Number of participants with a completed item:			
None	663 /1456 (45.5%)	969 /1456 (66.6%)	<0.001
One	768 /1456 (52.8%)	445 /1456 (30.6%)	
Two	24 /1456 (1.7%)	40 /1456 (2.75%)	
More than two	1 /1456 (0.1%)	2 /1456 (0.1%)	
Total number of participants with at least one completed item	793 /1456 (54.4%)	487 /1456 (33.5%)	<0.001
Total person-days of observation**	531440	413723	<0.001
Number of participants with at least one completed item per 100 person-years [95% CI]*	54.5 [43.3-65.6]	43.0 [30.8--55.0]	0.103
Rate ratio of participants with at least one completed item per 100 person-years	1	0.79	

*P-value, cluster adjusted p-value for ACCHS. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table D. Total number of MBS item 721 (chronic disease care plan) rebate claims.

	Baseline	Intervention period	p-value*
Total number of completed items	819	531	
Number of completed item claims per patient	0.56	0.36	0.005
Total person-days of observation**	531 440	413 723	<0.001
Total number of completed items per 100 person-years [95% CI]*	56.3 [44.5-68.0]	46.9 [31.4-62.0]	0.270
Rate ratio of completed items per 100 person-years	1	0.83	

* P-value, cluster adjusted p-value for ACCHS and patients. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table E. Total number of participants with MBS items (any of) 721,723, and 732 (chronic disease care plan, team-care arrangements (TCA) and review of a care plan or TCA) rebate claims.

	Baseline	Intervention period	p-value*
Number of participants with a completed item:			
None	463 /1456 (31.8%)	683 /1456 (46.9%)	<0.001
One	122 /1456 (8.4%)	215 /1456 (14.8%)	
Two	414 /1456 (28.4%)	285 /1456 (19.6%)	
More than two	457 /1456 (31.4%)	273 /1456 (18.8%)	
Total number of participants with at least one completed item	993 /1456 (68.2%)	773 /1456 (53.1%)	<0.001
Total person-days of observation**	531440	413723	<0.001
Number of participants with at least one completed item per 100 person-years [95% CI]*	68.2 [56.2-80.2]	68.2 [48.7-87.4]	>0.999
Rate ratio of participants with at least one completed item per 100 person-years	1	1	

*P-value, cluster adjusted p-value for ACCHS. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table F. Total number of MBS items (any of) 721, 723, and 732 (chronic disease care plan, team-care arrangements (TCA) and review of a care plan or TCA) rebate claims.

	Baseline	Intervention period	p-value*
Total number of completed items	2557	1800	
Number of completed item claims per patient	1.76	1.24	0.008
Total person-days of observation**	531 440	413 723	<0.001
Total number of completed items per 100 person-years [95% CI]*	175.6 [136.6-214.7]	158.8 [102.9.-214.1]	0.607
Rate ratio of completed items per 100 person-years	1	0.90	

* P-value, cluster adjusted p-value for ACCHS and patients. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table G. Total number of participants with MBS items (any of) 735, 739, and 743 (case conference-organizing and coordinating) rebate claims.

	Baseline	Intervention period	p-value*
Number of participants with a completed item:			
None	1415 /1456 (97.2%)	1391/1456 (95.5%)	
One	40 /1456 (2.8%)	57 /1456 (3.9%)	0.148
Two	0 /1456 (0%)	7 /1456 (0.5%)	
More than two	1 /1456 (0.1%)	1 /1456 (0.1%)	
Total number of participants with at least one completed item	41 /1456 (2.8%)	65 /1456 (4.5%)	0.154
Total person-days of observation**	531440	413723	<0.001
Number of participants with at least one completed item per 100 person-years [95% CI]*	2.8 [1.1-4.5]	5.7 [1.9-9.5]	0.123
Rate ratio of participants with at least one completed item per 100 person-years	1	2.03	

*P-value, cluster adjusted p-value for ACCHS. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table H. Total number of MBS items (any of) 735, 739, and 743 (case conference- organizing and coordinating) rebate claims.

	Baseline	Intervention period	p-value*
Total number of completed items	43	74	
Number of completed item claims per patient	0.03	0.05	0.148
Total person-days of observation**	531 440	413 723	<0.001
Total number of completed items per 100 person-years [95% CI]*	3.0 [1.2-4.7]	6.5 [2.0-11.1]	0.188
Rate ratio of completed items per 100 person-years	1	2.21	

* P-value, cluster adjusted p-value for ACCHS and patients. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table I. Total number of participants with MBS items (any of) 747, 750, and 758 (case conference-participation) rebate claims.

	Baseline	Intervention period	p-value*
Number of participants with a completed item:			
None	1455 /1456 (99.9%)	1453 /1456 (99.8%)	
One	1 /1456 (0.1%)	3 /1456 (0.2%)	na
Two	0 /1456 (0%)	0 /1456 (0%)	
More than two	0 /1456 (0%)	0 /1456 (0%)	
Total number of participants with at least one completed item	1 /1456 (0.07%)	3 /1456 (0.21%)	na
Total person-days of observation**	531440	413723	<0.001
Number of participants with at least one completed item per 100 person-years [95% CI]*	0.1 [0-0.2]	0.3 [0-0.6]	na
Rate ratio of participants with at least one completed item per 100 person-years	1	3.9	

*P-value, cluster adjusted p-value for ACCHS. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table J. Total number of MBS items (any of) 747, 750, and 758 (case conference- participation) rebate claims.

	Baseline	Intervention period	p-value*
Total number of completed items	1	3	
Number of completed item claims per patient	0.0007	0.0021	na
Total person-days of observation**	531 440	413 723	<0.001
Total number of completed items per 100 person-years [95% CI]*	0.07 [0-0.22]	0.26 [0-0.64]	na
Rate ratio of completed items per 100 person-years	1	3.85	

* P-value, cluster adjusted p-value for ACCHS and patients. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table K. Total number of participants with MBS items (any of) 10987 and 10997 (follow-up service to item 715 and 721 that includes a medication adherence check undertaken by a practice nurse or an Aboriginal and Torres Strait Islander health practitioner) rebate claims.

	Baseline	Intervention period	p-value*
Number of participants with a completed item:			
None	470 /1456 (32.3%)	625 /1456 (42.9%)	
One	248 /1456 (17.0%)	288 /1456 (19.8%)	0.148
Two	200 /1456 (13.7%)	167 /1456 (11.5%)	
More than two	538 /1456 (37.0%)	376 /1456 (25.8%)	
Total number of participants with at least one completed item	986 /1456 (67.7%)	831 /1456 (57.1%)	**0.020**
Total person-days of observation**	531440	413723	<0.001
Number of participants with at least one completed item per 100 person-years [95% CI]*	67.7 [58.1-77.4]	73.3 [60.3-86.1]	0.475
Rate ratio of participants with at least one completed item per 100 person-years	1	1.08	

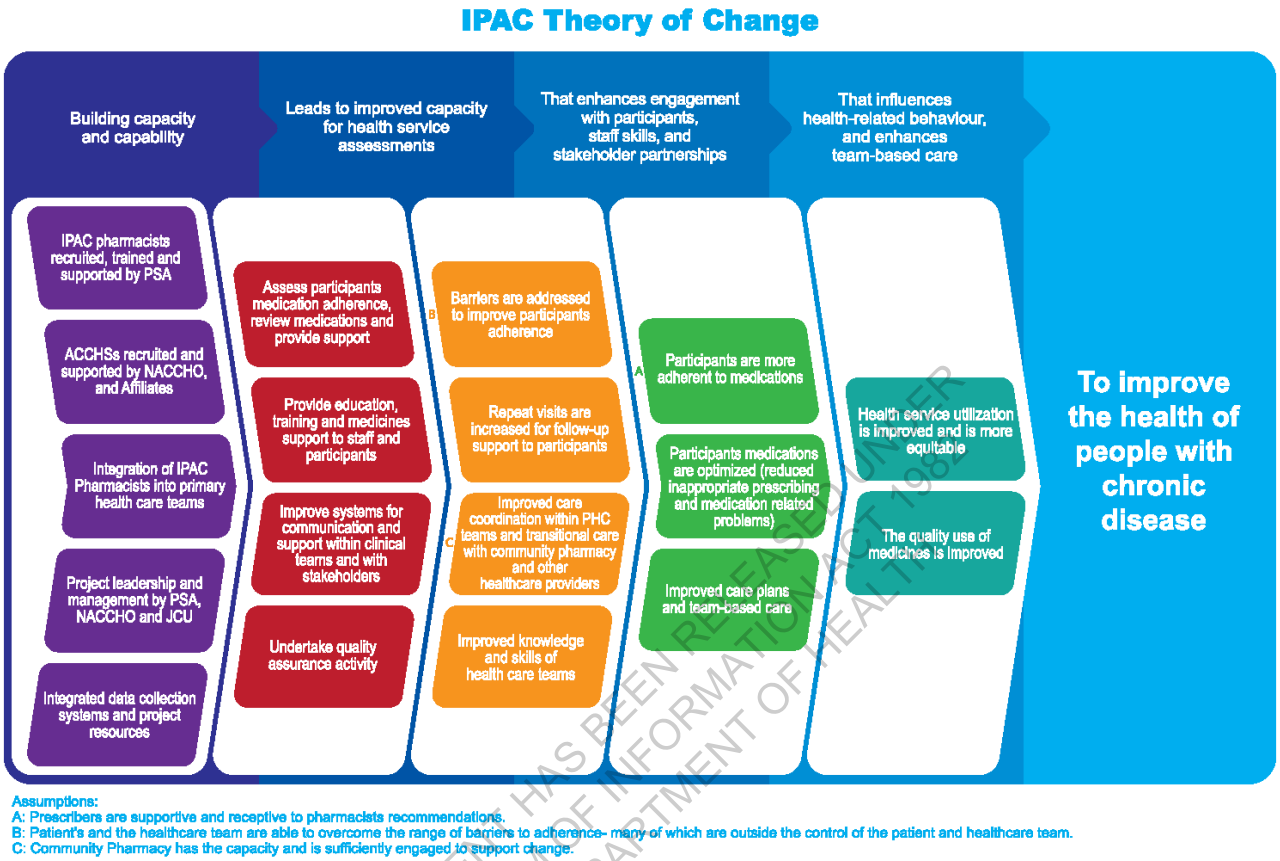
*P-value, cluster adjusted p-value for ACCHS. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Table L. Total number of MBS items (any of) 10987 and 10997 (follow-up service to item 715 and 721 that includes a medication adherence check undertaken by a practice nurse or an Aboriginal and Torres Strait Islander health practitioner) rebate claims.

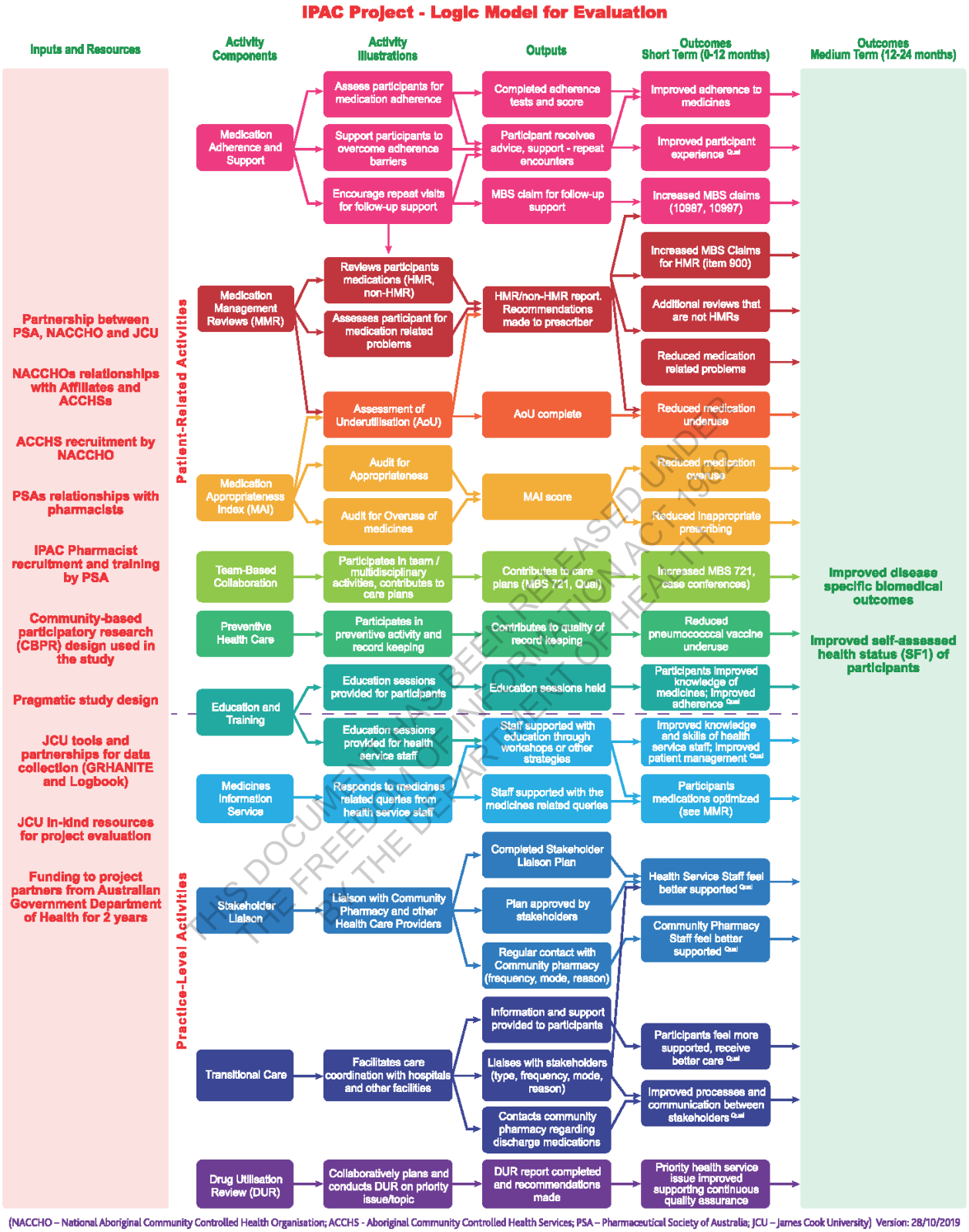
	Baseline	Intervention period	p-value*
Total number of completed items	4203	2910	
Number of completed item claims per patient	2.9	2.0	**0.035**
Total person-days of observation**	531440	413723	<0.001
Total number of completed items per 100 person-years [95% CI]*	288.7 [188.4-389.0]	256.7 [174.2-338.3]	0.602
Rate ratio of completed items per 100 person-years	1	0.89	

* P-value, cluster adjusted p-value for ACCHS and patients. P-values were determined using the . svy linearized : clogit Stata command (proportions) and using the cluster-adjusted SD from the . svy linearized : mean Stata command (means)

Appendix A: IPAC Project Theory of Change



Appendix B: The IPAC Project Logic Model for the Evaluation.



Appendix C: Stakeholder Liaison Plan Template.

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IPAC Project - MEDICINES STAKEHOLDER LIAISON PLAN

Complete a plan for each stakeholder

Name of Stakeholder / Service Provider	
Name of primary Stakeholder contact person (include phone number)	
Type of service provider	• Community pharmacy provider _____ • Hospital _____ • Other GP service provider _____ • Tertiary referral centre _____ • Aged Care Facility _____ • Pathology provider _____ • Other (please specify):
Nature of involvement in providing medication related services to the ACCHS	• S100 provider _____ • S100 support provider _____ • QUMAX arrangement _____ • Dispensing pharmacist _____ • HMR provider _____ • Tertiary referral centre _____ • Local hospital _____ • Other (please specify):
Preferred method(s) of engagement	• Phone _____ • Email _____ • Face-to-face _____ • Other (please specify)
Outline any suggested areas for improvement in workflow/liaison	

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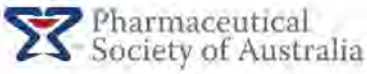
Evidence of Outcome

Actions undertaken to improve workflow/liaison	
Evidence that actions have led to improvement in workflow/liaison	
Feedback from Stakeholder / Service Provider	
Feedback from ACCHS	

Date of plan finalisation: _____ / _____ / _____

Signature of Stakeholder representative: _____

Appendix D: Drug Utilisation Review Template.



IPAC Project Drug Utilisation Review Report

Date of DUR _____

DUR Title (description)	
Source of best-practice evidence used to support DUR	
Criteria for DUR	
Method of data collection & evaluation	
Results	
Actions or recommendations (Proposed changes to standard of care)	
Staff members involved in making changes to care (include role)	
Outcome of actions	

Additional notes:

MASTER PHARMACIST PARTICIPATION BRIEF

Title	*Integrating Pharmacists within Aboriginal Community Controlled Health Service (ACCHSs) to improve Chronic Disease Management Project (IPAC)*
Short Title	*Putting Pharmacists into ACCHSs*
Project Sponsor	*James Cook University*
Coordinating Investigators	*Associate Professor Sophia Couzos (JCU),* s47F *(PSA), Mr Mike Stephens (NACCHO), Ms Dawn Casey (NACCHO)*
Evaluation Team	s47F s47F *Dr Erik Biros (JCU), Dr Deborah Smith (JCU),* s47F s47F s47F s47F s47F s47F s47F s47F s47F s47F s47F s47F
Location	*[Name of ACCHS]*

What is the IPAC Project?

IPAC stands for *'Integrating Pharmacists within Aboriginal Community Controlled Health Service (ACCHSs) to improve Chronic Disease Management'* Project.

This project will explore if including a registered non-dispensing practice pharmacist as part of the primary health care team within Aboriginal community controlled health services (ACCHSs) leads to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples. The project will explore improvements in prescribing by doctors, if patients are more likely to take their medicines, and if indicators of their health are improving over time, by measuring these factors before and after the pharmacist is appointed. Practice pharmacists will work with the doctors and other health staff in each ACCHS for a period of 15 months per service, in Vic, Qld and the NT.

Practice pharmacists will provide relevant healthcare activities within their scope of practice to patients. They will also provide education and training to existing staff within the services (as appropriate), improve relations with community pharmacies to overcome barriers that patients may face in accessing medicines, and assist in managing medications at transitions of care (such as discharge from hospital). This project will also explore the cost-effectiveness of pharmacist integration within ACCHSs.

How did this Project come about?

The Project was developed at the request of the National Aboriginal Community Controlled Health Organisation (NACCHO, representing ACCHSs across Australia) and the Pharmaceutical Society of Australia (PSA, representing pharmacists). The Project is a tripartite partnership between NACCHO, PSA and James Cook University (JCU). Participants include Affiliates of NACCHO in Vic, Qld, and the NT, up to 22 ACCHSs in these jurisdictions, practice pharmacists, and patients who will receive healthcare support from a pharmacist.

Community-based participatory research principles and methods are used to make sure there is appropriate Aboriginal governance over this Project.

Why is this Project important?

Aboriginal and Torres Strait Islander peoples experience a much higher burden of chronic disease due to cardiovascular, diabetes, and other health problems, and yet have poorer access to needed medicines.[12] Adverse health outcomes from these illnesses are preventable

if prescribing quality is improved, and patients are better supported with medicines use, which is a key health equity issue.

Non-dispensing pharmacists are not currently funded consistently or reliably to work within primary health care settings in the public health sector in Australia. Despite this, several ACCHSs across Australia have innovatively sourced funds and/or developed partnerships with community pharmacy's to source pharmacists in non-dispensing roles. This project is modelled on these pharmacists' roles and on international research evidence. There is extensive global evidence that practice pharmacists co-located within general practice clinics can enhance chronic disease management and quality use of medicines.[3]

The NACCHO and the PSA have promoted the need for this project for many years. The project will help the Australian Government make decisions about future funding and the role practice pharmacists may play as members of primary health care teams within ACCHSs and potentially other settings in Australia.

What is the aim of this project?

This project aims to improve quality of care outcomes for Aboriginal and/or Torres Strait Islander adult patients with chronic disease by integrating a practice pharmacist within the primary health care team of ACCHSs. This means the Project will investigate:

- Improvements in health measures of those patients who have been receiving support from a pharmacist and who agree to participate in the Project;
- Improvements in:
    - prescribing so that medicines patients are taking are appropriate for them and their individual healthcare needs;
    - patient adherence to medicines;
    - health service utilisation of Medicare;
    - relationships with and perceptions of stakeholders (ACCHSs staff; community pharmacies; pharmacists);
- The cost-effectiveness of the intervention, which will investigate the costs of the pharmacist service and measures of effectiveness such as increased Medicare utilisation (as a marker of increased patient access to healthcare services towards equity).

Does this project have ethics approval?

Ethics approval has been received from a Victorian Human Research Ethics Committee (HREC). This is the St Vincent's Pubic Hospital HREC in Melbourne. This HREC participates in National Mutual Acceptance of ethics. This means that the review of this committee in Victoria may be acceptable to other HRECs. Acknowledgement from JCU has also been received. This Project will also seek ethics review from two other HRECs in the Northern Territory. These are the:

- Menzies School of Health Research HREC
- Central Australian HREC

As this project is to be run in Qld, Victoria and the NT, ethics review is required from all these jurisdictions.

How is the Project funded?

The Australian Government under the Pharmacy Trials Program of the 6th Community Pharmacy Agreement has funded the project for 29 months.

Governance

The Project Partners and the Project Operational Team Committee

This project is a partnership between the PSA, NACCHO, and JCU (College of Medicine and Dentistry), guided by a Memorandum of Understanding that outlines communication and governance processes.

The PSA, as the lead agency, is responsible for managing the Head Agreement with the Department of Health, and service agreements with partners and ACCHSs, and will coordinate the appointment of practice pharmacists, their recruitment, selection, placement, and training. The NACCHO will provide Aboriginal governance leadership for the project and coordinate all communication with ACCHSs, Affiliates and the NACCHO Board. JCU will undertake the project evaluation, having developed the research methodology based around a pragmatic, community-based participatory research model.

The Project Operational Team Committee is made up of the project partners and is Chaired by the Deputy CEO of NACCHO, Ms Dawn Casey.

Steering Committee

The Operational Team Committee will report to this group as this is made up of representatives of the Project partners, the Department of Health, the Pharmacy Guild of Australia and external experts.

Members of the Evaluation Team

The Project Partners are members of the evaluation team as are other Aboriginal community representative bodies. These are the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); the Queensland Aboriginal and Islander Health Council (QAIHC), and the Aboriginal Medical Services Alliance in the NT (AMSANT). These organisations are NACCHO Affiliates and will be responsible for state-based service support to registered ACCHSs, and provide guidance to the project as members of the evaluation team.

Project Reference Group

State and Territory Affiliates of NACCHO (QAIHC, VACCHO and AMSANT) will be members of the Project Reference Group. Participating ACCHSs will also be invited to be members of the Project Reference Group managed by NACCHO. The Chair of the Project Reference Group will be a nominated member of the NACCHO Board of Directors. This group will meet by teleconference or web-based platforms.

Aboriginal governance and leadership

The way in which these groups communicate and link with each other is shown in Figure 1 and 2. The Project respects and acknowledges Aboriginal governance principles, and ACCHS sector leadership and involvement.

Figure 1. Governance and partnership structure of the IPAC project

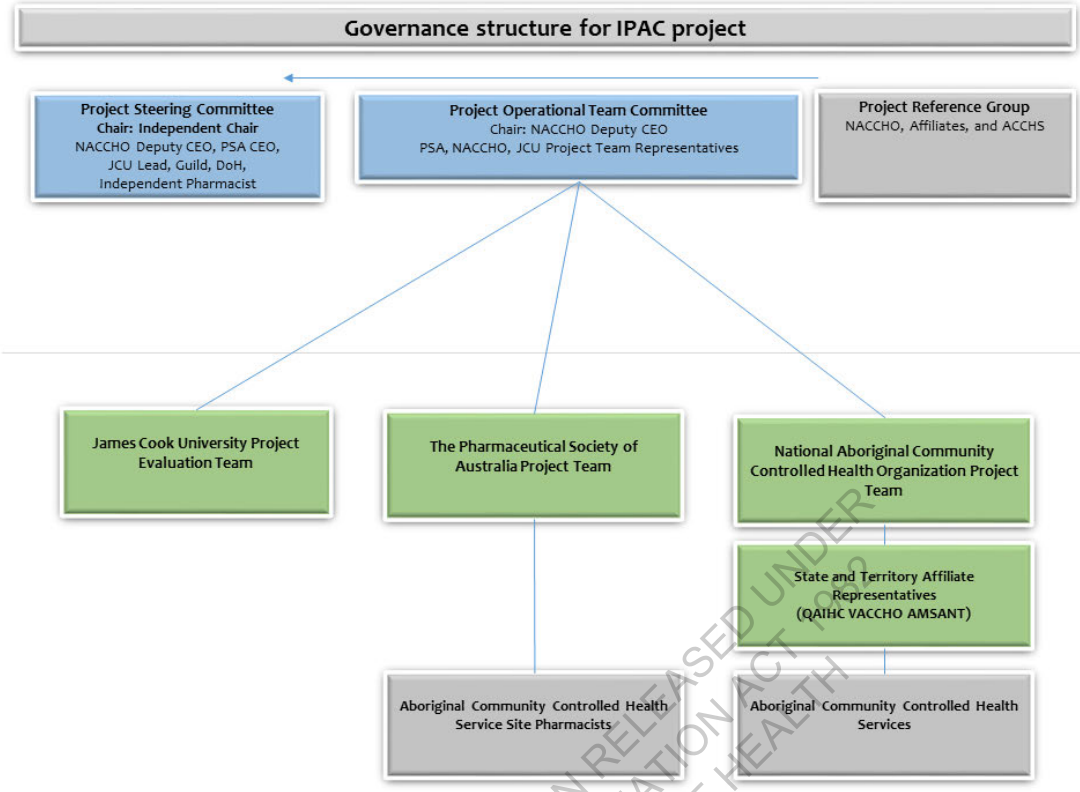
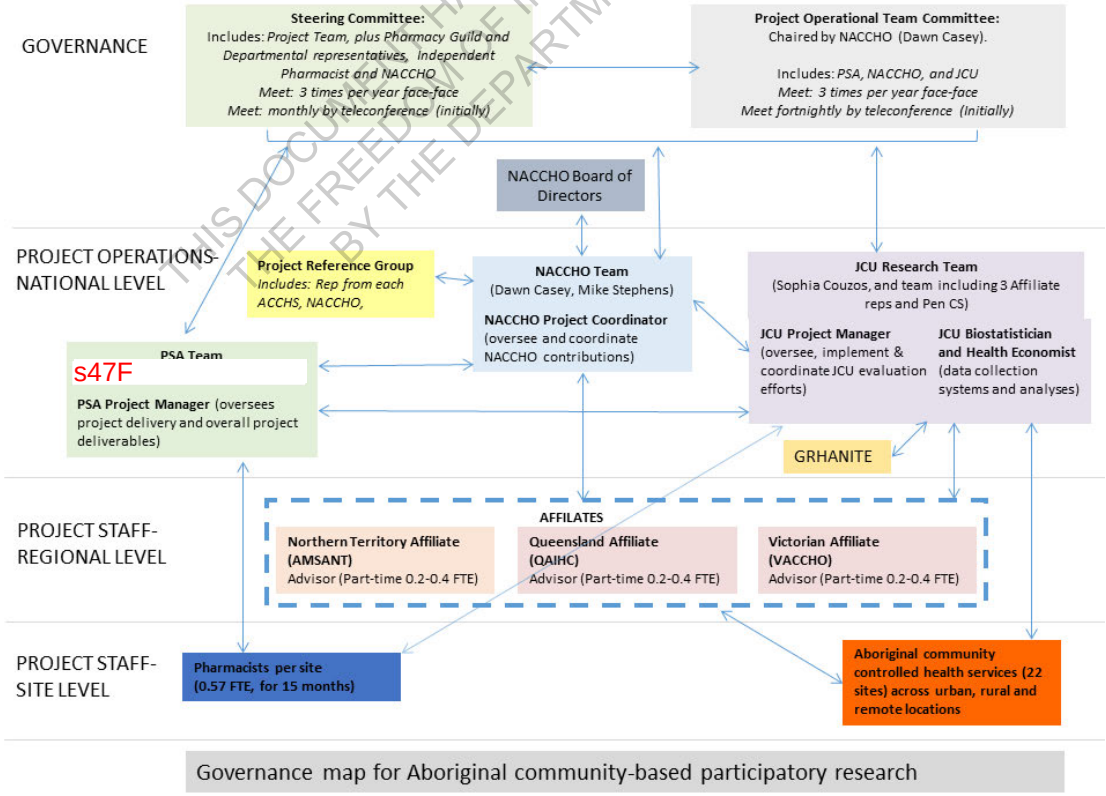


Figure 2. Governance map for the IPAC project.



What is the design of this project?

The project partners are committed to undertaking the Project to ensure clear benefits to ACCHSs, and to ensure acceptability and sustainability of the intervention within ACCHSs.

The project is a pre and post study where the pharmacist intervention will be added to standard primary health care practice within ACCHSs. Information will be collected from the time the pharmacist starts until they finish, and this will be compared with information from 12 months before the pharmacist started.

The parts of the project

There are three project phases over a 29 month project duration: Phase 1: Establishment (4 months); Phase 2: Implementation/intervention (19 months); Phase 3: Analysis and Reporting (6 months). The project is scheduled by be completed by April 2020. ACCHSs will be invited in stages (tranches) and will therefore be staggered. This is so that the project can give time to each service to get them ready for the project.

The selection of project sites

The project is inviting ACCHSs in geographically diverse settings in Vic, Qld, and NT. Up to 22 ACCHSs will be able to participate. ACCHSs need to meet certain eligibility criteria to participate as project sites.

The eligibility criteria for ACCHSs is:

- The ACCHS employs at least one (1) full-time- equivalent (FTE) general practitioner per clinic who is able to prescribe medicines to clients of that organisation.
- The ACCHS does not currently employ a non-dispensing practice pharmacist at the participating clinic.
- The ACCHS uses a clinical information system such as Communicare, Best Practice, and Medical Director.
- The ACCHS has participated in continuing quality improvement and reporting on the national Key Performance Indicators for at least 24 months through the use of electronic data extraction tools.
- The ACCHS is participating in the *Quality Assurance for Aboriginal and Torres Strait Islander Medical Services* (QAAMS) program, if it is conducting 'point of care' testing.
- The ACCHS agrees to download the GRHANITE data extraction tool into one computer within the practice, adhere to program business rules/protocol and guidelines, data provision requirements, and patient/service consent requirements for the evaluation of the program.
- The ACCHS can provide the practice pharmacist access to a private consulting room on the clinic premises that has access to the clinical information system used by the practice.
- The ACCHS can allocate a staff member who will act as a 'go to' person to assist the practice to obtain informed patient consent.
- The ACCHS is a member of NACCHO, and the relevant NACCHO State/Territory Affiliate.
- The ACCHS is an accredited practice in accordance with the RACGP Practice Standards.
- In non-remote locations, the ACCHS must be participating or eligible to participate in the PBS co-payment measure (practice incentive program).
- In remote locations, the ACCHS must be eligible to participate in the remote Section 100 arrangements for the supply of pharmaceutical benefits

These criteria have been developed with Affiliate input to suit most ACCHSs in Qld, Vic, and the NT, and to make the project as 'real life' as possible. It is important that ACCHSs have

clinical information systems (CIS) that the pharmacist can use like other health staff. Only the listed clinical information systems can work with the GRHANITE™ tool to collect information. (GRHANITE is explained later in this document).

The project will recognise the diversity of Aboriginal peoples and Torres Strait Islanders and models of care across Australia, and will select ACCHSs in urban, regional and remote areas. This is so that the project can understand the many ways that ACCHSs may utilise the pharmacist in their clinic.

How will ACCHSs be invited to take part?

ACCHSs will be invited to participate in the project by NACCHO and Affiliates through an 'expression of interest' process. The 'expression of interest' process will explain to ACCHS the process that will be used for site selection.

The Operational Team Committee, Chaired by the NACCHO Deputy CEO will review the expressions of interest and decide if a temporary Panel made up of Affiliate representatives is necessary to select the most suitable sites to participate in the project. As the recruitment process for sites will be staggered, this process will be repeated.

When NACCHO receives an expression of interest from an ACCHS, and the ACCHS is agreed to being a suitable site, the NACCHO Project Coordinator will contact the ACCHS and explain the project further to provide instructions on the process required to establish the site participation.

Formal participation of ACCHSs

After this consultation, a Site Agreement, Site Consent form, and Site Participation Brief *(this document)* will be provided to the ACCHS. Once this is signed and agreed, the project officers will arrange for practice pharmacist recruitment and placement within the ACCHS.

A visit to the ACCHS will be arranged to undertake a 'Needs Assessment' and a 'Health Systems Assessment' just before, or at the time that the practice pharmacist commences (these are explained later in this document).

How will each ACCHS benefit from this project?

Each service will be offered a practice pharmacist (aggregated 0.57 FTE across 22 sites each for 15 months duration) under a service agreement with the PSA. This will enhance the medicines-related workforce capacity of the ACCHS. Practice pharmacists are registered to work within their scope of practice and will have a non-dispensing role. The appointments will include salary, training, and the provision of supportive resources.

In the short-term, Medicare claims for medications-related, preventive care and chronic disease care may increase. The practice pharmacist will support other staff with quality prescribing and medicines use. The relationship with community pharmacies in the local area may improve if pharmacies' are helped to provide more appropriate services to the local community. Relationships between the ACCHS, local hospitals and other care providers may improve with communication between care providers when it pertains to the medicines that patients are taking.

These short-term benefits have potential for long-term gains for the sector as a whole. The project will provide the Australian Government with the evidence-base (biomedical, process, and economic evaluations) for the development of national health policies to potentially support on-going resourcing for practice pharmacists integrated within ACCHSs.

What is the role of the Affiliates in this Project?

NACCHO is a project partner and will maintain Aboriginal governance over this project. Affiliates are also participants in this project. They will be providing support to ACCHSs through funded project officer positions (0.2-0.4 FTE). The ACCHS will be notified of the name and contact details of the Affiliate staff to contact if and when the service needs to.

What is the pharmacist's role in the ACCHS?

The pharmacist employed within the ACCHS will deliver medication advice and education to patients and staff. They will work to improve patient medication adherence, improve prescribing, tailor medications to best suit the patient in collaboration with the prescriber, and assist with/oversee medication management processes. They may provide health promotion, disease prevention, and assist patients with chronic disease self- management and more judicious use of medicines.

The pharmacist will be required to respond to medication enquiries from patients and health professionals such as general practitioners and Aboriginal and Torres Strait Islander Health Workers/Practitioners, conduct staff education, review prescribing, mentor new prescribers, participate in case conferences, liaise across health sectors, undertake medication management reviews, and evaluate drug utilisation to ensure optimal therapy. As part of their collaborative work, an important element of the practice pharmacist's role is liaison with local community pharmacists to ensure continuity of care, and assist in medication management with transitions of care (such as when the patient is discharged from hospital).

Overall, there are 10 core roles targeting *patients*, and *health professionals and health systems.* These roles are all non-dispensing, for which practice pharmacists are registered to deliver. This is summarised in Table 1.

Whilst the project has developed these core roles for evaluation purposes, each participating ACCHS has the flexibility to utilise the services of the pharmacist according to service and client priorities. Practice pharmacists will be supported to adapt to cultural ways of delivering primary health care within each service. The project will aim to document the diversity in pharmacist core roles and in the patient journey. This will be possible through qualitative evaluation, but also through pre-post Health Systems Assessments (this is explained later in this document). The practice pharmacist will be supported to adapt to their role as directed by the staff and CEO.

Most of the practice pharmacist's activity must be devoted to providing supportive clinical care to patients who are participants in this project.

Table 1. Summary of practice pharmacists core roles

SUMMARY OF PRACTICE PHARMACISTS CORE ROLES

Core Role #	Theme	Core activity
1 (a)	**Medication Management Reviews**	Pharmacist reviews the medication the patient is taking. The pharmacist initiates and facilitates a medication management review- which may be a Home Medicines Review (HMR) or a non-HMR (medication management review not conducted in the patient's home)
1 (b)		Pharmacist reviews the patient who had a HMR after 12 months and a Non-HMR after 3-6 months.
1 (c)		Pharmacist ensures the MMR is claimed by the practice when completed (as a DMMR item 900 or RMMR item 903)

2	**Team-based collaboration**	Pharmacist participates in clinic activities that support team-based chronic disease care plans, and cardiovascular (CV) risk assessment
3 (a)	**Medication adherence assessment & support**	Pharmacist assesses the medication adherence of the patient being seen
3 (b)		Pharmacist improves the patient's experience with their medicines
4	**Medication appropriateness audit**	Pharmacist assesses 'medication appropriateness and underutilisation of medicines' as an audit of a sample of patients with chronic disease.
5	**Preventative health care**	Pharmacist provides preventive interventions to patients
6	**Drug Utilisation Review**	Pharmacist conducts a DUR to audit and improve a priority issue at the service
7	**Education and training**	Pharmacist conducts education sessions at the service
8	**Medicines information service**	Pharmacist provides medicines related information to staff within the service and responds to clinician medicines enquiries.
9	**Medicines stakeholder liaison**	Pharmacist develops a written stakeholder liaison plan supporting engagement with community pharmacies.
10	**Transitional care**	Pharmacist facilitates care coordination with relevant hospitals; residential aged care facilities, etc.

Pharmacist's qualifications

Pharmacist's who will be able to work in ACCHSs will be required to have:

- current registration with the Australian Health Practitioners Regulation Agency (AHPRA) as a pharmacist;
- more than 2 years post-registration experience;
- medication review accreditation such as from the Australia Association of Consultant Pharmacy (AACP) or Society of Hospital Pharmacists of Australia (SHPA) or working towards accreditation;
- post-graduate clinical qualifications or demonstrated clinical experience (e.g. hospital or HMRs).

The need for post-graduate qualifications or accreditation will be dependent on ACCHSs preference regarding the applicant and an adequate supply of accredited and experienced pharmacist applicants.

The PSA confirms that the proposed activities are consistent with the existing scope of practice of pharmacists as defined by the PSA Competency Standards endorsed by the Australian Health Practitioner Registration Agency.

Training the pharmacist at the ACCHS

The PSA will deliver the training to practice pharmacists in partnership with NACCHO. Some of the training will be off-site (before the pharmacist starts) and some will be on-site (at the start of their placement in the ACCHS). The NACCHO Coordinator and PSA training facilitator will arrange a training time with the practice pharmacist and with the nominated ACCHS, so that on-site training can best suit the ACCHS.

To follow up training, pharmacists will also have access to structured pharmacist mentor program that will link them with a dedicated mentor pharmacist with experience in the ACCH sector and to the other practice pharmacists within the project.

What patients' are eligible to be participants in this project?

If the patient is aged 18 years of age and over and has the following conditions, then they are eligible to be a participant in this project:

- Cardiovascular disease (coronary heart disease, stroke, hypertension, dyslipidaemia and any other CV disease)
- Type 2 diabetes mellitus,
- Chronic kidney disease,
- Other chronic conditions that mean a patient is at high risk of developing medication-related problems (e.g. polypharmacy).

These conditions are selected because *most* of the mortality gap for Aboriginal and Torres Strait Islanders is due to these chronic diseases. Optimizing medicines for people with these conditions can make an important impact on their health.

The consent of the patient will be required to participate in this project. Most of the patients attending ACCHSs are of Aboriginal and Torres Strait Islander origin (81%).[4] Therefore, we expect most of the patients involved in this project will be of Aboriginal and Torres Strait Islander origin.

Patients who are regular patients of the service should be prioritised as pharmacists will make sure they follow-up these patients over time.

If a patient consents to be a participant, how may they benefit from this project?

These participants will have immediate access to an on-site pharmacist at no charge. The Pharmacist will check their medicines and make sure they are right for them. Some recommendations may require the prescriber to change medicines or their dose, or cease a medication, or start a necessary medication.

The pharmacist will help resolve problems the participant may have with taking medicines, storing them, and will assess for adverse effects. Participants will be offered medication review in the clinic, or at home, or a place that best suits them. Just like the doctors and other staff, the pharmacist will record the encounter and recommendations in the CIS so that the doctor and health team can read them and make any agreed prescribing changes. The pharmacist also has more time to spend on supporting participants with medications than the doctor has.

The Pharmacist will see participants again to provide them with ongoing support. The pharmacist may follow-up with other members of the primary healthcare team, including with community pharmacy, and depending on the participants needs, with the hospital for discharge medications. This intensive support may help to improve the health of the participant.

There are no other expectations on participants in this project. Personal details of participants are not collected at all, and the data being extracted for the project is completely de-identified. A *Participant Consent Form* and *Participant Information Brief* is available for the ACCHS and practice pharmacist to seek patient consent. Patient participation in this project is voluntary. If consent is not given, this will not affect the patient's routine treatment, or their relationship the clinic, and the patient will still be able to be referred to the Pharmacist.

If a patient consents to be a participant, how may this benefit the ACCHS?

If patients agree to be participants, this enables the ACCHS to collect information for the purpose of the project. The participation of the patient will assist the ACCHS to collect information to determine the clinical and cost-effectiveness of the practice pharmacist, and will support the clinic activity overall (with Medicare and staff education). The information will inform on whether the health of participants improves over time, compared to their health before they received the services of the pharmacist. The ACCHS may receive a site-specific

report if they wish. If patient consent is not given, information cannot be extracted from the CIS for this project. Patient consent is therefore vital to assess the value of the practice pharmacist within ACCHSs.

How will patients be referred to the pharmacist in the ACCHS?

The staff within the ACCHS will need to be briefed about this project and the role of the practice pharmacist. The project will also seek the consent of general practitioners in the clinic and provide them with an *information brief*. This *Site Participation Brief* can assist the ACCHS with informing other staff.

Patients attending the ACCHSs doctor, health worker or other healthcare provider will be invited to talk to a practice pharmacist. These staff can refer the patient to the practice pharmacist. NACCHO and the PSA will prepare some simple promotional material to help health staff with this referral, so that patients who are most in need and meet the inclusion criteria are offered the services of the pharmacist.

The practice pharmacist or a designated staff member will tell the patient about this Project (and provide the patient with the *participant information brief*) and ask them if they want to take part. They will then be asked to *sign a participant consent form*. They may see the Pharmacist straight away or an appointment may need to be made for a later time.

The practice pharmacists (with assistance from trained ACCHS staff) may also directly approach patients attending the clinic who meet the individual participant criteria. The process for participant recruitment will be flexible according to the preferred process recommended by the ACCHS. This can be arranged during the first site visit to the ACCHS (see later in this document).

How will our ACCHS seek patient consent?

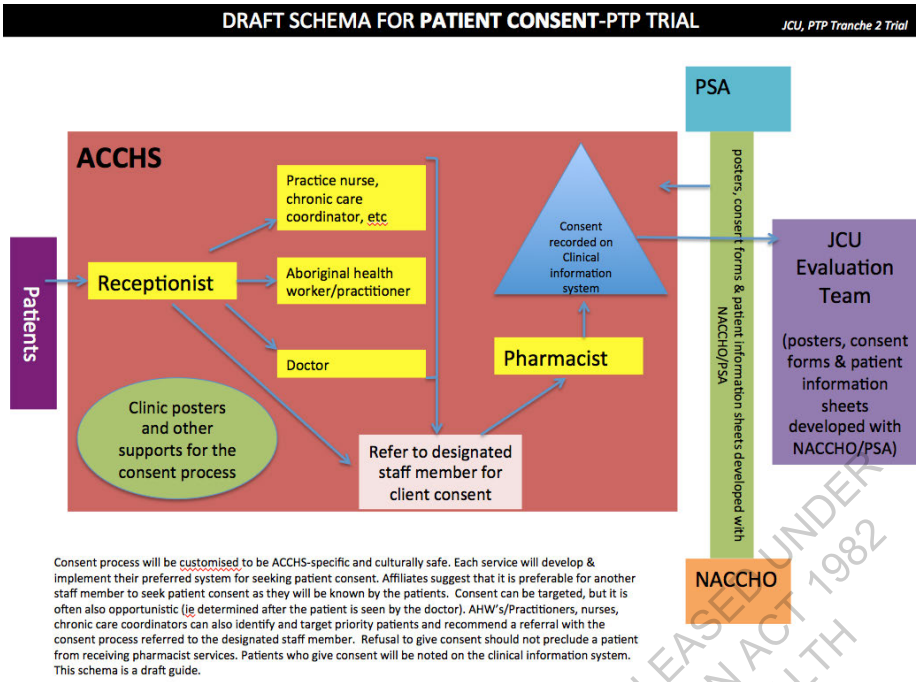
A suggested process for seeking individual patient consent has been developed in consultation with NACCHO Affiliates on the Evaluation Team. The process respects the systems that ACCHSs may wish and choose to adopt.

The practice pharmacist will be trained to seek the participant's consent. Training for seeking participant consent will also be provided to other staff who may be designated by the ACCHS to seek the participant's consent for cultural appropriateness reasons.

The participants consent form will then be signed and dated by the patient, a witness, and the designated staff member seeking patient consent. The consent form will be stored in a locked briefcase by the practice pharmacist until posted by registered post. It may be transmitted electronically to JCU after scanning. A written copy of the verbal information will be provided to the patient, including advice on how they may ask questions or make complaints about the project.

Consent will then be recorded on the clinical information system (CIS) by the practice pharmacist and GRHANITE will extract information only from consented patients. This suggested process is summarised in Figure 4.

Figure 4. A suggested process to seek patient consent.



How will participants be followed-up?

Practice Pharmacists will aim to follow-up participants using the usual clinic processes. Pharmacists will work with the existing staff in the ACCHS to follow-up participants in the same way used for all patients. Participants will need to be reviewed according to clinical needs and Medicare rules, and may include 3-monthly, 6-monthly or an annual review or more frequent review by the pharmacist.

The pharmacist will need to use the CIS within the ACCHS to record follow-up clinical details like other healthcare staff. The pharmacist will also record follow-up details in the pharmacist log-book as is appropriate for the type of review being conducted (such as medication appropriateness index measurements).

How many patients will ACCHS be asking to participate?

It is estimated that the practice pharmacist and the ACCHS may seek consent from about 350 people to be part of this Project and to see the Pharmacist over 15 months. This may vary considerably from service to service.

It is important for the ACCHS to encourage patients to be referred to the pharmacist early in the project. This is so that enough time is available to follow-up patients during the 15 months the pharmacist is employed in the project.

Are there any risks or benefits to patients from taking part?

The Pharmacist is a qualified and registered health professional who will be trained to work in this ACCHS. The risks to patients are no different to seeing a Pharmacist in a Pharmacy, except that patients will be seeing Pharmacists in this clinic. The Pharmacists will not be prescribing or dispensing medicines as they would in a Pharmacy. They will be working with the primary health care team in the ACCHS.

How will information for the project be collected?

The project has been designed to be acceptable and feasible to ACCHSs and practice pharmacists, by making most of the data collection a 'by-product' of service delivery. There

are three main types of information that will be collected with the help of ACCHSs. Information will be collected from clinical information systems (CIS), pharmacist log-books (managed by the pharmacist), and from site visits to ACCHSs.

1. Deidentified information about patients who have consented (participants) will be collected from services clinical information systems (CIS), using an electronic data extraction tool known as **GRHANITE™**. ACCHSs will be supported to have the GRHANITE data extraction software installed in one personal computer in the clinic. This software will be installed in one workstation to minimise practice impact. When GRHANITE runs, it does so at a scheduled time and queries data from the practice database server. This is the only time GRHANITE communicates with the practice server. GRHANITE will extract weekly data from the CIS to the secure JCU repository. The ACCHS does not need to do anything to maintain that this program is working.

2. Practice pharmacists will also collect information about what they do through an **electronic log-book**. This system will be an online secure database requiring practice pharmacist secure log-in. It will be used by practice pharmacists to record deidentified daily activity. Each electronic log-book entry will be able to be interrogated by the JCU data custodian. The daily-recorded activity will refer to 6 core pharmacists roles. The electronic interface will be user-friendly to minimise the reporting burden of practice pharmacists.

3. **Health systems assessment, qualitative data, and cost-effectiveness analysis** data will be collected during visits to the ACCHS. Mainly the NACCHO Project Coordinator, will undertake visits to the ACCHS. A qualitative researcher will visit only three ACCHSs if they are invited by the service. The costs related to the employment of pharmacists will be sourced mainly from the PSA.

How does GRHANITE work and how secure is it?

GRHANITE™ strictly conforms to extract only data that is approved. It provides ethical and secure mechanisms for the provision of data from the CIS. If an individual gives their permission to be involved in a project, GRHANITE can read this consent information if it is recorded in the clinical notes. Patients who have not consented will not have their data interrogated, even if deidentified. This is an 'opt-in' consent process. Patient names, dates of birth, address or other identifying information are not extracted.

The data extraction from the CIS within the ACCHS will only extract deidentified data and then transmit it securely to the secure repository at JCU. The exported data is encrypted, and can only be decrypted at its final destination. This ensures transmission security. Data is deidentified as patients are assigned a unique patient ID. It is not possible for the project partners to reidentify any patient.

GRHANITE software will not operate if copied or moved from one computer to another. All installations require a unique authorising license. It is a nationally recognised tool as over 1000 health services across Australia have used/are using this for quality improvement and for research activity.

JCU will be the repository body responsible for the protection of data from loss, misuse and unauthorised access. A data custodian will be appointed (the biostatistician investigator). JCU will comply with the Code for the Responsible Conduct of Research (JCU) [This Code has been adapted from the Australian Code for the Responsible Conduct of Research ["the National Code"], developed jointly by the National Health and Medical Research Council, Australian Research Council and Universities Australia, and published in 2007.[5]

What type of information will be collected by GRHANITE?

The information will be deidentified and only from consented patients (participants). The information will refer to periods 12 months before, and the periods after the pharmacist first provided support to the participants. This is summarised in Table 2.

Table 2. Deidentified patient information that will be extracted from clinical information systems (CIS) in the ACCHS

Measure	Detail
Patient characteristics	age, year of birth, sex, height and weight (for BMI), condition (diabetes, hypertension, dyslipidaemia, CHD, PAD, CVA, CKD, plus other disease *(in patients who fit the inclusion criteria with polypharmacy)*, smoking status (history details: start/stop year), postcode, CTG status, ethnicity, Aboriginal and Torres Strait Islander status, DVA status, pension/concessional status, year of death.
Encounter/contact indices & other demographic measures	contacts with staff (different job roles), episodes of care (date of visit, reason for visit, duration, visit type), patient status/record status (active), created and updated dates and user who created and updated the record; consented patients; patients ID/MRN/UR number/chart No/record No
Biometric indices	Diastolic and systolic BP, HbA1c, lipids (HDL, LDL, TG's, and TC), CV absolute risk assessment (levels and risk), ACR, e-GFR,
Prescribing indices	All medications (including PBS drug code); all information contained within prescriptions (route, strength, formulation, quantity); date of the script being generated, including ceased/delete date; deleted flag (if any) and reason for delete or ceased; created and updated dates, and user (job role) who created and updated the record. This information is for both current medications and past medications.
Dispensing indices	All medications (including PBS drug code); all information contained within prescriptions (route, strength, formulation, quantity); date of the medicine being supplied and dispensed; user (job role) who created and updated the record. This information is for both current medications and past medications.
Measures of health service utilisation:	
Medicare Benefits Schedule indices	900 (DMMR or HMR), 903 (residential aged care DMMR or HMR), 721 (GPMP), 732 (GPMP review 3 months later), 715 (Health Check); record status, created and updated dates, and user (job role) who created and updated the record, item billing amount.
Non-HMR data (out-of home interviews)	non-HMR flagged in CIS will link this to the above variables *(to be recorded by the pharmacist)*.
Measures of medication adherence	• Electronic measures of medication adherence *(to be calculated by the evaluators)* • Medication Adherence *(to be recorded by the pharmacist)*

ACR= albumin-creatinine ratio; BP= blood pressure; CIS= clinical information systems; CKD= chronic kidney disease; CTG= Close The Gap; CV= cardiovascular; CVA= cerebrovascular disease; DET= data extraction tool (GRHANITE); DMMR= Domiciliary Medication Management Review; DVA: Dept of Veterans Affairs; e-GFR= electronic glomerular filtration rate; GPMP= General Practice Management Plan; HDL= high density lipoprotein; HMR= Home Medications Review; LDL= low density lipoprotein; MAI= Medication Appropriateness Index; PAD= peripheral artery disease; TC= total cholesterol; TG= triglyceride

What type of information will be collected by the pharmacist in the log-book?

The pharmacist will record their daily activity in the log-book. This will include information about education sessions they provided to staff, adhoc advice provided and any evidence this led to an outcome, the development of any resources for patients or the ACCHS, whether the pharmacist developed a plan to liaise with community pharmacy (and details of that plan), and the number of medicines reconciliations from stakeholders like hospitals.

In particular, the pharmacists log-book will enable practice pharmacists to record the results of medication assessments for each of 30 participants. Of the participants seen by a practice pharmacist, 30 participants per site will have their medications intensively appraised as part of the medication management review.

No personal information about participants is contained in the log-book. The participant does not need to be present for the medication assessment as it is an audit of the participants medications held in the CIS.

The pharmacist will only record the unique 'patient ID' to enable matching of the medication assessment audit of 30 participants to the participant data extracted through GRHANITE.

The practice pharmacist will communicate the findings of the medication assessment for the participant to the prescribing team within the ACCHS so that appropriate clinical action is taken. Practice pharmacists will ensure that the assessment takes account of additional clinical information such as an assessment of the participant's absolute cardiovascular risk when assessing their medications.

Practice Pharmacists will follow-up participants as per usual clinic processes. These follow-up mechanisms may vary from service to service (see above).

What type of information will be collected during the site visits?

Every participating ACCHS site will be visited at least twice during the project.

1. The 'needs assessment' visit (see '*what will happen during the first visit'*).

2. To conduct a 'health systems assessment' (HSA):

- at the time of, or just prior to the appointment of the pharmacist, and
- repeated towards the end of the implementation phase (month 12-15).

The NACCHO Project Coordinator will conduct visits and assessment with assistance from Affiliate staff. The needs assessment and health systems assessment will be conducted at the first visit.

The '*needs assessment'* will collect information about what the ACCHS may need to support the practice pharmacist to work in that clinic. This will be used to help the pharmacist to get started.

The *'health systems assessment'* will source information about the ACCHS. Each ACCHS is different in many ways. The project needs to understand how many staff (and types) are employed within the ACCHS, the total service population, the total service budget, Aboriginal governance structures, health services on offer, quality improvement processes, models of care such as outreach, if home medicines reviews are conducted and how, type of CIS used, recall systems in place, the adequacy of existing communication with the hospital, and community pharmacy/ies, medicines access information, use of point of care testing, regional services available such as specialist and allied health visits, and how the ACCHS will implement and define the core roles of practice pharmacists.

A meeting with key informant staff in a focus group setting will be needed to undertake the health systems assessment. This information will be collated in a summary report for the ACCHS to use for any quality assurance activity.

What type of information will be collected for qualitative analysis?

Three ACCHSs will be invited to participate in a qualitative evaluation of the Project in mid-late 2019. ACCHSs will be asked if they will support focus group discussions with certain patients, Aboriginal health workers/practitioners, and with the pharmacist on site. These meetings will be fully catered and will be conducted in ways to minimize clinic disruption. ACCHSs will be contacted closer to that time to explain what that might involve.

What will happen during the first visit to the ACCHS?

The 'needs assessment' visit to the ACCHS will elicit the type of support needed by the ACCHS so that the practice pharmacist may best be integrated within the service. The visit will also assist the ACCHS to establish their preferred system to seek patient consent, and ensure the pharmacist can use the CIS, has a space to consult with patients, and the CIS is set to accept the 'job-role' for the pharmacist (this is necessary for the GRHANITE data extraction). A 'health systems assessment' may also be undertaken at this visit (see above).

The NACCHO Project Coordinator will make contact at this visit with the nominated ACCHS staff member who will act as a 'go to' person. Together with the nominated 'go to' person/s and relevant ACCHS staff, a project consent pathway and process that is responsive to the local ACCHS' model of care will be planned. A second 'go to' person may also need to be identified by the ACCHS and Coordinator as contingency for leave, resignation or movement between clinics or roles.

The NACCHO Project Coordinator will ensure that the service has adequate promotional material and strategies to engage both ACCHS staff and clients.

Who owns the GRHANITE information?

The raw (unanalysed) data collected from the GRHANITE data extraction is owned by the ACCHS even though it will be used, analysed and stored safely by JCU. Details regarding this is included in the service agreement with the ACCHS for this project.

Intellectual Property

Details regarding Intellectual Property of the Project will be included in the Service Agreement with the PSA.

Use of information collected by the Project

The information collected from this project will be used to prepare reports to the Australian Government on 'quality of care' outcomes (the project objective) that arise from integrating a practice pharmacist within ACCHSs. The reports will assess change in the:

- quality of prescribing,
- quality of medicines support through indicators of health service utilization,
- quality of the patient, service and stakeholder experience, and
- ultimately an effect of these improvements on biometric indices as a measure of health outcome.

The reports will also assess the cost-effectiveness of the practice pharmacist within ACCHSs.

The data analysis will also be able to provide ACCHSs and Affiliates with local level and aggregated data. Most analyses at this level would not be meaningful because the number of

participants will be too small. However, the information will be aggregated at a national level for the NACCHO, Affiliates, ACCHSs, and the PSA, as well as the Australian Government. This will inform the development of health policy about practice pharmacists and the role they can play supporting Aboriginal and Torres Strait Islander peoples with chronic disease in Australian primary health care settings.

Health systems assessment summaries will also be able to be provided to ACCHSs for their use.

Security of information collected by the Project

As the leading research organisation, JCU (the repository body) will be responsible for the protection of data from loss, misuse and unauthorised access. The Data Custodian (Biostatistician: Erik Biros) will be responsible for this role.

Further, the Project Operational Team Committee, Chaired by the Deputy CEO of NACCHO, will be consulted in all matters brought to its attention with regard to concerns about data security.

How will the collected information be transported to JCU?

Completed Site Consent Forms will be collected by the NACCHO Project Coordinator, scanned and sent electronically to the data custodian. Participant consent forms will scanned by the practice pharmacist and electronically transmitted to the data custodian. The forms will be stored electronically in a secure computer under the management of the data custodian on the property of College of Medicine and Dentistry, James Cook University.

Information extracted using GRHANITE and from the Pharmacist log-book will be transmitted electronically and stored on password-protected internal server on JCU premises. Data accessed during the analysis phase will be stored in JCU-supported database applications only.

Health Systems Assessment (HSA) and Needs Assessment information collected from site visits, will be collected on paper-based forms, (or in electronic format) collected by the NACCHO Project Coordinator and will be transported in a locked briefcase, scanned and stored in electronic format in a secure computer under the management of the data custodian.

Where and for how long is the information going to be kept?

Data will be kept for a minimum period of 7 years from the end of the year of publication of the last refereed publication or other form of public release to an audience external to JCU.

Electronic data will be stored on password-secured databases only. Any paper-based documents will be scanned and stored electronically, and the paper documents stored in a locked cabinet in a secure room at JCU. The data custodian (Biostatistician- Erik Biros) will be responsible for data storage consistent with the JCU *Code for the Responsible Conduct of Research.*

After the minimum period of storage, the data may be considered for disposal if there is a written request to the Evaluation Lead, from both the NACCHO and the PSA for the disposal of the data. As the raw unanalyzed data extracted by GRHANITE is owned by the ACCHSs, JCU will seek instruction from NACCHO and each ACCHS as to the ongoing use or destruction of this data. The Evaluation Lead will authorize the data custodian to delete the data if this is instructed by NACCHO, in accordance with the JCU *Code.*

Who will be able to access this information?

Data will be accessible only to members of the Evaluation Team who will have a role in handling this information. From time to time, one member of the evaluation team (the

University of Melbourne HaBIC Research Information Technology Unit) may need access to the data-landing server at JCU to provide technical support services.

ACCHSs may request access to de-identified information from their service. These requests can be made to the Project Operational Team Committee or its members, or directly through the NACCHO Affiliate or Project Officers involved in this project. The request must also include documentation of intended data use and must align with project objectives (the individual consent provided by each participant). Requests to access the data that *does not align* with the project objectives will need HREC approval. Similarly, Affiliates may request access to data at their jurisdictional level. This request must be in writing and align with the project objectives.

External requests from other organizations and research agencies not participating in this project to access data from this project will need to be submitted to the Project Operational Team Committee. NACCHO will recommend that external agencies seek approval from Affiliates and from participating ACCHSs relevant to the request. Approval will not be granted for the release of data if it is not approved by NACCHO. There may be a need to seek approval from the Department of Health if this is a condition in the Head Agreement for this project. All external requests will need to have HREC approval prior to the release of this data.

What can we do if we have concerns about data security, research misconduct or complaints?

ACCHSs can report any breaches in data security or research misconduct or complaints to:

- project partners/staff,
- Affiliates,
- NACCHO directly, and/or
- Designated HREC representative.

Reports received by project staff will be forwarded to the Operational Team Committee and the Deputy CEO of NACCHO.

What is the role of ACCHSs in this project?

The ACCHS will host the practice pharmacist who will be providing health services to the patients in the community. The pharmacist will effectively be an employee of the PSA, who will provide all employment support. This will minimise the administrative burden on the ACCHS so that the pharmacist and ACCHS can focus on effective service delivery from the start. NACCHO and respective Affiliates will have the capacity to liaise closely with PSA, ACCHS and the pharmacist to ensure that the pharmacist's roles are understood clearly by both parties.

The Head Agreement between the PSA and the Department of Health will influence the service agreement between the PSA and the ACCHS. The Service Agreement with the ACCHS will document the terms of participation including: Health Service Responsibilities and Financial Arrangements.

ACCHSs will be provided with a *Site Consent Form* that will need to be signed if the ACCHS agrees to be a participant in this project.

The NACCHO Project Coordinator will be available to ACCHSs to assist in understanding and delivering on their roles within the project. They may also work with their Affiliate representative to assist ACCHSs.

The following is a summary of the ACCHSs role as a participant in this project that will be negotiated with each ACCHS to be most appropriate for that service. The role of the ACCHS is:

- To nominate a 'go to' person to be a point of contact for the project staff.

- To support the practice pharmacist to use the CIS within the practice, and access the patient's clinical records in order to support patient care and make medicines-related recommendations to other health staff.
- To enable the CIS to recognise the practice pharmacist in their 'job role'. (The ACCHS will be assisted with this. This is so that the information can be collected about the work the pharmacist has done).
- To support the pharmacist to access a private consulting room to meet with patients.
- To support the practice pharmacist to have time to record their work and findings in the pharmacist log-book.
- To assist the practice pharmacist to work with other members of the health care team by sharing information about the project with other members of the team.
- To assist the pharmacist to prepare a workplan that best suits the model of care of the ACCHS.
- To host information for patients attending the practice by using posters and other health promotion material to promote patients to be participants in this project.
- To develop a participant consent process that is approved by the ACCHS involving the practice pharmacist and/or other staff in the ACCHS.
- To support site visits and support a focus group with relevant staff for 'health systems assessment' and 'needs assessment'.
- To support site visits and support focus groups with relevant staff for the qualitative evaluation if the ACCHS wishes to volunteer as a case study site (further information about this will be provided to ACCHS to make a decision in 2019).
- Any other matters that are relevant to the work of the practice pharmacist that the ACCHS may wish to consider. (Examples include mechanisms for home medicines review, or use of point of care testing, etc).

What support will ACCHSs receive in this project?

Each ACCHS that participates in the project will receive:

- The services of an on-site registered practice pharmacist for a 15-month duration.
- Administration of pharmacist employment and contract to be provided by PSA.
- The opportunity to select their preferred practice pharmacist.
- A 'Needs Assessment' site visit to ascertain any specific needs of ACCHS.
- A facilitated 'training' on-site visit to support and prepare the practice pharmacist within the primary healthcare team.
- Resources to support the practice pharmacist, such as medication management guides.
- A supportive mentor for the practice pharmacist (that will be managed by NACCHO and the PSA).
- Installation of the GRHANITE data extraction tool in the CIS and licence for its use for 15 months.
- Two site visits to explore Health Systems Assessment (one of these will be at the same time as the needs assessment visit).
- A Health Systems Assessment Report for ACCHS use for CQI.
- Involvement of a nominated staff member to be a member of the Project Reference Group in the project.
- Support from a nominated Affiliate officer involved in this project.
- Support from the NACCHO Project Coordinator during site visits and contact by email and phone.
- An opportunity to review project findings and provide feedback through ACCHS membership of the Project Reference Group.

- Customised reports specific to the participating ACCHS (if requested and if the data analysis is meaningful due to limitations with small participant numbers).

Each Affiliate that participates in the project will receive:

- Remuneration to participate in the project. This can be used to employ a part-time project officer (or to back-fill existing staff).
- Involvement of nominated staff as members of the Evaluation Team in the project.
- An opportunity to review project findings and provide feedback (through membership of the evaluation team and Project reference group).
- Customised reports specific to the jurisdiction (if requested).

How will ACCHSs find out the results of the Project?

ACCHSs will receive information about the Project through NACCHO communication mechanisms. The Project will finish at ACCHSs in late 2019. The ACCHSs will know the results in 2020. Other ways in which ACCHSs will be informed include:

- Through the Project Reference Group which will be provided with updates on progress with the project and extracts of reports arising from the project.
- Summary results to individual ACCHSs (pertaining to their own data) may be provided upon request to the Operational Team Committee, although these may not be meaningful due to small participant numbers and the inability to undertake data analysis.
- Extracts of reports arising from this project will be summarized in plain language and disseminated according to usual NACCHO communication mechanisms, such as email, the NACCHO News, and NACCHO website, including communication with any relevant special interest groups supported by NACCHO.
- Presentations detailing progress and results will be communicated at NACCHO and/or Affiliate Conferences and Annual Meetings.

The findings of the project will also be reported for publication in articles and journals relevant to this project. There may also be presentations at conferences.

Reports will also be provided to the Australian Government, Department of Health, and through communication mechanisms used by the Pharmaceutical Society of Australia. NACCHO (as a project partner) will check this information before it is released.

Can ACCHSs decide to withdraw from this project?

ACCHSs and Affiliates that are participants reserve the right to withdraw their participation in the project in accordance with their service agreements. If an ACCHS site withdraws, the ACCHS will be asked to provide a written reason for the withdrawal to the PSA (for the contract) and the Project Operational Team Committee. The ACCHS will be asked whether they agree to the continued use of the data collected in this Project prior to their withdrawal of Site Consent. The withdrawal of the Site from the project will mean the withdrawal of the site support specified in the service agreement (and explained above). The withdrawal of the Site will be reported to all relevant HRECs when the Project's annual report is due.

Can Pharmacists decide to withdraw from this project?

Pharmacists participating reserve the right to withdraw their participation in the project in accordance with their employment contract.

Who can Pharmacists contact for more information or to make a complaint?

Pharmacists can contact s47F from the Pharmaceutical Society of Australia: s47F Alternatively you can contact the

NACCHO Project Lead: Mike Stephens, s47 ; Email: mike.stephens@naccho.org.au. Or the NACCHO Deputy Chief Executive Officer: Ms Dawn Casey at dawn.casey@naccho.org.au.

The Human Research Ethics Committees will continue to provide oversight as the project progresses. You can contact the Ethics Committee with any concerns about the safety and fairness of the Project at: Executive Office of Research, St Vincent's Hospital Melbourne, Tel: 03 9231 2394, or email: research.ethics@svhm.org.au

Thank you on behalf of the IPAC Project Team.

The ***IPAC Project*** is the *Integrating Pharmacists within ACCHSs to improve Chronic Disease Management Project (IPAC).* The Project Partners and Project Operational Team Committee for the ***IPAC Project*** include: The National Aboriginal Community Controlled Health Organisation (NACCHO); Pharmaceutical Society of Australia, and the College of Medicine and Dentistry, James Cook University. ***Evaluation Team*** members include the Project Partners, and the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); Queensland Aboriginal and Islander Health Council (QAIHC); and the Aboriginal Medical Services Alliance in the NT (AMSANT). The Project Reference Group includes representatives of NACCHO, Affiliates and ACCHSs.

[1] Pharmaceutical Society of Australia. *Guide to providing pharmacy services to Aboriginal and Torres Strait Islander people.* Jul 2014. http://www.psa.org.au/download/guidelines/Guide-to-providing-pharmacy-services-to-Aboriginal-and-Torres-Strait-Islander-people.pdf

[2] Couzos S, Murray R: Health, Human Rights and the Policy Process. In: *Aboriginal Primary Health Care: An Evidence-based Approach.* edn. Edited by Couzos S, Murray R. Melbourne: Oxford University Press; 2007: 29-63.

[3] Tan ECK, Stewart K, Elliott RA, George J. Integration of pharmacists into general practice clinics in Australia: the views of general practitioners and pharmacists. Int J Pharm Pract 2014;22(1):28–37. At: http://onlinelibrary.wiley.com/doi/10.1111/ijpp.12047/pdf

[4] Australian Institute of Health and Welfare 2016. Healthy Futures—Aboriginal Community Controlled Health Services: Report Card 2016. Cat. no. IHW 171. Canberra: AIHW.

[5] JCU Code for the Responsible Conduct of Research (JCU) https://www.jcu.edu.au/policy/research-management/code-for-the-responsible-conduct-of-research

MCQ Assessment questions

IPAC Project - Master Pharmacist Participation Brief

1/ The IPAC Project is a partnership between:

(Select the CORRECT answer)

a/ The Pharmaceutical Society of Australia, James Cook University (College of Medicine and Dentistry) and the National Aboriginal Community Controlled Health Organisation (NACCHO)

b/ The Pharmaceutical Society of Australia and the National Aboriginal Community Controlled Health Organisation (NACCHO)

c/ The Pharmaceutical Society of Australia and the Department of Health

d/ The National Aboriginal Community Controlled Health Organisation and its affiliates in Victoria, Queensland and the Northern Territory

2/ To ensure appropriate Aboriginal governance over this project, what research principles and methods are used?

(Select the CORRECT answer)

a/ Literature review

b/ Community-based participatory research principles and methods

c/ Observational study

d/ Field experiment

3/ The IPAC Project will investigate improvements in:

(Select the INCORRECT answer):

a/ patient adherence to medicines

b/ health service utilisation of Medicare

c/ relationships with, and perceptions of, stakeholders (eg. community pharmacies, ACCHS staff)

d/ pharmacist dispensing accuracy within Aboriginal Community Controlled Health Services

4/ Affiliates of NACCHO involved in the IPAC include:

(Select the CORRECT answer)

a/ Victorian Aboriginal Community Controlled Health Organisation, (VACCHO), Queensland Aboriginal & Islander Health Council (QAIHC) and Aboriginal Health Council of Western Australia (ACHWA)

b/ Aboriginal Medical Services Alliance Northern Territory (AMSANT), Victorian Aboriginal Community Controlled Health Organisation (VACCHO) and Aboriginal Health & Medical Research Council of NSW (AHMRC)

c/ Aboriginal Medical Services Alliance Northern Territory (AMSANT), Victorian Aboriginal Community Controlled Health Organisation (VACCHO) and QAIHC

d/ Aboriginal Medical Services Alliance Northern Territory (AMSANT), Aboriginal Health Council of South Australia (AHCSA) and Queensland Aboriginal & Islander Health Council (QAIHC)

5/ Noting that the project is a 'pre and post' study, information will be collected for the period:

(Select the CORRECT answer)

a/ From the time the pharmacist starts until 12 months later, & this will be compared with information from 6 months before the pharmacist started

b/ From the time the pharmacist starts until they finish 15 months later, & this will be compared with information from 12 months before the pharmacist started

c/ From the time the pharmacist starts until the end of the Analysis and Reporting phase

d/ From the start of the Establishment phase until the time the pharmacist finishes

6/ How may the ACCHS benefit from the project?

(Select the INCORRECT answer)

a/ Enabling medications to be dispensed onsite by the IPAC pharmacist

b/ Increased Medicare claims related to management of chronic disease

c/ Enhanced relationships between the ACCHS, local hospitals & other care providers

d/ Enhanced medicines-related workforce capacity at the ACCHS

7/ The role of the pharmacist within the ACCHS may include:

(Select the INCORRECT answer)

a/ Delivery of medication advice & education to patients and staff

b/ Responding to medication-related enquiries from patients and health professionals

c/ Liaising with local community pharmacists to enhance patient care

d/ Packing dose administration aids

8/ Regular patients of the ACCHS who are aged 18 years or over with the following conditions are eligible to be participants in this project:

(Select the INCORRECT answer)

a/ chronic kidney disease

b/ cardiovascular disease

c/ acute traumatic injury

d/ diabetes

9/ Which ONE of the following statements related to patient consent is FALSE

a/ The informed consent of patients will be required for participation in this project

b/ The preferred process for seeking patient consent will be determined by the ACCHS

c/ Once a patient has given informed consent to participate in the project, a fee will be charged for services provided by the pharmacist

d/ GRHANITE will only extract information from the ACCHS clinical information system for patients who have given informed consent to participate in the project

10/ Which ONE of the following statements related to patient participation is CORRECT?

a/ It does not matter when patients are referred to the pharmacist as each patient only needs to be seen once within project time

b/ **It is important for the ACCHS to encourage patients to be referred to the pharmacist early in the project so that enough time is available to follow up patients during the 15 months the pharmacist is employed in the project**

c/ The later that patients are referred to the pharmacist the better, as this will be closer to the Analysis and Reporting Phase of the project

d/ All patients who attend the clinic will be considered participants in the project so referral to the pharmacist is unnecessary

Pharmaceutical Society of Australia

Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC)
Project Overview

NATIONAL ABORIGINAL COMMUNITY CONTROLLED HEALTH ORGANISATION
NACCHO

JAMES COOK UNIVERSITY AUSTRALIA

PSA is the peak national body for pharmacists

Pharmaceutical Society of Australia

Background

- Aboriginal and Torres Strait Islander peoples experience a much higher burden of chronic disease
- Adverse health outcomes from these illnesses may be prevented…
- Extensive global evidence that practice pharmacists co-located within general practice clinics can enhance chronic disease management and quality use of medicines

Pharmaceutical Society of Australia

Background

- Funding issues for pharmacists in public health sector
- Innovative funding sourced by ACCHSs
- Providing practice pharmacists with the appropriate cultural, communication, clinical systems training, and integration within ACCHSs may significantly improve the quality of health care received and experienced by Aboriginal and Torres Strait Islander peoples

IPAC Project – Overview & Objectives

- Aims to determine whether including a registered non-dispensing pharmacist as part of the primary health care team within Aboriginal Community Controlled Health Services (ACCHSs) leads to improvement in the quality of the care received by Aboriginal and Torres Strait Islander peoples
- Tripartite partnership between PSA, NACCHO & JCU
- Funded by the Australian Government for 29 months

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IPAC Project Protocol

- Provides a framework for the management and conduct of the IPAC project
- Guided by a Memorandum of Understanding that outlines communication and governance processes
- Guides the participation of all Aboriginal Community Controlled Health Services (ACCHSs) as project sites
- Documents the specific requirements of the project

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Ethics approval has been granted by:

- St Vincent's Hospital Melbourne HREC (Victoria)
- James Cook University HREC (QLD)
- Menzies School of Health Research HREC (NT)
- Central Australia HREC (NT)

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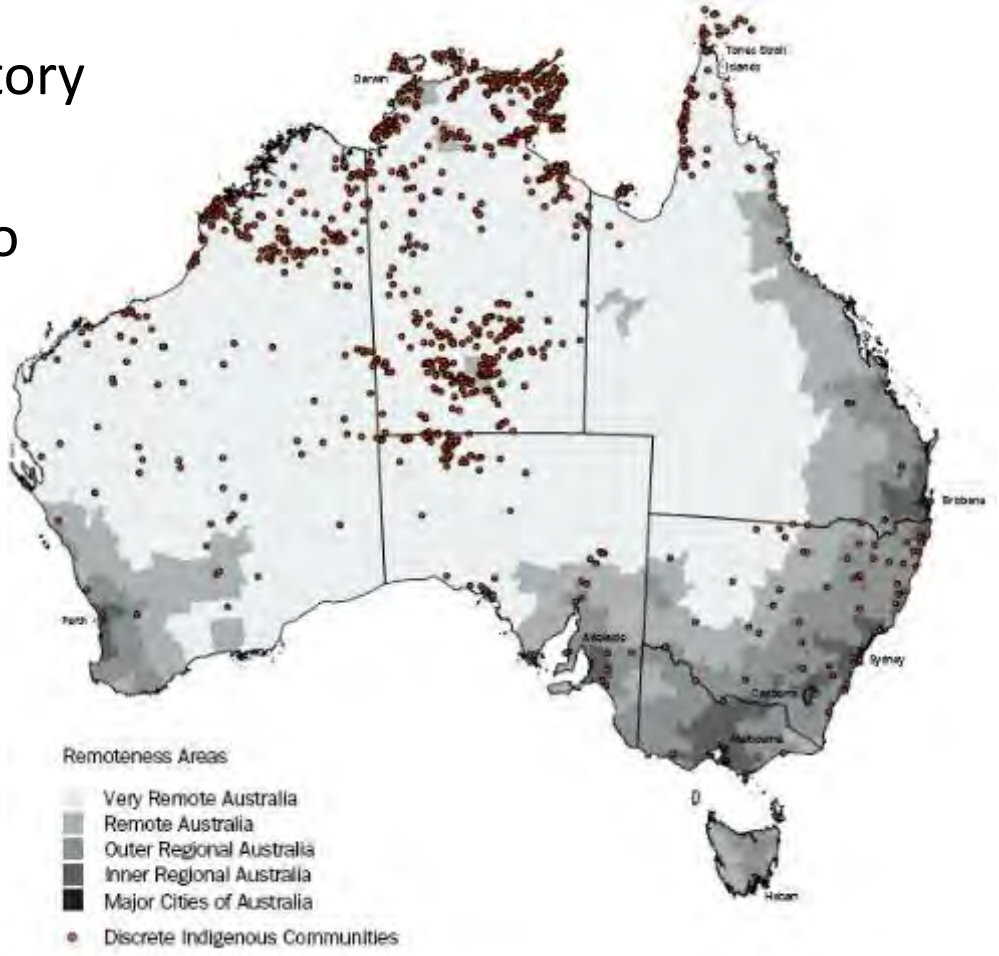
Study design

- Community-based participatory research (CBPR) design
- Up to 22 ACCHSs accepted to participate, from three jurisdictions
- Spread of geographically diverse settings
- Each service will be offered a practice pharmacist (aggregated 0.57 FTE across 22 sites) for 15 months' duration



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Participant inclusion criteria

Regular patients of the ACCHS aged 18 years & over with:

- Cardiovascular disease
- Type 2 diabetes mellitus
- Chronic kidney disease
- Other chronic conditions at high risk of developing medication-related problems (e.g. polypharmacy)

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The role of the IPAC project pharmacist

In broad terms….

- To provide relevant healthcare activities to patients within their scope of practice
- To provide education and training to existing staff within the services as appropriate
- To enhance relations with community pharmacies to overcome barriers to access of medication by patients
- To assist in managing medications at transitions of care
- *To record all activities related to the 10 core pharmacist roles

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Data collection

- Indices of best practice prescribing & quality of care measures
- De-identified patient data will be collected from the clinical information systems (CIS) of ACCHSs pertaining to consented patients by GRHANITE DET
- Additional de-identified data on patients and health systems interactions will be collected by practice pharmacists through an electronic log-book
- Qualitative and cost-effectiveness data will be collected during site visits & remotely

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Data analysis

The following factors will be explored by measuring before and after the pharmacist is appointed…

- Improvements in prescribing by doctors
- Whether patients are more likely to take their medicines
- If indicators of health are improving over time

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Thank you!

PSA is the peak national body for pharmacists

IPAC Project – Data collection methods for Pharmacists' 10 core roles

*For direct patient-related activities the pharmacist should also write in the patients' progress notes in the ACCHS CIS to ensure clear communication with other members of the ACCHS primary healthcare team.

Core role number	Method of data collection			
	Logbook (pharmacist to enter)	**Flagged entry in ACCHS CIS (pharmacist to enter)**	**GRHANITE DET (not requiring pharmacist input)**	**Qualitative analysis (to be done by JCU)**
1/ Medication Management Reviews	Details for HMRs & Non-HMRs (including outcome of AOU) + follow-up.	'Non-HMR'	Item 900 claims (HMR). MBS claims related to team based activities.	
2/ Team-based Collaboration	Participation in team meetings, even if not MBS claimable.		MBS claims related to team based activities.	Yes
3/ Medication adherence assessment & support (N-MARS)	Answers to N-MARS survey.	'N-MARS'		
4/ Medication appropriateness audit (MAI) & Assessment of Underutilsation (AOU)	Answers to MAI & AOU survey for all audited patients, as well as AOU for all HMRs & Non-HMRs.	'MAI' only (it will be assumed that the AOU has also been conducted)	Prescribing indices.	
5/ Preventive Health Care	Participation in preventive health care activities – record under Education & Training.		Biometric measures entered or updated in the CIS by the pharmacist for consented patients.	Yes
6/ Drug Utilisation Review	Details of DUR, upload DUR report (template available).			Yes
7/ Education & Training	Record as a discrete 'event' when education or training is provided - upload example of educational material provided. Upload evaluation summary report (template available) for group sessions.			Yes
8/ Medicines Information Service	Record as a discrete 'event' each time an enquiry is received.			Yes
9/ Medicines Stakeholder Liaison	Upload a single written Medicines Stakeholder Liaison Plan (template available). Record as a discrete 'event' each time contact is made with community pharmacy.			Yes
10/ Transitional Care	Record as a discrete 'event' each time contact is made with an external agency.			Yes

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Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC)
Consent

NATIONAL ABORIGINAL COMMUNITY CONTROLLED HEALTH ORGANISATION
NACCHO

JAMES COOK UNIVERSITY AUSTRALIA

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Patients attending ACCHSs as participants

- 'Regular' patients aged 18 years or over with chronic disease
- Targeted chronic diseases
- Based on Australian Institute of Health and Welfare analysis

Australian Government
Australian Institute of Health and Welfare

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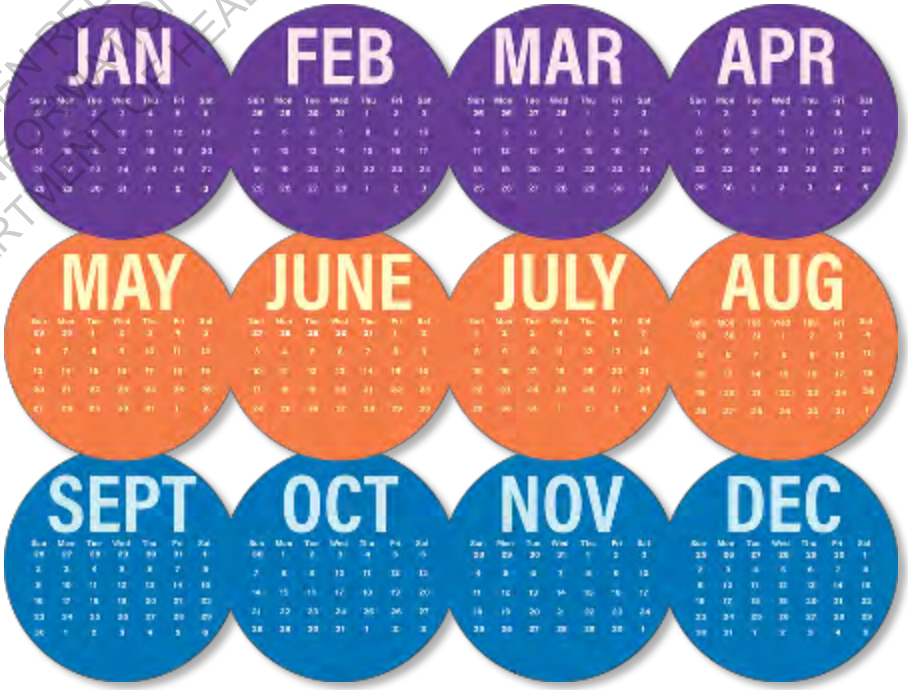
Individual participant recruitment…

- At any stage within 15-month period of pharmacist project time
- Early participation encouraged
- Guidance for participant selection necessary
- Defined by the participant inclusion criteria



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Participant inclusion criteria

Regular patients aged 18 years and over with:

- CVD
- Diabetes
- CKD
- Other chronic conditions

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Individual participant recruitment

- Convenience sampling
- Developed in consultation with NACCHO Affiliates
- Targeted or opportunistic
- Referral by a doctor, health worker or other healthcare provider
- Practice pharmacist may also approach patients
- ACCHS to determine preferred participant recruitment process

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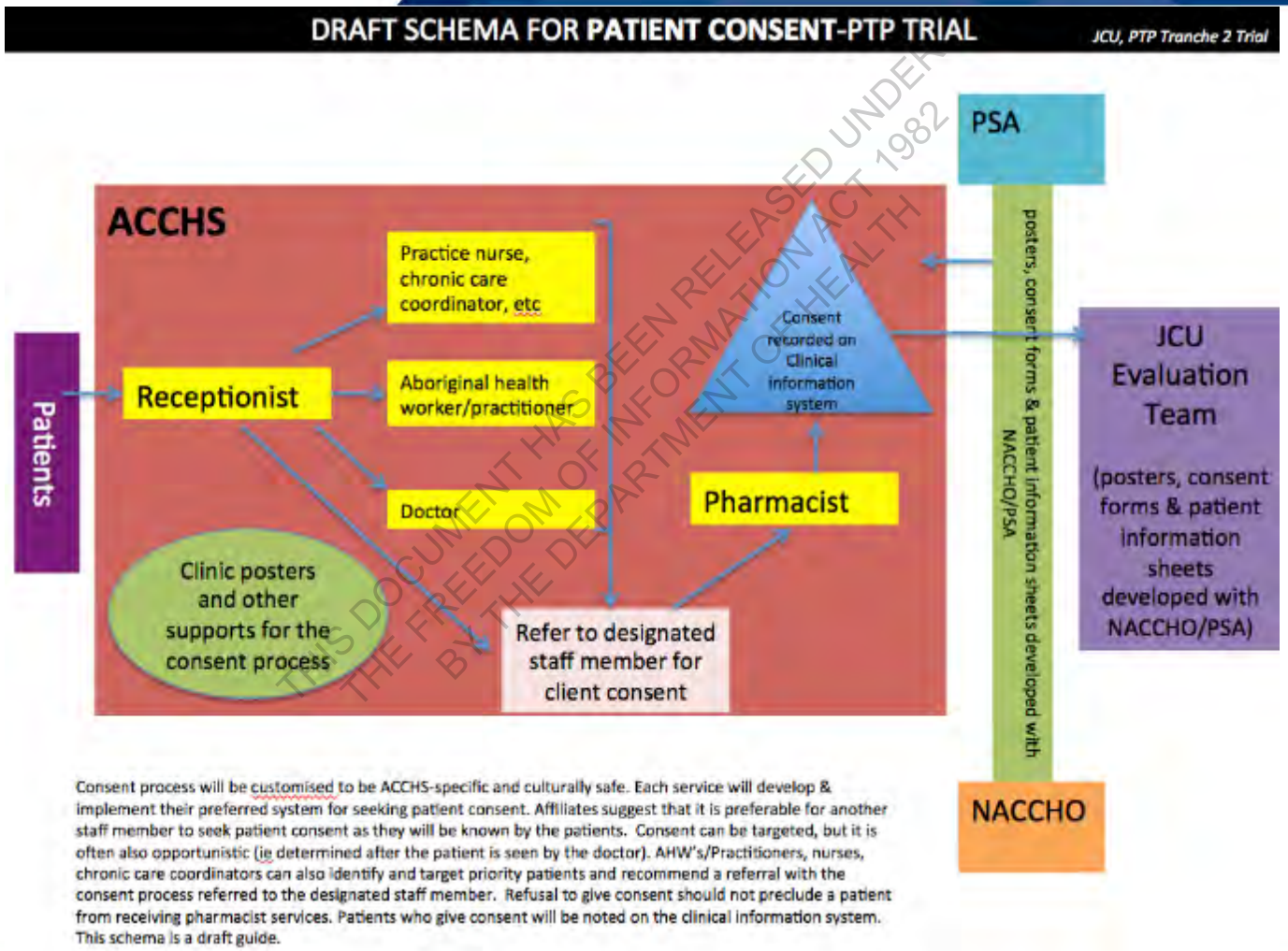
Pathway for patient consent - Draft schema



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IPAC Project individual patient consent

- Informed consent required for participation
- Participant Information Brief used for provision of written information
- Information to also be provided verbally
- Written consent sought from all eligible patients who agree to receive pharmacist services
- Refusal to give consent should not preclude receiving pharmacist services

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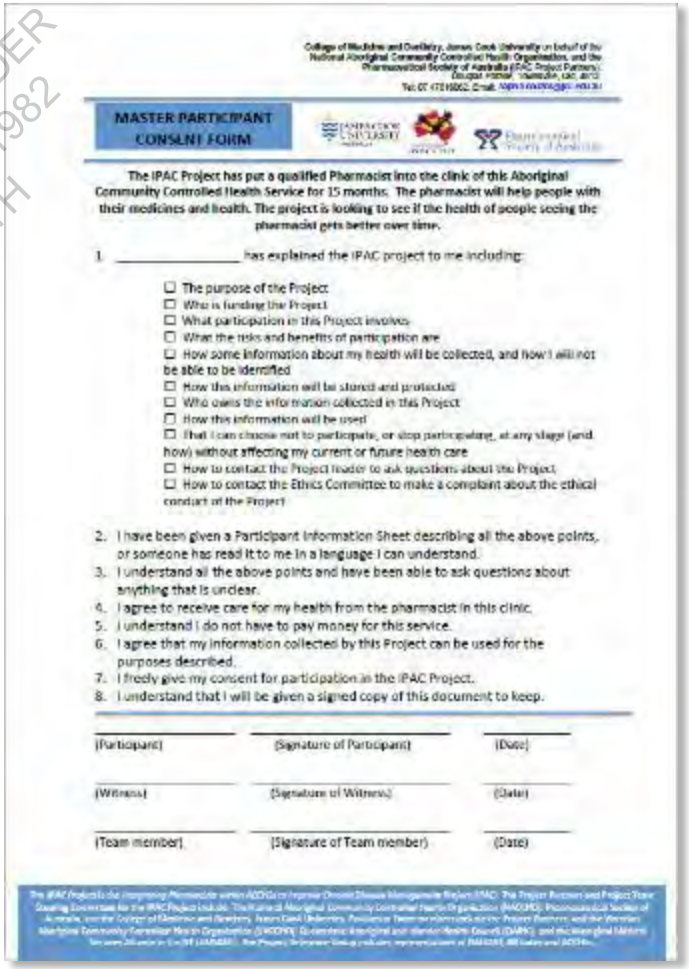
Individual consent

Written consent is required to acknowledge:

- Understanding of information provided
- Agreement for extraction of de-identified health information
- Agreement to the information being stored, used and published
- Free consent to participate in this project

Consent form is to be signed and dated by the patient, a witness, and designated staff member seeking patient consent



MASTER PARTICIPANT CONSENT FORM

The IPAC Project has put a qualified Pharmacist into the clinic of this Aboriginal Community Controlled Health Service for 15 months. The pharmacist will help people with their medicines and health. The project is looking to see if the health of people seeing the pharmacist gets better over time.

1. _____ has explained the IPAC project to me including:

- ☐ The purpose of the Project
- ☐ Who is funding the Project
- ☐ What participation in this Project involves
- ☐ What the risks and benefits of participation are
- ☐ How some information about my health will be collected, and how I will not be able to be identified
- ☐ How this information will be stored and protected
- ☐ Who owns the information collected in this Project
- ☐ How this information will be used
- ☐ That I can choose not to participate, or stop participating, at any stage (and how) without affecting my current or future health care
- ☐ How to contact the Project leader to ask questions about the Project
- ☐ How to contact the Ethics Committee to make a complaint about the ethical conduct of the Project

2. I have been given a Participant Information Sheet describing all the above points, or someone has read it to me in a language I can understand.
3. I understand all the above points and have been able to ask questions about anything that is unclear.
4. I agree to receive care for my health from the pharmacist in this clinic.
5. I understand I do not have to pay money for this service.
6. I agree that my information collected by this Project can be used for the purposes described.
7. I freely give my consent for participation in the IPAC Project.
8. I understand that I will be given a signed copy of this document to keep.

(Participant) (Signature of Participant) (Date)

(Witness) (Signature of Witness) (Date)

(Team member) (Signature of Team member) (Date)

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Following IPAC patient consent…

- Patient to receive a written copy of Participant Information Brief & signed consent form
- Pharmacist to scan & forward signed consent forms to JCU
- Practice pharmacist to record consent in ACCHS CIS
- GRHANITE data extraction period specified
- All data will be de-identified

Pharmaceutical Society of Australia

Individual withdrawal

- Possible at any stage without consequence
- Pharmacist to record reason for withdrawal in logbook
- Data no longer collected by GRHANITE
- All records removed from CIS & logbook
- HRECs to receive information about patients who withdrew consent

Pharmaceutical Society of Australia

Documenting consent in the logbook

For first time patient entry in the logbook, pharmacist to enter:

- Patient ID (find this in the ACCHS CIS)
- Is patient over 18?
- Inclusion criteria that apply to this patient (CVD, Diabetes Mellitus, CKD, Other chronic condition)
- Patient initals

If consent is withdrawn, enter on the logbook home screen:

- Patient ID
- Reason for withdrawal

Pharmaceutical Society of Australia

Thank you!

MASTER PHARMACIST CONSENT FORM

Name of Project: *Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Project*

Name of Aboriginal Community Controlled Health Organisation: insert name of ACCHS
Project Leaders: Ms Dawn Casey, Mr Mike Stephens (NACCHO), Associate Professor Sophia Couzos (JCU), Ms Deb Bowden (PSA)
Evaluation Organisation: Evaluation Team led by the College of Medicine and Dentistry, JCU.
Project Sponsor: James Cook University (JCU)

1. The purpose of the Project, as outlined in the attached Pharmacist Participation Brief, has been explained, and I have had the opportunity to ask questions about the project.
2. I have the right to withdraw my consent and cease any further involvement in this Project at any time in accordance with my employment contract.
3. As the Practice Pharmacist employed by the ACCHS, I will participate in off-site and on-site training as required, delivered by a visiting facilitator from the PSA in consultation with NACCHO.
4. I will have access to the clinical information system and will utilise the information contained within to undertake my clinical duties, and to support the data collection required for this Project.
5. I will record participant data from consenting patients in the clinical information system, and also record activity in a Pharmacist Log-book as outlined in the Pharmacist Participation Brief.
6. I will participate in on-site support visits to assist our service to integrate my role into our health service team
7. I will participate in on-site visits and telephone interviews to facilitate data collection about our health service.
8. I will receive assistance from the ACCHS staff to obtain the written consent of individual participants in this Project.
9. Project staff and partners will ensure there is continuing consultation with me during the course of this Project.
10. I understand that if I have any complaints or questions concerning this Project I can contact any of the key contacts mentioned in the Pharmacist Participation Brief. This includes the St Vincent's Hospital Melbourne Human Research Ethics Committee with contact details as follows: Executive Office of Research, St Vincent's Hospital Melbourne, Tel: 03 9231 2394, or email: research.ethics@svhm.org.au
11. I understand I will receive a signed copy of this document and the Pharmacist Participation Brief to keep.

_____	_____	_____
(Pharmacist)	(Signature of Pharmacist)	(Date)
_____	_____	_____
(Witness)	(Signature of Witness)	(Date)
_____	_____	_____
(Team member)	(Signature of Team member)	(Date)

The ***IPAC Project*** is the *Integrating Pharmacists within ACCHSs to improve Chronic Disease Management Project (IPAC).* The Project Partners and Project Operational Team for the ***IPAC Project*** include: The National Aboriginal Community Controlled Health Organisation (NACCHO); Pharmaceutical Society of Australia, and the College of Medicine and Dentistry, James Cook University. *Evaluation Team* members include the Project Partners, and the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); Queensland Aboriginal and Islander Health Council (QAIHC); and the Aboriginal Medical Services Alliance in the NT (AMSANT). The Project Reference Group includes representatives of NACCHO, Affiliates and ACCHSs.

College of Medicine and Dentistry, James Cook University on behalf of the
National Aboriginal Community Controlled Health Organisation, and the
Pharmaceutical Society of Australia (IPAC Project Partners).
Douglas Parade, Townsville, Qld, 4812.
Tel: 07 47816062; Email: sophia.couzos@jcu.edu.au

MASTER PARTICIPANT INFORMATION BRIEF

INFORMATION SHEET
(THIS IS FOR YOU TO KEEP)

Title	*Integrating Pharmacists within Aboriginal Community Controlled Health Service (ACCHSs) to improve Chronic Disease Management Project (IPAC)*
Short Title	*Putting Pharmacists into ACCHSs*
Project Sponsor	*James Cook University*
Coordinating Investigators	*Associate Professor Sophia Couzos (JCU), Ms Deb Bowden (PSA), Mr Mike Stephens (NACCHO), Ms Dawn Casey (NACCHO)*
Evaluation Team	s47F *Dr Erik Biros (JCU), Dr Deborah Smith (JCU),* s47F
Location	

What is the IPAC Project?
Our Aboriginal Community Controlled Health Service [ACCHS] has put a Pharmacist in this clinic for 15 months as part of the IPAC Project. The Pharmacist will help people by talking with them about their medicines and health. In this project they will not give out medicines. They will be part of the clinic like other staff.

This Project will help the Government to know if ACCHSs should be given money for a pharmacist to stay on in the clinic like other staff.

Do I have to take part? How will it work?
You are invited to take part in this project. If you don't want to, you can say no. This will not affect your health care at this clinic. A doctor, nurse, or health worker will ask some people coming to this clinic if they want to see the Pharmacist to help them with their medicines. A staff member will tell you about this Project and ask if you want to take part. You will then be asked to sign a consent form. You may see the Pharmacist straight away or make an appointment for a later time.

The Pharmacist will ask you about your medicines and your health. This is to find out how to make it easier for you to take the right medicines. The pharmacist will work with the doctor and other staff about your medicines, and will see you again to help you as much as possible. You can still see the Pharmacist even if you say no. If you decide to take part and later change your mind, you can withdraw from the project at any time. You can tell the Pharmacist or a staff member in the ACCHS that you no longer wish to take part.

Who is running the Project?
Aboriginal leaders in many organisations have all supported this Project. This ACCHS has said how this Project will run in this clinic.

Ethics approval has been received from the St Vincent's Hospital Melbourne Human Research Ethics Committee and this means that the project has been checked as safe and fair for people living in this part of Australia. This and other committees will watch over this Project. Aboriginal leaders and peoples from ACCHSs involved in this Project are also watching over this Project.

College of Medicine and Dentistry, James Cook University on behalf of the
National Aboriginal Community Controlled Health Organisation, and the
Pharmaceutical Society of Australia (IPAC Project Partners).
Douglas Parade, Townsville, Qld, 4812.
Tel: 07 47816062; Email: sophia.couzos@jcu.edu.au

Who can be in this Project?

People coming to this ACCHS for a good while can be part of it if they are over 18 years of age, and if they have a health condition like diabetes, heart disease or other disease that means they need to take a lot of medicines. To be part, you must be able to show that you understand and agree that information about your health will be collected when seeing the Pharmacist.

What does taking part in this Project involve?

If you agree to take part, you will be seen by the Pharmacist in the clinic who will check your medicines and make sure they are the right ones for you. They will ask if you would like a full check of your medicines in the clinic, or at home, or a place that is best for you. The Pharmacist will listen to you and help you to get what you need

You can see the Pharmacist as many times as you like, whenever you like, and to ask for help about anything to do with your medicines. The Pharmacist will check how you are going, and may ask to see you in again. You will not need to pay any money for this service.

How will information be collected?

The information we need will already be in your clinic health record. It will just be copied from the record and include information from 12 months before you saw the pharmacist and information after you saw the pharmacist. No information about your name, date of birth, Medicare number, or any other personal information, or who you are, will be copied from your records. Your information will just be given a number and not a name. Information will be collected about your health, prescriptions, clinic visits, and Medicare information. Some information about people like their gender, age, Aboriginality, being a pensioner, and if they smoke will also be collected. The information that is collected will only be used for this project.

Are there any risks or benefits to me from taking part?

The Pharmacist is a qualified and registered health professional who has also been trained to work in this ACCHS. The risks are the same as if you saw a Pharmacist in a Pharmacy, except that you will be seeing them in this clinic.

Who can I talk to for more information or to make a complaint?

If you would like to know the results of this project or if you have any worries you can talk to staff at ACCHS. If you have any other worries, or need more information or would like to make a complaint, you can contact the NACCHO Project Lead: Mike Stephens, Tel: 02 6246 9300; Email: mike.stephens@naccho.org.au. Other Project staff to contact include: Deb Bowden from the Pharmaceutical Society of Australia: Tel: 02 6283 4740; Email: Deb.Bowden@psa.org.au. You can also contact the NACCHO Deputy Chief Executive Officer: Ms Dawn Casey at dawn.casey@naccho.org.au.

You can contact the Ethics Committee with any concerns about the safety and fairness of the Project at: Executive Office of Research, St Vincent's Hospital Melbourne, Tel: 03 9231 2394, or email: research.ethics@svhm.org.au:

Thank you on behalf of the IPAC Project Team.

The ***IPAC Project*** is the *Integrating Pharmacists within ACCHSs to improve Chronic Disease Management Project (IPAC).* The Project Partners and Project Operational Team for the ***IPAC Project*** include: The National Aboriginal Community Controlled Health Organisation (NACCHO); Pharmaceutical Society of Australia, and the College of Medicine and Dentistry, James Cook University. ***Evaluation Team*** members include the Project Partners, and the Victorian Aboriginal Community Controlled Health Organisation (VACCHO); Queensland Aboriginal and Islander Health Council (QAIHC); and the Aboriginal Medical Services Alliance in the NT (AMSANT). The Project Reference Group includes representatives of NACCHO, Affiliates and ACCHSs.

Appendix 7. Ten (10) Core Pharmacists roles in the IPAC project

SUMMARY OF PRACTICE PHARMACISTS CORE ROLES

Core Role #	Focus	Theme	Core activity	Process*	Output/Outcome
1 (a)	Patient	**Medication Management Reviews**	**Pharmacist reviews the medication the patient is taking. The pharmacist initiates and facilitates a medication management review- which may be a Home Medicines Review (HMR) or a non-HMR (medication management review not conducted in the patient's home)**	Targets HMR and Non-HMR for participants (*as per patient inclusion criteria)*.	Medication optimisation, Direct improvement in biometric data, Reduction in inappropriate polypharmacy, Number and type of recommendations made in the medication management plans and to prescribers.
1 (b)	Patient		**Pharmacist reviews the patient who had a HMR after 12 months and a Non-HMR after 3-6 months.**	Undertakes participant-follow up	Outcomes as above
1 (c)	Patient		**Pharmacist ensures the MMR is claimed by the practice when completed (as a DMMR item 900 or RMMR item 903)**	Pharmacist will work with the practice staff to support MBS claims.	Increased claims for DMMR
2	Patient and practice	**Team-based collaboration**	**Pharmacist participates in clinic activities that support team-based chronic disease care plans, and cardiovascular (CV) risk assessment**	Contributes to clinic efforts to undertake GP Management care plans (GPMP), and efforts to measure and stratify CV risk	Improved chronic disease management (GPMP), Improved CV risk assessment, Team-based care is enhanced.
3 (a)	Patient	**Medication adherence assessment & support**	**Pharmacist assesses the medication adherence of the patient being seen**	Conducted at first and subsequent consultations of participants (eg those having an HMR/non-HMR, and/or those being assessed for other reasons)	Improved participant adherence; Increased participant visits and generation of prescriptions for participants; Direct improvements in biometric data
3 (b)	Patient		**Pharmacist improves the patient's experience with their medicines**	Uses appropriate strategies to support chronic disease self-management (self-care) and medication adherence	Improved participant experience and adherence; New resources to Improve patient health literacy about self-care and/or medicines use
4	Patient and Practice	**Medication appropriateness audit**	**Pharmacist assesses 'medication appropriateness and underutilisation of medicines' as an audit of a sample of patients with chronic disease.**	A sample of 30 participants are audited using MAI tool and are assessed for the underutilization of medicines.	Improvements in prescribing (medication appropriateness) and reduction in suboptimal prescribing.

5	Patient and practice	**Preventative health care**	**Pharmacist provides preventive interventions to patients**	Pharmacist uses the opportunity to promote preventive interventions with every participant contact.	Improved recording of smoking status and improved result; Mapping the interactions participants have and other healthcare providers have with the practice pharmacist
6	Practice	**Drug Utilisation Review**	**Pharmacist conducts a DUR to audit and improve a priority issue at the service**	A DUR (ie a quality assurance activity) is conducted after identifying a priority issue within the ACCHS. Interventions are recommended in collaboration with the practice staff.	The DUR improves the standard of care at the practice.
7	Practice	**Education and training**	**Pharmacist conducts education sessions at the service**	Co-designed with ACCHS	Description of this specific activity. Additional information from focus groups with staff can elicit if staff felt their learning had improved.
8	Practitioner	**Medicines information service**	**Pharmacist provides medicines related information to staff within the service and responds to clinician medicines enquiries.**	Ad hoc provision of advice to clinical staff about medications. E.g. PBS queries, dose titration, interactions, new and emerging drugs, out of stock, etc	Description of this specific activity. Pharmacist may describe evidence of an outcome in the logbook. Additional information from focus groups with staff can elicit if staff felt they were supported.
9	System	**Medicines stakeholder liaison**	**Pharmacist develops a written <u>stakeholder liaison plan</u> supporting engagement with community pharmacies.**	A written plan will support the provision of referrals and communication of all relevant patient information (such as for HMRs) with community pharmacy	Descriptive. Pharmacist may describe evidence of an outcome in the logbook.
10	System	**Transitional care**	**Pharmacist facilitates care coordination with relevant hospitals; residential aged care facilities, etc.**	Adhoc care coordination to ensure seamless care across community and hospital settings by relaying all relevant information including contact details, current medications list, management plan, monitoring requirements	Improved transitional care communication. Improved discharge summary management and medicines reconciliation.

**#* *References to the term 'patient' refers to general interactions and activities with those patients attending the ACCHS. The Practice Pharmacist will be attending to 'patients' as well as 'participants'. The term 'participant' refers specifically to patients who have consented to participate in this Project. Deidentified data will only be collected with regard to 'participants'.*

Pharmaceutical Society of Australia

Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Core Role 1 - Medication Management Reviews

NATIONAL ABORIGINAL COMMUNITY CONTROLLED HEALTH ORGANISATION
NACCHO

JAMES COOK UNIVERSITY AUSTRALIA

PSA is the peak national body for pharmacists

Pharmaceutical Society of Australia

Medication Management Review - Background

- Low HMR uptake
- ACCHSs provide few HMR referrals
- Potential for HMRs or medication management reviews conducted within the ACCHS

Pharmaceutical Society of Australia

Potential barriers to HMRs

HMR may be inappropriate in certain circumstances…

- No fixed address
- Not opportunistic
- Culturally inappropriate
- Travel challenges
- Language barrier

Pharmaceutical Society of Australia

More potential barriers…

- Need for visual or learning resources
- No accredited pharmacist available
- Accredited pharmacist has reached HMR cap
- Patient preference
- A HMR is not appropriate for other reasons

Pharmacists within the ACCHS

- Deliver holistic medication management services
- May undertake medication management reviews in alternate settings
- Able to conduct a ‘Non-HMR’
- Anticipate improvement in biometric data, medication optimisation & reduction in inappropriate polypharmacy

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HMR patient inclusion criteria

6CPA Program rules:

- Taking 5 or more regular medications
- Taking >12 doses of medication per day
- Significant changes made to medication treatment regimen in the last three months

- Medication with a narrow therapeutic index or medications requiring therapeutic monitoring

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HMR patient inclusion criteria…

- Symptoms suggestive of an adverse medicine reaction
- Sub-optimal response to treatment with medicines
- Suspected non-adherence or inability to manage medication related therapeutic devices
- Patients having difficulty managing their own medicines
- Patients attending a number of different doctors
- Recent discharge from a facility/hospital (within 4 weeks)

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HMR Service eligibility criteria

- The patient is living in a community setting
- The patient is at risk of or experiencing medication misadventure
- Identifiable clinical need and the patient will benefit from a HMR Service

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Initiation of the Medication Management Review

Once a patient has been identified for a HMR, the practice pharmacist:

- Will initiate and facilitate the medication management review
- May refer HMR to external provider
- May personally conduct the HMR, either within or outside IPAC project hours

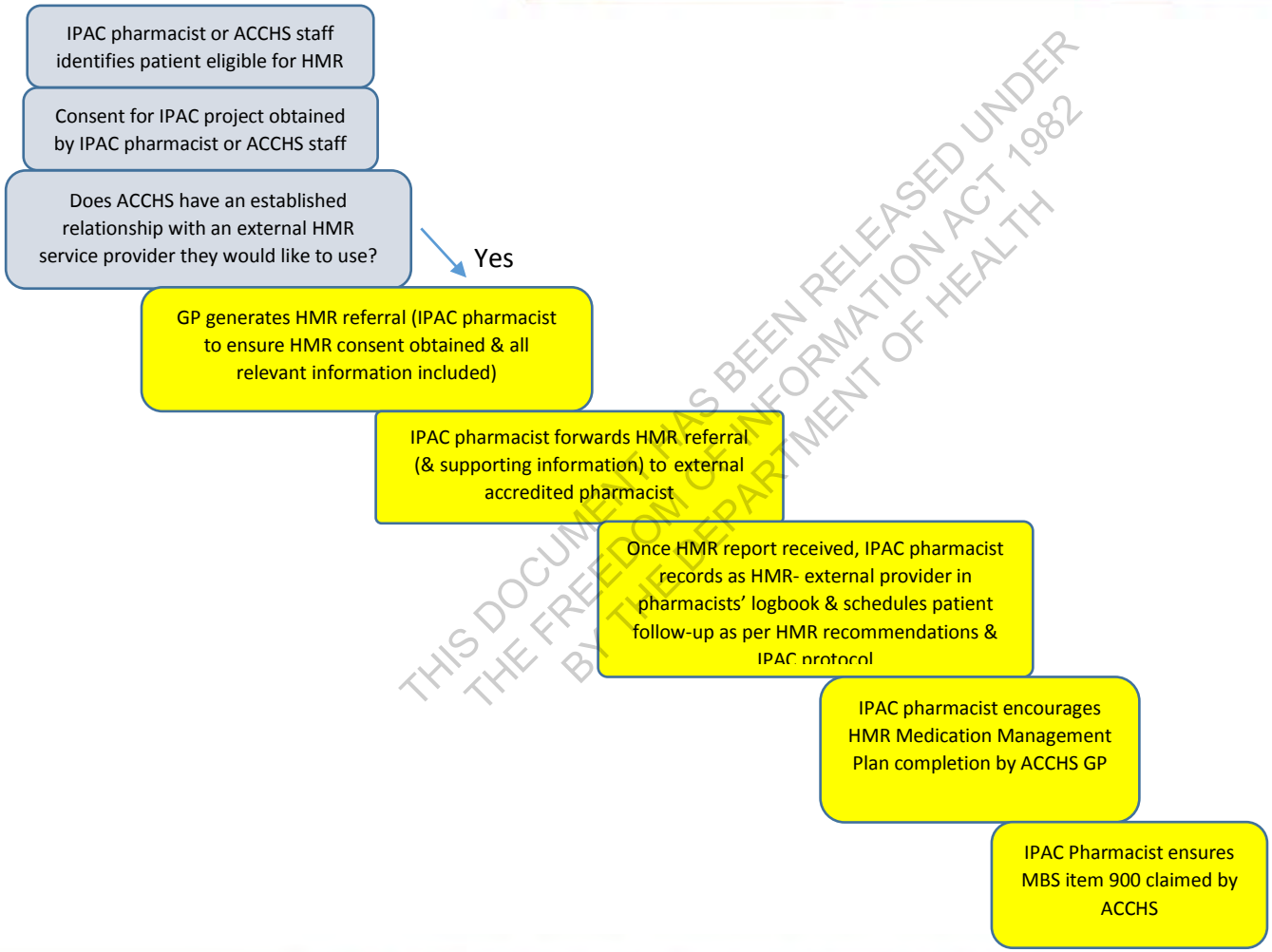
Pharmaceutical Society of Australia

If HMR has been conducted by an external pharmacist

The practice pharmacist will:

- Follow up to ensure receipt of HMR report
- Encourage GP to prepare Medication Management Plan to enable MBS item 900 claim by ACCHS
- Record details of the HMR in the pharmacists' electronic logbook
- An flagged entry in the ACCHS CIS is not required, but remember to write in patient's progress notes

IPAC project HMR conducted by external provider



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If HMR to be conducted by the practice pharmacist within IPAC project hours…

- Seek IPAC Project & consent & HMR referral
- Liaise with the patient & AHW
- Conduct HMR (must be accompanied) & provide HMR report
- Discuss recommendations with the prescriber & document in ACCHS CIS
- Record details of HMR in the pharmacists' electronic logbook
- A flagged entry in the ACCHS CIS is <u>not</u> required, but remember to write in progress notes

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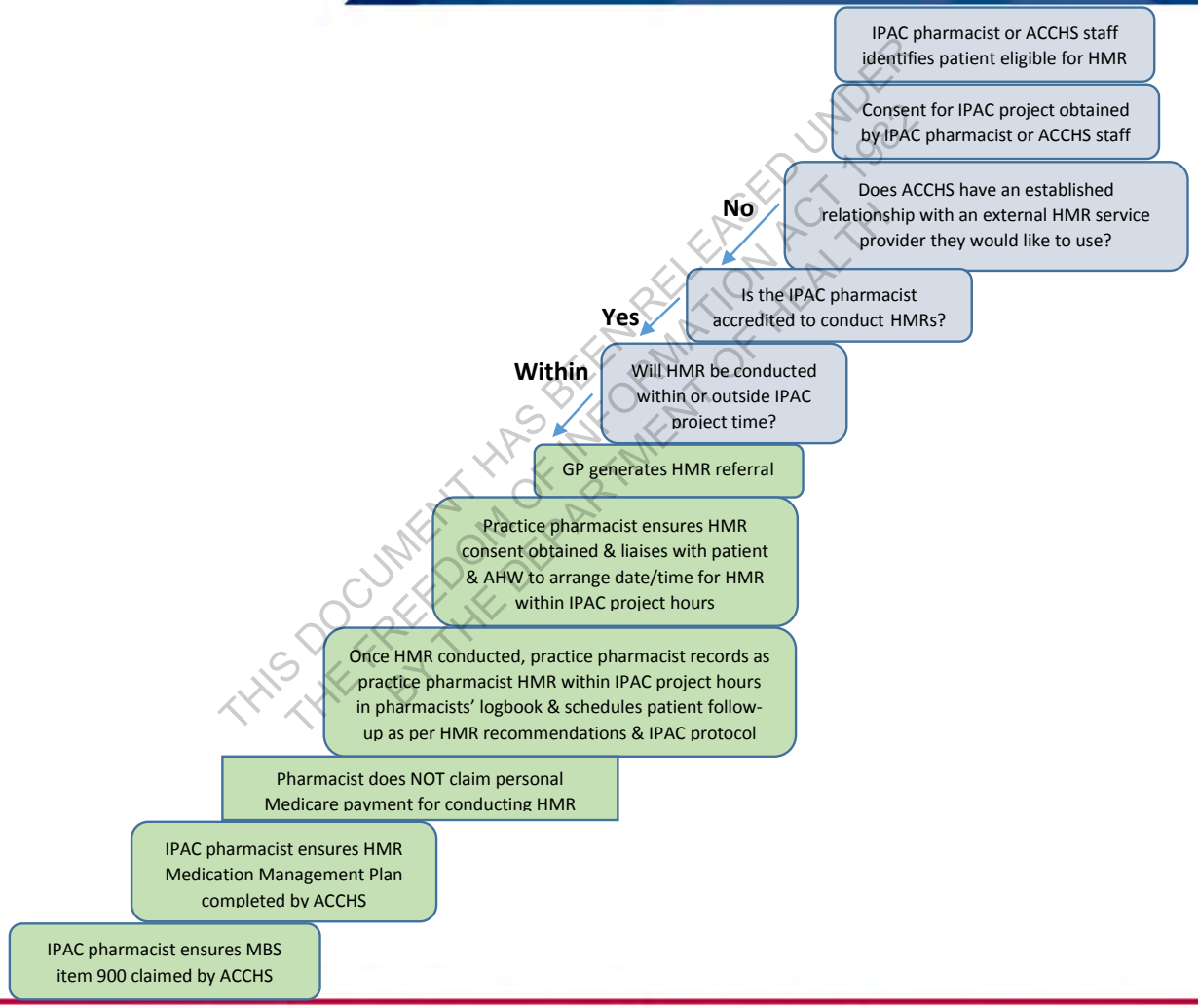
Upon completion of the HMR by the practice pharmacist within IPAC project hours

- Encourage GP to prepare Medication Management Plan to enable MBS item 900 claim by ACCHS
- Practice pharmacist will NOT claim individual payment from 6CPA
- Schedule patient follow-up
- Consider adding patient recall if necessary

IPAC project HMR conducted by practice pharmacist within IPAC project hours



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If HMR is to be conducted by the practice pharmacist outside IPAC project hours

- Seek IPAC Project consent & HMR referral
- Liaise with the patient & AHW
- Conduct HMR & provide HMR report
- Discuss recommendations with prescriber & document in ACCHS CIS
- Record details of HMR in the pharmacists' electronic logbook
- A flagged entry in the ACCHS CIS is <u>not</u> required

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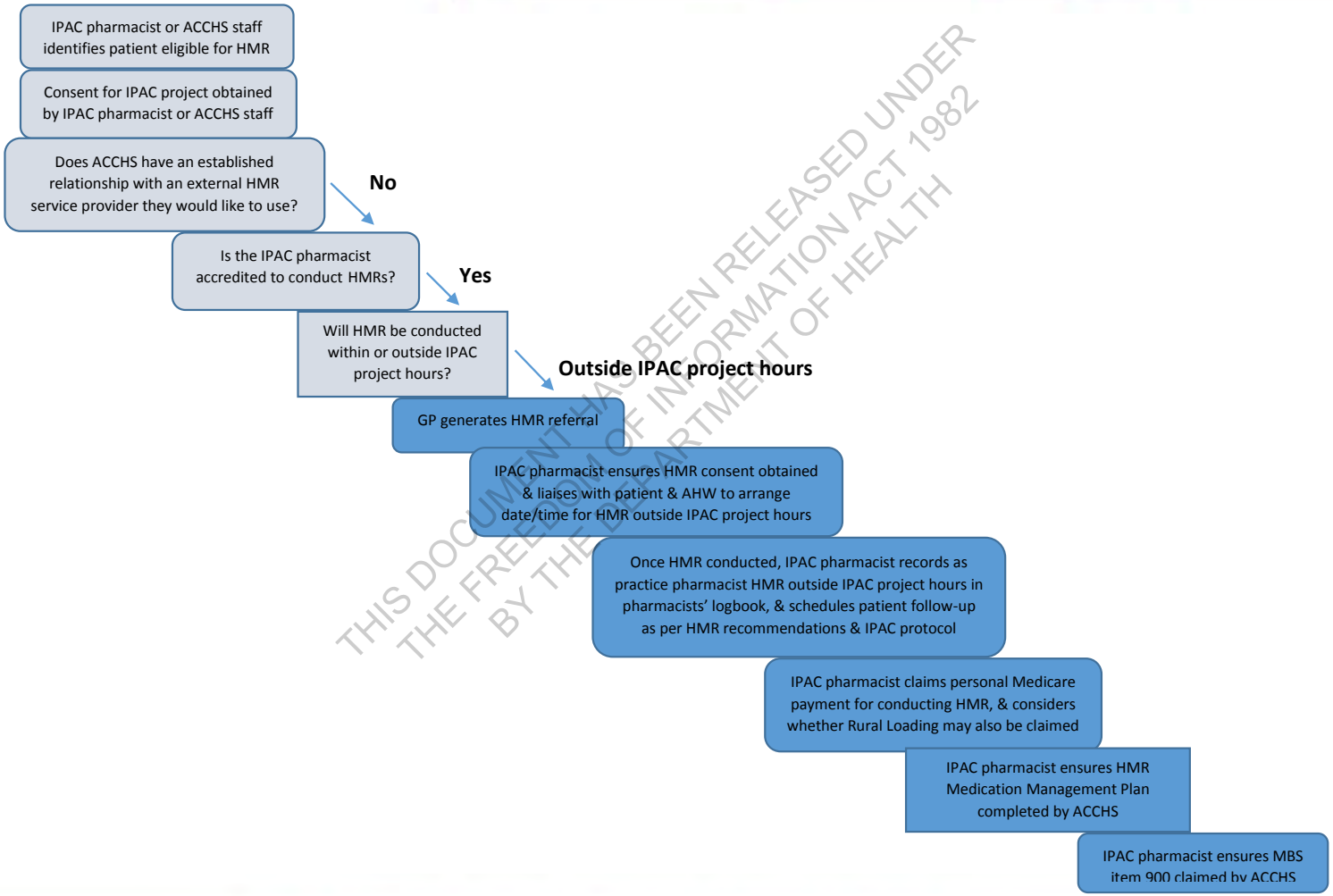
Upon completion of the HMR by the practice pharmacist outside IPAC project hours

- Encourage GP to prepare Medication Management Plan to enable MBS item 900 claim by ACCHS
- Practice pharmacist can claim individual payment from 6CPA
- Consider Rural Loading claim
- Schedule patient follow-up
- Consider adding patient recall if necessary

IPAC project HMR conducted by practice pharmacist outside IPAC project hours



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Exemption criteria for repeat HMR

- Discharge from hospital after an unplanned admission in the previous 4 weeks
- Significant change to medication regimen in the past 3 months
- Change in medical condition or abilities (including falls, cognition, physical function)
- Prescription of a medicine with a narrow therapeutic index or requiring therapeutic monitoring

Exemption criteria for repeat HMR…

- Presentation of symptoms suggestive of an adverse drug reaction
- Sub-therapeutic response to therapy
- Suspected non-adherence or problems with managing medication-related devices
- Risk of, or inability to continue managing own medicines due to changes in dexterity, confusion or impaired vision

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Recording details of the HMR in the logbook

- Patient ID
- Date of HMR
- Date of data entry
- What were the reasons for choosing to do this medication review (HMR)?
- Was this HMR conducted by the practice pharmacist or an external pharmacist?
- If the HMR was conducted by an external pharmacist, what was the reason for referring this HMR to an external pharmacist?
- If the HMR was conducted by an external pharmacist, what assistance did you provide to this pharmacist?

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Recording details of the HMR in the logbook…

- If the HMR was conducted by the practice pharmacist, was this HMR conducted within or outside IPAC service hours?
- If the HMR was conducted by the practice pharmacist, what was the time taken to complete the HMR?
- Was there a prescribing omission for this patient?
- List the medication-related problems identified from this HMR
- After completing the HMR, what were the recommendations?

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Recording details of the HMR in the logbook…

- After completing the HMR, were the recommendations discussed with the prescriber?
- What recommendations were agreed?
- What recommendations were rejected?
- Is the HMR complete?
- Did the practice generate MBS item 900 for this service?

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What is a Non-HMR?

- Comprises some or all the elements of a HMR
- Allows for an opportunistic medication review
- Does not require a referral
- If clinical need exists, may be considered for patients ineligible for HMR…

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Reasons for choosing a Non-HMR

- Project pharmacist is not accredited & no available external HMR provider
- HMR capping of 20/month has been reached
- The patient does not meet criteria for repeat HMR
- Patient preference
- The patient is at risk of forgoing a HMR if not conducted opportunistically

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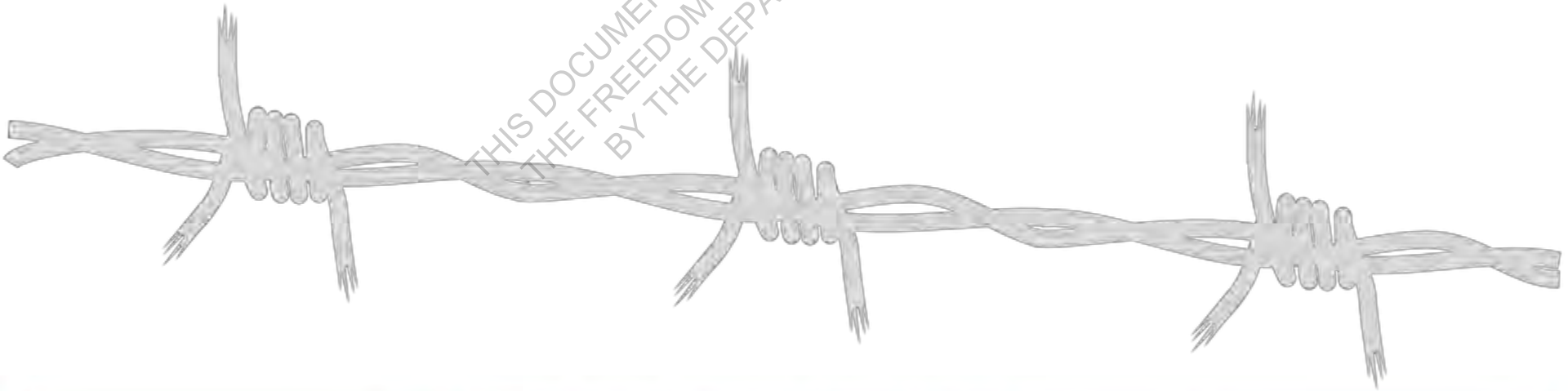
More reasons for choosing a Non-HMR

- Home visit is culturally inappropriate
- Travel challenge
- Language communication barrier
- Need for visual or learning resources
- A HMR is not appropriate for other reasons…



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Criteria for Non-HMR

- An interactive face-to-face or telehealth interview
- Collection of patient-specific data
- Compilation of a comprehensive medication profile
- Assessment of the medication profile to identify medication-related problems
- Conduct Assessment of Underutilisation (AOU)

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Criteria for Non-HMR…

- Prioritising a list of medication-related problems
- Recommendations made & documented in the ACCHS CIS
- A formal HMR report is not required
- Recommendations discussed with the prescriber

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Recording the details of a Non-HMR in the pharmacists' electronic logbook

- Patient ID
- Date of Non-HMR
- Date of data entry
- What were the reasons for choosing to do this medication review (Non-HMR)?
- At what location was the Non-HMR conducted?
- What was/were the reason(s) for choosing a Non-HMR over a HMR
- Was there a prescribing omission for this patient?

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Recording the details of a Non-HMR in the pharmacists' electronic logbook…

- Check that all criteria for the Non-HMR have been completed
- List of medication-related problems identified from this Non-HMR
- After completing the Non-HMR, what were your recommendations?
- After completing the Non-HMR were your recommendations discussed with the prescriber?
- Is your Non-HMR complete?
- Pop-up reminder to record Non-HMR in CIS
- Time taken to complete the Non-HMR

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Recording the Non-HMR in the ACCHS CIS

- Pop-up reminder will appear in logbook to prompt recording of 'Non-HMR' in ACCHS CIS
- Use code 'Non-HMR', as per the Procedures for Communicare & Best Practice
- GRHANITE will extract 'Non-HMR' code data from CIS for evaluation

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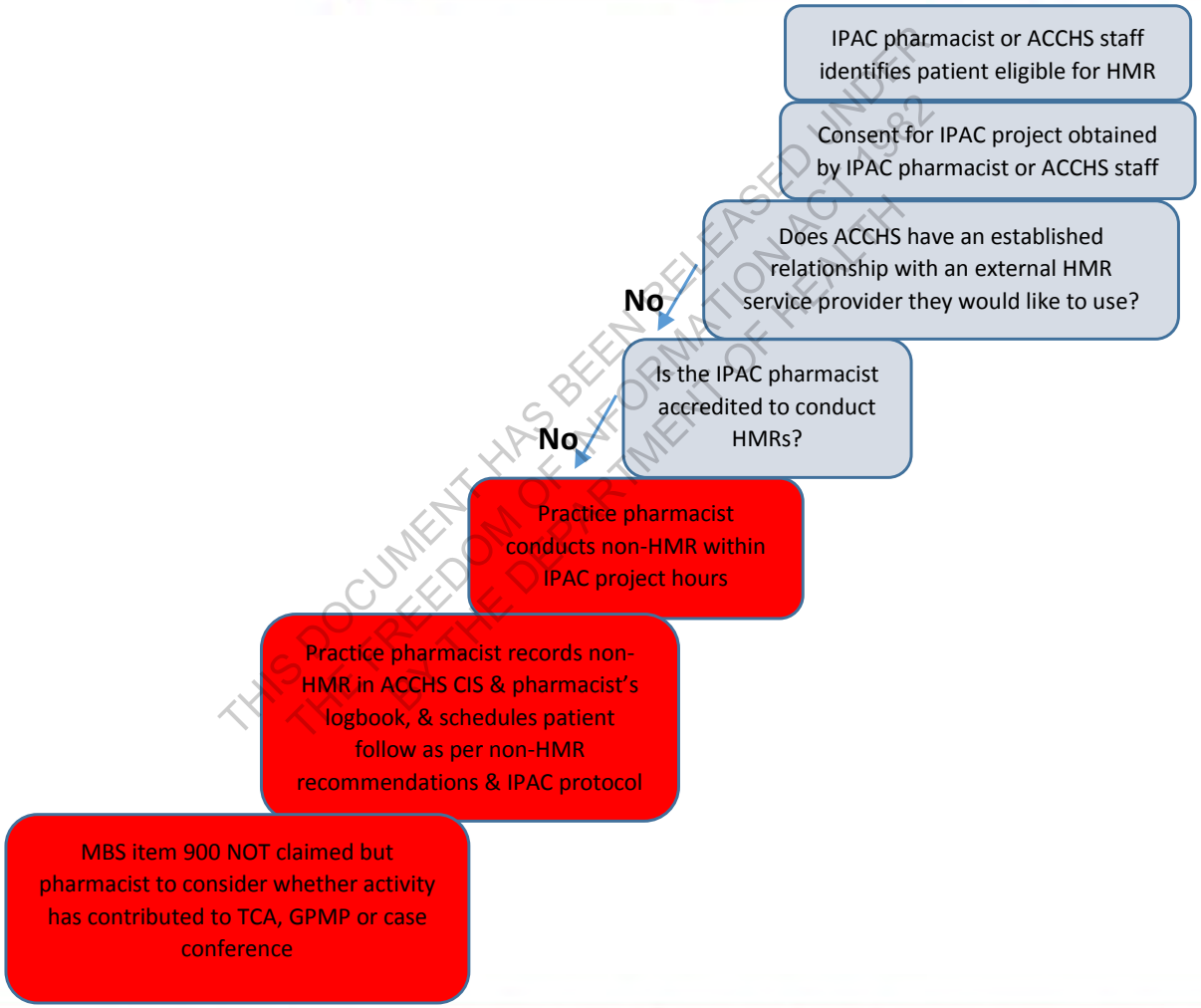
Non-HMRs & team-based collaboration

- Practice pharmacist cannot claim personal Medicare payment
- ACCHS cannot claim MBS item 900
- BUT consider whether the Non-HMR may have contributed to other MBS-claimable items
- GRHANITE will extract data measures of health service utilization directly from the ACCHS CIS

IPAC project Non-HMR conducted by practice pharmacist



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Follow-up after a HMR or Non-HMR

- Reinforcement of advice and recommendations
- Monitoring the impact of actions arising from the HMR or Non-HMR
- Assessment of the need for future pharmacist activity

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Record details of the Non-HMR or HMR follow-up in the electronic logbook

- Is the follow-up to a HMR or Non-HMR
- Patient ID
- Date of follow-up
- Date of data entry
- At what location was the follow-up conducted?
- What did the follow-up include?
- After completing the follow-up, were your recommendations discussed with the prescriber?
- Time taken to complete the follow-up

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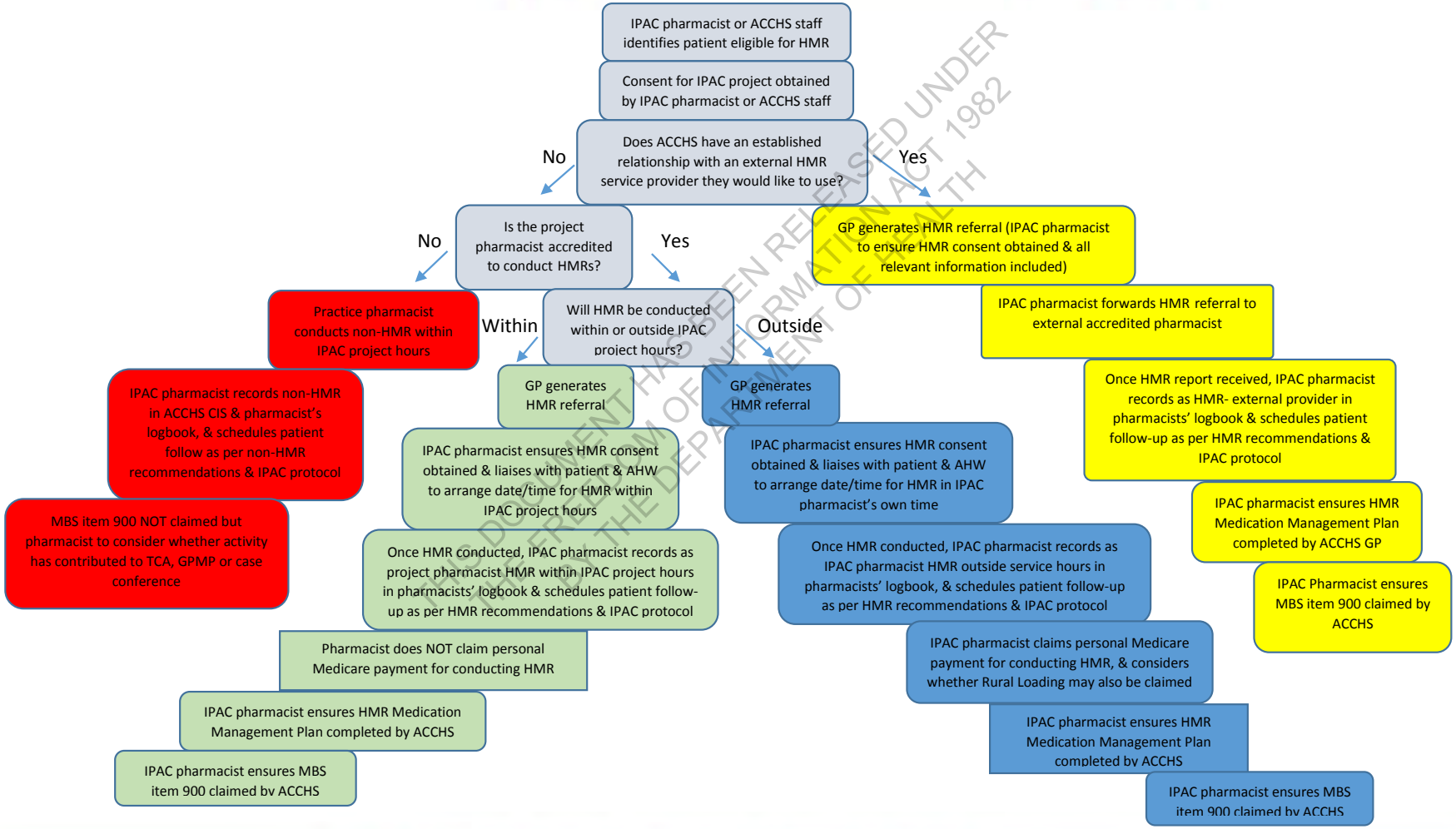
IPAC Project HMR Model



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Thank you!

IPAC Project

Guidelines for the provision of Home Medicines Reviews

Identification of eligible patients

Identification of patients eligible for a HMR will be undertaken by the practice pharmacist or another member of the ACCHS clinical team. Determination of patient eligibility will follow the HMR Program Rules as specified by the 6CPA. Priority will be given to selection of IPAC Project consented 'regular' patients aged 18 years or over with one or more of the following chronic diseases:

- Cardiovascular Disease
- Diabetes
- Chronic Kidney Disease

HMR process

The practice pharmacist will first consider whether the ACCHS has an existing relationship with an external HMR provider. If so, the practice pharmacist will support this relationship by seeking the HMR referral from the GP at the ACCHS & forwarding this, along with any necessary supporting documentation, to the external HMR provider. The IPAC Project pharmacist will encourage the ACCHS GP to complete a Medication Management Plan following receipt of the HMR report to enable the ACCHS to claim MBS item 900 payment

If there is not an existing external relationship for provision of HMR services, and the IPAC Project pharmacist is accredited to conduct HMRs, the IPAC Project pharmacist may conduct the HMR either within or outside IPAC Project service hours.

HMRs conducted outside IPAC Project service hours

The IPAC Project pharmacist will only claim personal payment under the 6CPA if the HMR has been conducted outside IPAC Project service hours. In this situation the IPAC Project pharmacist will also encourage the ACCHS GP to complete a Medication Management Plan following receipt of the HMR report to enable the ACCHS to claim MBS item 900 payment.

HMRs conducted within IPAC Project service hours

It is important to note that regulatory requirements for GPs when claiming payment for MBS item 900 (DMMR/HMR) differ to those relevant to pharmacists under the 6CPA HMR Program Rules.

Recent clarification of the criteria (see here) for MBS item 900 payment to GPs has confirmed that, while the patient's home remains the preferred location for a HMR, an accredited pharmacist may conduct a HMR for an Aboriginal or Torres Strait Islander patient at a location other than the patient's home. Benefits for a HMR service under MBS item 900 are payable to GPs once in each 12 month period, except where there has been a significant change in the patient's condition or medication regimen requiring a new HMR.

While a HMR referral remains necessary, this enables opportunistic HMRs to be conducted in the clinic or another location preferred by the patient, & for the referring GP to claim payment for MBS item 900 upon receipt of the formal HMR report & subsequent completion of the Medication Management Plan.

In such circumstances the accredited IPAC Project pharmacist must forego personal payment for the HMR under the 6CPA, for the following reasons;

- The pharmacist will be working within IPAC Project service hours
- The 6CPA HMR Program location rules relevant to pharmacists have not been met (ie. no prior written approval granted from 6CPA to conduct the HMR at an alternate location)

For reasons of personal and cultural safety the IPAC Project pharmacist must be accompanied by a member of the ACCHS team (eg. an Aboriginal Health Worker) when conducting Home Medicines Review at locations other than the clinic.

IPAC project criteria for non-HMR

Core role 1 for pharmacists in the IPAC project relates to the provision of Medication Management Reviews. For this core activity, the pharmacist initiates and facilitates a Medication Management Review, which may be either a Home Medicines Review (HMR) or a non-HMR.

The IPAC protocol defines a non-HMR as comprising some or all the elements of a HMR, but not fulfilling all relevant MBS HMR criteria (see here). A non-HMR allows for an opportunistic medication review without a referral from the patient's GP.

Patients for whom a HMR has been conducted within the last 12 months, but who do not meet the exemption criteria for repeat HMR, may be considered for a non-HMR if clinical needs exists. Similarly a patient may have a HMR conducted & then followed by one or more non-HMRs (& vice-versa). A single patient may have several non-HMRs conducted over the 15 months of the IPAC project.

Criteria for a non-HMR should include:

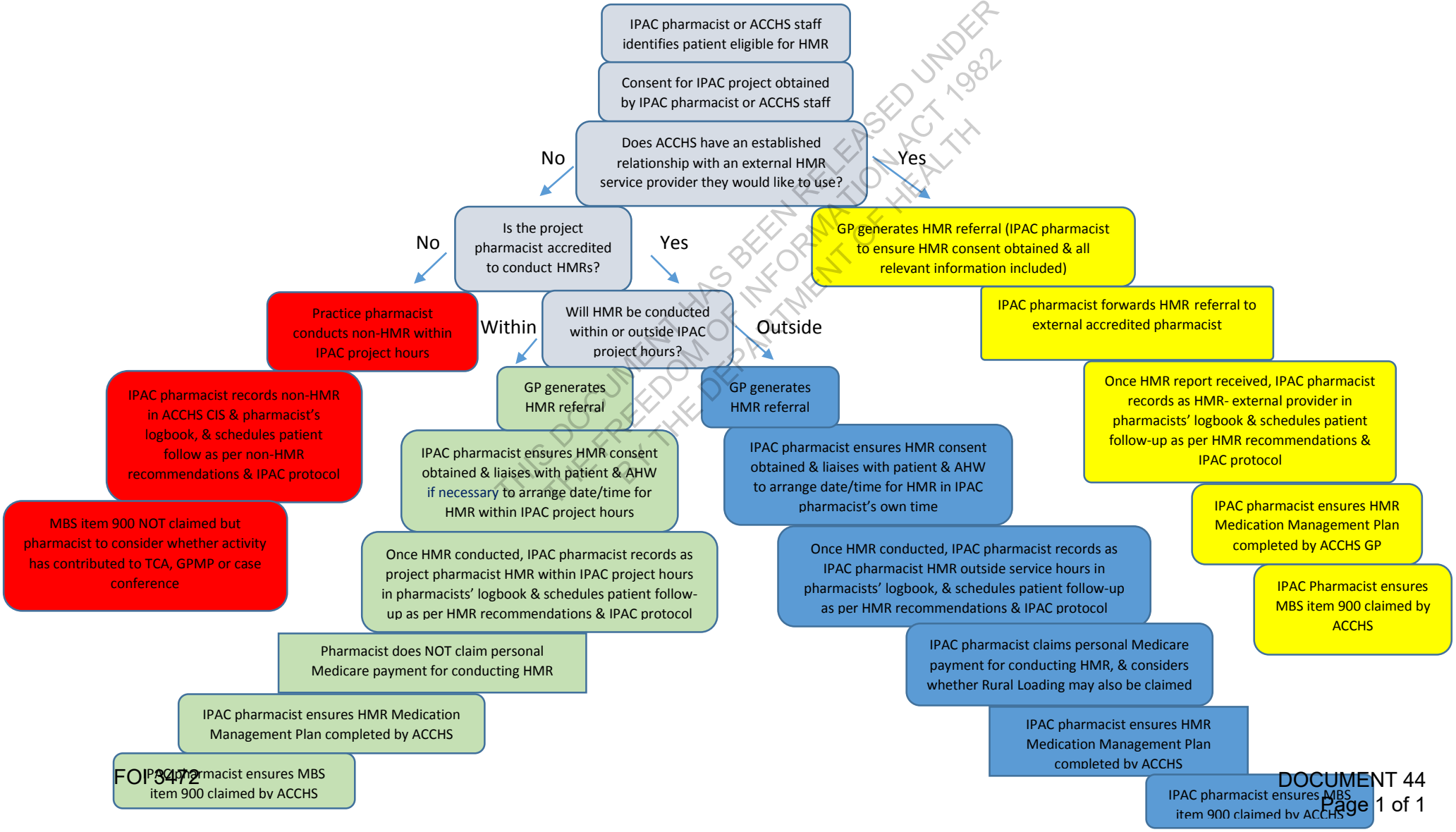
- An interactive face-to-face or telehealth interview with the patient (& caregiver, AHW as deemed appropriate)
- Collection of patient-specific data such as demographic and/or personal information, relevant social history, medical history, consumer assessment (eg. frailty, vision, hearing, swallowing, falls risk, balance, cognition, memory, mood, gait, mobility or dexterity)
- Compilation of a comprehensive medication profile (this may include information gathered from various sources such as the patient, carers, other health care providers, ACCHS patient profile, dispensing history, lab test results & hospital admission or discharge summaries)
- Education of the patient about their medicines in response to assessed needs at the interview
- Assessment of the medication profile to identify medication-related problems, including problems identified by the patient
- Prioritising a list of medication-related problems – it is optimal that these be discussed with the patient during the interview if possible
- Recommendations made & documented in the ACCHS clinical information system to resolve medication-related problems with the patient, caregiver and prescriber
- Recommendations discussed with the prescriber

As per the IPAC protocol, the project pharmacist will schedule patient follow-up 3-6 months after completion of the non-HMR. Criteria for follow-up should include:

- Reinforcement of advice and recommendations provided by the pharmacist (and GP if appropriate) at the non-HMR
- Monitoring of the impact of any actions arising from the non-HMR
- Assessment of the need for future pharmacist activity (eg another non-HMR, HMR, education session, preventive intervention)

The collection of non-HMR data will inform the evaluation of core roles #1-3. Information on core roles #1-3 can be sourced from GRHANITE which enables non-HMR encounters to be linked to the CIS study measures. Further information related to the provision of non-HMRs will also be captured in the pharmacists' logbook.

IPAC project HMR model



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Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Core Role 2 - Team-based collaboration

NATIONAL ABORIGINAL COMMUNITY CONTROLLED HEALTH ORGANISATION
NACCHO

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Background of ACCHSs

- First established in 1971
- Operated by the local Aboriginal and Torres Strait Islander community
- Culturally safe environments that support an Aboriginal patient's sense of choice and power

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The ACCHS primary healthcare team

- A doctor working in a ACCHS may call on specialist skills of several allied health workers through the MBS
- Pharmacists not currently included in MBS list of allied health providers for provision of CDM services
- May act as a barrier to optimising quality of care

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Pharmacists within ACCHSs

- Integrate within the ACCHS, immerse in the ACCHS model of care
- Become member of primary healthcare team
- Provide patients, staff and health service with valuable skills
- Assist individual patients with medication needs & support chronic disease care
- Play important role in assisting the ACCHS with the range of medicines related health policies and programs

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Pharmacist participation in team-based activities

- Clinic activities (e.g. clinical meetings) which support team-based care to improve CDM
- Requires understanding of MBS, in particular GPMP, TCA & claiming for services provided to Aboriginal and Torres Strait Islander patients
- Activities which improve cardiovascular (CV) risk assessment by supporting clinic efforts to measure & stratify CV risk

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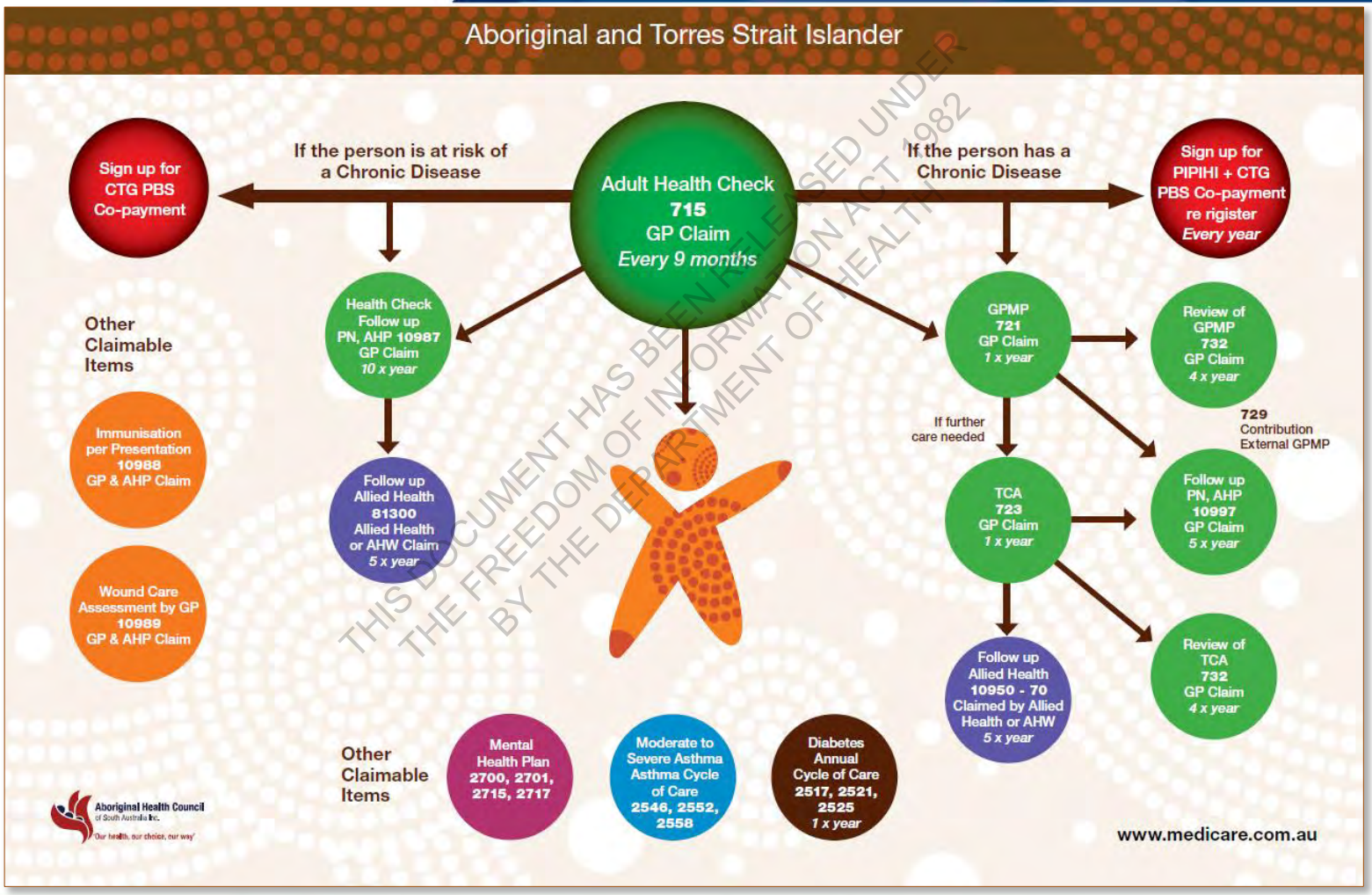
MBS Flow Chart for Chronic Disease



Recording team-based activities

- Record details of collaborative activities in the patient's progress notes in the CIS electronic health record
- Data related to MBS claims history will be extracted by GRHANITE
- Use logbook to capture pharmacist involvement in team-based care

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Thank you!

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Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Core Role 3 (N-MARS) - Medication adherence assessment & support

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Medication adherence assessment & support

- Medication adherence is central to good health outcomes
- Adherence for many people with chronic disease is extremely poor
- Economic costs of non-adherence are high

- Many factors may contribute to reduced medication adherence in Aboriginal and Torres Strait Islander populations

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Assessment of medication adherence - Background

Several types:

- Self-reported measures
- Direct measures
- From pharmacists
- Electronic measures such as secondary database analyses
- Biomedical measures (eg. blood pressure)

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NACCHO – Medication Adherence Responses Scale (N-MARS) patient survey

- New!
- Aboriginal-specific self-reporting measure of medication adherence
- Tested for clinical sensitivity and content validity
- Comprises 11 Yes/No questions plus 1 requiring a numeric answer

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N-MARS patient survey questions

- Culturally appropriate and suitable to the Aboriginal and Torres Strait Islander patient context
- Supplement the use of electronic measures of adherence
- Help prescribers and pharmacists to identify modifiable factors affecting patient adherence
- Used to inform strategies for health staff to assist individual patients to overcome barriers to adherence

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N-MARS patient survey
Question 1 Explores the *extent* to which doses are missed

The first part of this question requires a Yes/No answer, while the second part requires a numeric response between 0-7

Q1	Did you forget to take any of your medicines yesterday?		
	Explore: How many days in the last week have you taken this medication? (Response = number 0-7)]		

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N-MARS patient survey
Questions 2- 11 Explore *reasons* for non-adherence

Q2	Is it hard for you to remember to take your medicines?	Yes	No
Q3	Do you know when, and how, to take your medicines?		
Q4	Is it hard for you to take your medicines in the right way? (like the Dr/Nurse/AHW said)		
Q5	Do you feel that taking your medicines will be good for your health?		
Q6	Do you sometimes take less medicine to make the medicine last longer?		
Q7	Do you sometimes stop taking your medicines because you think you are ok?		
Q8	Do you sometimes stop taking your medicine because you think it might make you sick?		
Q9	Do you sometimes miss taking your medicine or 'run out' because it costs too much, or it is hard to get more?		
Q10	Do you sometimes run out of medicines because you give them away or share them with other people?		
Q11	Do you go without your medicines when you are away from home?		

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Completing & recording the results of the N-MARS patient survey

- Each participant enrolled in the IPAC project will be asked the twelve questions included in the N-MARS survey
- Survey conducted at least twice for each participant
- The more N-MARS assessments the better!
- Pharmacist to record N-MARS answers in the electronic logbook
- Pharmacist also to record in the patient's profile within the ACCHS CIS that the N-MARS has been conducted

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Following the N-MARS patient survey…

- Use survey results to develop appropriate strategies to support chronic disease self-management & medication adherence
- Measures of medication adherence will be analysed for change from baseline

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Thank you!

N-MARS Patient Survey

Patient ID: _____ Patient initials: _____ Date of survey: _____

Survey completed by: _____ Role: _____

(Role 1= practice pharmacist, 2= doctor, 3= nurse, 4= AHW, 5= Other)

Question No.	Patient Survey Questions	Answer Yes	Answer No
EXTENT TO WHICH DOSES ARE MISSED			
Q1	Did you forget to take any of your medicines yesterday? Notes:		
	Explore: How many days in the last week have you taken this medication? {Response = number between 0-7] Medicine 1_____ Medicine 6 _____ Medicine 2_____ Medicine 7 _____ Medicine 3 _____ Medicine 8 _____ Medicine 4 _____ Medicine 9 _____ Medicine 5 _____ Medicine 10 _____ Notes:		
REASONS FOR NON-ADHERENCE			
Q2	Is it hard for you to remember to take your medicines? Notes:		
Q3	Do you know when, and how, to take your medicines? Notes:		
Q4	Is it hard for you to take your medicines in the right way? (like the Dr/Nurse/AHW said) Notes:		

Q5	Do you feel that taking your medicines will be good for your health? Notes:		
Q6	Do you sometimes take less medicine to make the medicine last longer? Notes:		
Q7	Do you sometimes stop taking your medicines because you think you are ok? Notes:		
Q8	Do you sometimes stop taking your medicine because you think it might make you sick? Notes:		
Q9	Do you sometimes 'run out' of medicines because it costs too much, or it is hard to get more? Notes:		
Q10	Do you sometimes run out of medicines because you give them away or share them with other people? Notes:		
Q11	Do you go without your medicines when you are away from home? Notes:		

Additional self-perception of health status question:

SF1. In general would you say your health is (please tick one):

- Excellent ___
- Very good ___
- Good ___
- Fair ___
- Poor ___
- Very poor ___

Medication Appropriateness Index (MAI) Patient Survey

Patient ID: _____ Patient initials: _____ Date of survey: _____

Question	Response
1. Is there an indication for the drug? Comments:	A = indicated B = marginally indicated C = not indicated Z = do not know
2. Is the medication effective for the condition? Comments:	A = effective B = marginally effective C = ineffective Z = do not know
3. Is the dosage correct? Comments:	A = correct B = marginally correct C = incorrect Z = do not know
4. Are the directions correct? Comments:	A = correct B = marginally correct C = incorrect Z = do not know
5. Are the directions practical? Comments:	A = practical B = marginally practical C = impractical Z = do not know
6. Are there clinically significant drug-drug interactions? Comments:	A = insignificant B = marginally significant C = significant Z = do not know
7. Are there clinically significant drug-disease/condition interactions? Comments:	A = insignificant B = marginally significant C = significant Z = do not know
8. Is there unnecessary duplication with other drugs? Comments:	A = necessary B = marginally necessary C = unnecessary Z = do not know
9. **Is the duration of therapy acceptable?** Comments**:**	A = acceptable B = marginally acceptable C = unacceptable Z = do not know
10. Is this drug the least expensive alternative compared to others of equal utility? Comments**:**	A= least expensive B= equally expensive C= most expensive Z = do not know

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Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC)

Core role 4

Medication Appropriateness Audit

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Medication Appropriateness Index (MAI)

- Internationally validated
- Assesses potential for improvement in prescribing
- To be conducted for 30 consented participants per pharmacist 1 FTE
- Measured twice for each participant
- Does not require the participant to be present
- Pharmacist will communicate the findings to the prescribing team

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MAI - General Instructions

- The MAI comprises 10 questions
- Each question relates to individual participant & medicine in question
- For combination drugs, complete the MAI for each individual drug
- List of the participant's medical conditions and medicines is required
- Clinical judgement must be applied
- Take account of additional clinical information
- If unsure, consult an evidence-based clinical reference

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MAI - Scoring

- For each question, the pharmacist answers by selecting A, B, C or Z
- A, B or Z are scored zero by the evaluators
- If C, evaluators will assign a weighted score for that question
- Pharmacists' logbook will facilitate the date and pharmacist's rating (A, B, C or Z) of the MAI for each medicine
- Calculation of mean score will be done by the evaluators

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MAI Q1 - Is there an indication for the drug?

- Assesses whether there is sufficient reason to use the drug
- Sufficient reason may include not only curative or palliative therapy but also preventive therapy for a disease or condition
- Requires list of medical conditions documented for the participant
- A drug is not indicated if no condition exists for its use
- A=indicated,
- B=marginally indicated
- C=not indicated (score 3)
- Z=do not know

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MAI Q2 - Is the medication effective for the condition?

- Assesses whether the medication prescribed is capable of being effective for the indication in a population of patients
- A=effective
- B=marginally effective
- C=ineffective (score 3)
- Z=do not know

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MAI Q3 - Is the dosage correct?

- Does the prescribed dose fall within the dosage range noted in evidence-based reference texts
- Take into account known age-related changes in drug pharmacokinetics and pharmacodynamics
- Some participants may have drug levels, laboratory results or vital signs to help assess whether the dosage is appropriate
- A=correct
- B=marginally correct
- C=incorrect (score 2), specify C+
  if dose too high, C- is dose too low
- Z=do not know

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MAI Q4 - Are the directions correct?

- Assesses the appropriateness of instructions
- Take into account route of administration, relationship to food and liquid, the schedule and time of day
- A=correct
- B=marginally correct
- C=incorrect (score 2)
- Z=do not know

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MAI Q5 - Are the directions practical?

- Assesses whether the directions for use are capable of being put into practice by the patient or caregiver
- Reflects the potential for patient adherence without sacrificing efficacy
- A=practical
- B=marginally practical
- C=impractical (score 1)
- Z=do not know

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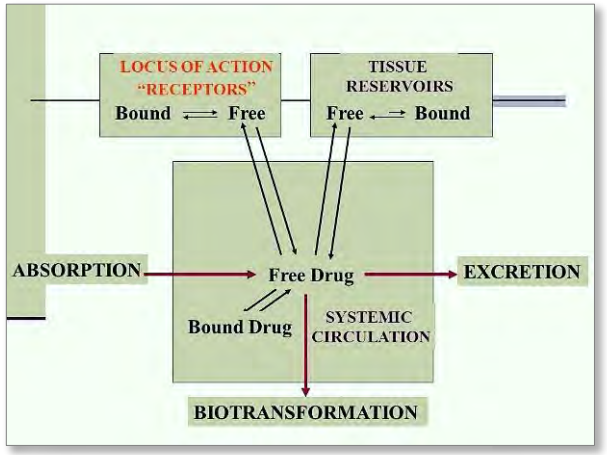
MAI Q6 - Are there clinically significant drug-drug interactions?

- Assesses the effect that the administration of one medication has on the pharmacokinetics or pharmacodynamics of another medication
- A=insignificant (where no interaction exists)
- B=marginally significant (where an interaction exists but there is no clinical evidence for toxicity or adverse effects)
- C=significant (score 2)
- Z=do not know



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MAI Q7 - Are there any clinically significant drug-disease/condition interactions?

- Assesses the effect that a drug has on a pre-existing disease or condition
- A=insignificant (where no interaction exists)
- B=marginally significant (where the reference indicates an interaction but the patient shows no sign of worsening disease)
- C=significant (score 2, where the drug is contraindicated for the condition and/or the patient shows clinical evidence of disease with use of the drug)
- Z=do not know

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MAI Q8 - Is there unnecessary duplication with other drugs?

- Defined as risky or non-beneficial overlap of drugs
- Assesses whether two drugs from the same chemical or pharmacological class are prescribed simultaneously
- A=necessary
- B=marginally necessary
- C=unnecessary (score 1)
- Z=do not know

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MAI Q9 - Is the duration of therapy acceptable?

- Assesses whether the length of time the patient has received the drug is acceptable
- A=acceptable
- B=marginally acceptable
- C=unacceptable (score 1)
- Z=do not know

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MAI Q10 - Is this drug the least expensive alternative compared to others of equal utility?

- Assesses how the cost of the drug to the patient compares to other drugs of equal safety and efficacy
- A drug is considered more expensive if it costs >10% more than alternatives (medications within the same therapeutic class) of equal utility
- A=least expensive
- B=equally expensive
- C=most expensive (score 1)
- Z=do not know

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MAI - Recording

- Enter in electronic logbook using patient's unique ID
- This links GRHANITE de-identified data extracts to the MAI scores
- Reasons for a rating of B or C should be added in the comments section of the logbook pertaining to that question

- Also record in patient's medical records in ACCHS CIS that the MAI has been conducted

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Recording the MAI in the logbook

- Patient ID
- Date MAI conducted
- Date of data entry
- Generic name of medicine
- What type of medicine is this? (drop-down box)
- Then add the answers to the 10 questions of the MAI for that medicine
- Then prompted to repeat for another medicine if necessary

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Recording the outcomes of the MAI in the logbook

- After completing the MAI (for all regular medicines), what were your recommendations?
- After completing the MAI, were you recommendations discussed with the prescriber?
- Is your MAI complete?
- Have you recorded that an MAI was completed in their electronic health record?

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Thank you!

Medication Appropriateness Index (MAI) – Examples

Question	Example
1. Is there an indication for the drug? A= indicated B= marginally indicated C= not indicated Z= do not know	• Amlodipine is prescribed and hypertension is recorded in patient history =A • KCl prescribed to patient taking a diuretic without history of hypokalaemia =B • Olanzapine prescribed but schizophrenia and related psychoses or bipolar disorder not documented=C
2. Is the medication effective for the condition? A= effective B= marginally effective C= ineffective Z= do not know	• Pantoprazole prescribed for peptic ulcer disease =A • Amitriptyline for neuropathic pain =B (not indicated but accepted as effective) • Quinine sulfate prescribed for leg cramps =C
3. Is the dosage correct? A= correct B= marginally correct C= incorrect Z= do not know	• Warfarin 3mg daily for patient with AF and stable INR of 2.2 =A • Atorvastatin at highest end of usual dose range but cholesterol level remains elevated =B (dose is necessary but additional therapy is needed) • Digoxin 250mcg daily for elderly patient with CrCl 25ml/min =C+ (dose too high)
4. Are the directions correct? A= correct B= marginally correct C= incorrect Z= do not know	• Prednisolone 5mg m with food =A • Latanoprost eyedrops instil 1 drop into the eye at night =B (should specify which eye or both eyes) • KCl without directions regarding food =C
5. Are the directions practical? A= practical B= marginally practical C= impractical Z= do not know	• Amitriptyline 25mg tab 1 n =A • Directions given as 'mdu' =B • Ipratropium MDI 2 puffs q6h =C (qds more appropriate to fit waking hours rather than directing every 6 hours)
6. Are there clinically significant drug-drug interactions? A= insignificant B= marginally significant C= significant Z= do not know	• Metoprolol and rabeprazole =A • Metformin and esomeprazole =B (interaction documented but clinical significance not established) • Diltiazem and atorvastatin =C (diltiazem inhibits CYP3A4 metabolism of atorvastatin)

7. Are there clinically significant drug-disease/condition interactions? A= insignificant B= marginally significant C= significant Z= do not know	• Rivaroxaban in a patient with asthma =A (no interaction or precaution documented) • Atenolol in a patient with diabetes and no worsening of glycaemic control =B • Doxepin in an elderly patient with glaucoma =C (contraindicated)
8. Is there unnecessary duplication with other drugs? A= necessary B= marginally necessary C= unnecessary Z= do not know	• Regular indacaterol inhaler plus prn use of salbutamol MDI in patient with COPD =A (necessary duplication of beta agonists for therapeutic effect) • Combination of paracetamol 500mg & 665mg SR tabs not exceeding max total recommended daily dose =B • citalopram m plus fluvoxamine n =C (2 drugs from same SSRI class with resulting risk of serotonin overload)
9. Is the duration of therapy acceptable? A= acceptable B= marginally acceptable C= unacceptable Z= do not know	• Dual antiplatelet therapy with aspirin & clopidogrel for 6-12 months after insertion of drug-eluting stent =A • Long-term PPI use with occasional intermittent symptoms =B • Long term monotherapy with oral corticosteroid in patient with COPD =C (unfavorable risk:benefit ratio) *note that if the drug is not indicated, rating =C
10. Is this drug the least expensive alternative compared to others of equal utility? A= less expensive B= equally expensive C= more expensive Z= do not know	• Magmin tab =A (PBS-subsidised for Aboriginal and Torres Strait Islander patients, cheaper to patient than OTC magnesium supplement) • Ramipril 5mg tab =B (same cost to patient as perindopril 5mg tab, listed in CARPA as alternative option for heart failure) • FerroGrad C tab =C (non-PBS, >10% more expensive than Ferro-tab which is PBS-subsidised for Aboriginal and Torres Strait Islander patients) *note that if the drug is not indicated, rating =C

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Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC)

Core role 4

Assessment of Underutilisation (AOU)

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Assessment of Underutilisation (AOU)

- Prompts identification of medicines that have been omitted
- Conducted by the practice pharmacist at the time of MAI audit
- Conducted at 2 points in time, once at baseline (month 1-3) & again 12 months later
- Also applied for each HMR or non-HMR conducted by the practice pharmacist

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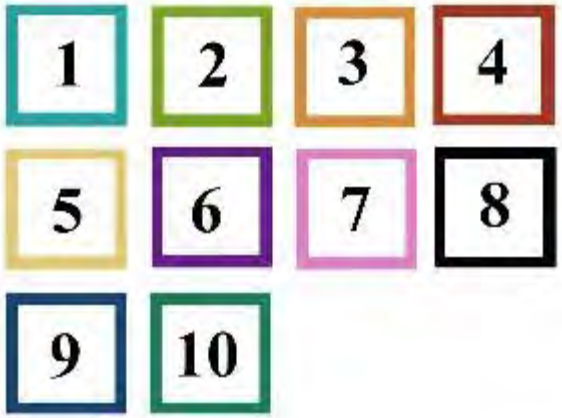
Conducting the AOU

- 10 evidence-based indicators
- Drawn from current recommendations within Australian best practice prescribing guidelines
- Pharmacist needs to be aware of the clinical condition of the participant, their medications & medication history
- Clinical judgement needed to identify <u>other</u> prescribing omissions



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Conducting the AOU…

- Consider whether prescribing has been adjusted to take into account clinical appropriateness, contraindications or clinical decisions to withdraw therapy
- Ratings dichotomized as ‘no prescribing omission’ or ‘omission of an indicated drug’
- The participant does not need to be present
- Logbook enables AOU outcome to be recorded at the end of each MAI assessment
- Logbook also facilitates recording of the AOU for every HMR & Non-HMR

AOU - Category A
A patient with calculated high absolute risk for CVD (>15%)

Patient group

- A patient with calculated high absolute risk for CVD (>15%)

Core recommendation 1

- If high risk (calculated >15%): the patient should be prescribed both BP and lipid lowering therapy

(Ref: NVDPA Guidelines for the management of absolute cardiovascular disease risk. 2012)

AOU - Category A
Prescribing omission description

- A prescribing omission will be determined if there is an absence of BP or lipid lowering therapy in a patient who is of calculated high absolute CV risk
- Record details of the prescribing omission in the logbook (4 options)

AOU - Category B
A patient in a clinically high-risk category for CVD (>15% risk)

Patient group

- A patient in a clinically high-risk category for CVD (>15% risk)

Core recommendation 2

- If high risk (clinically determined): the patient should be prescribed both BP and lipid lowering therapy

(Ref: NVDPA Guidelines for the management of absolute cardiovascular disease risk. 2012)

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A patient is known to be at clinically high risk (>15%) for CVD in the following circumstances

- Diabetes and age >60 years
- Diabetes with microalbuminuria
- Moderate or severe CKD (persistent proteinuria or estimated glomerular filtration rate (eGFR) <45 mL/min/1.73 m2)
- A previous diagnosis of familial hypercholesterolaemia
- SBP ≥180 mmHg or DBP ≥110 mmHg
- Serum total cholesterol >7.5 mmol/L
- Aboriginal and Torres Strait Islander adults aged over 74

AOU - Category B
Prescribing omission description

- A prescribing omission will be determined if there is an absence of BP or lipid lowering therapy in a patient who is of clinically high absolute CV risk
- Record details of the prescribing omission in the logbook
(4 options)

Patient group

- A patient with an established diagnosis of cardiovascular disease

Core recommendation 3

- The patient should be commenced on low-dose aspirin treatment (75-150mg) unless contraindicated. Consider alternative antiplatelet agents such as clopidogrel (75 mg) if aspirin hypersensitivity is present

(Ref: National Guide, 3rd ed. 2018,
& eTG – Cardiovascular 2018)

AOU - Category C
Prescribing omission description

- A prescribing omission will be determined if there is an absence of low-dose aspirin or clopidogrel therapy in a patient with established cardiovascular disease
- Record details of the prescribing omission in the logbook (3 options)

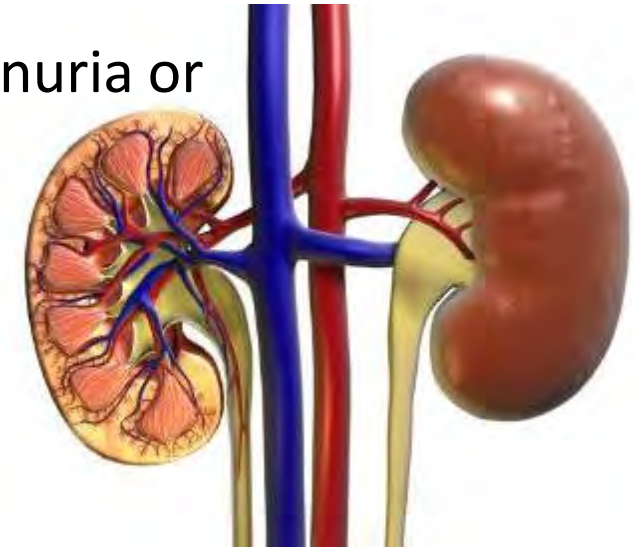
Patient group

- A patient with Type 2 diabetes and microalbuminuria or macroalbuminuria

Core recommendation 4

- In people with T2DM and microalbuminuria or macroalbuminuria, an ACEI or ARB should be used to protect against progression of kidney disease

(Ref: General Practice Management of Type 2 Diabetes, RACGP, 2016-18, 10.4 Nephropathy & Australian Medicines Handbook, Jan 2018)



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Interpreting Albumin to Creatinine Ratio (ACR)

	Gender	Normal albumin excretion	Microalbuminuria	Macroalbuminuria
Urinary albumin to creatinine ratio	Male	<2.5mg/mmol	2.5-25mg/mmol	>25mg/mmol
	Female	<3.5mg/mmol	3.5-35mg/mmol	>35mg/mmol

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AOU - Category D
Prescribing omission description

- A prescribing omission will be determined if there is an absence of treatment with ACEI/ARB in a patient with T2DM with microalbuminuria or macroalbuminuria
- Record details of the prescribing omission in the logbook (3 options)

AOU - Category E
A patient without diabetes who has CKD and macroalbuminuria

Patient group

- A patient without diabetes who has CKD and macroalbuminuria

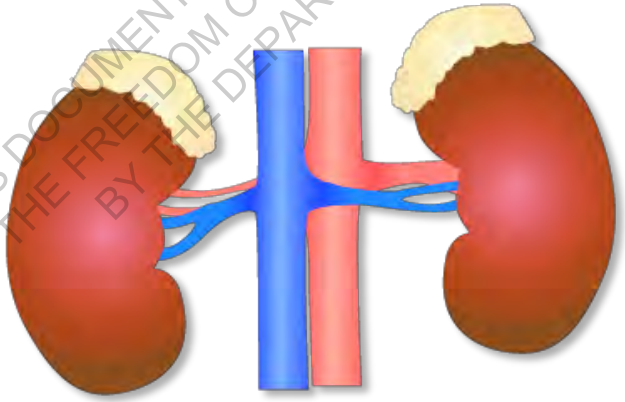
Core recommendation 5

- In adults without diabetes who have CKD and macroalbuminuria, advise treatment with an ACEI or ARB regardless of eGFR or BP level

(Ref: KHA-CARI Guidelines May 2013, &
National Guide 3rd ed. 2018, p97)

AOU - Category E
Prescribing omission description

- A prescribing omission will be determined if there is an absence of treatment with ACEI/ARB in a patient without diabetes who has CKD and macroalbuminuria
- Record details of the prescribing omission in the logbook (3 options)



Patient group

- A patient with heart failure with a reduced left ventricular ejection fraction (HFrEF)

Core recommendation 6

- An ACE inhibitor or ARB is recommended in all patients with HFrEF unless contraindicated or not tolerated…to decrease mortality and decrease hospitalisation

(Ref: National Heart Foundation of Australia (NHFA) and the Cardiac Society of Australia and New Zealand (CSANZ) 2018, p 22 and p 26. Also eTG Cardiovascular, March 2018)

AOU - Category F
Prescribing omission description

- A prescribing omission will be determined if there is an absence of treatment with ACEI/ARB in a patient with HFrEF
- Record details of the prescribing omission in the logbook (3 options)

Patient group

- A patient with T2DM who needs metformin

Core recommendation 7

- Metformin is the first-choice antihyperglycaemic drug in T2DM

(Ref: eTG Endocrinology, March 2018)

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AOU - Category G
Prescribing omission description

- A prescribing omission will be determined if there is an absence of treatment with metformin in a patient with T2DM, where there is no contraindication or intolerance to metformin
- Record details of the prescribing omission in the logbook (1 option only)

Patient group

- A patient with T2DM who needs a second oral antihyperglycaemic drug

Core recommendation 8

- If glycaemic targets are not met with lifestyle measures and the maximum tolerated dose of metformin, the next step is to add a second antihyperglycaemic drug
  (Ref: eTG Endocrinology March 2018)

- If omission determined, record details of the prescribing omission in the logbook (4 options)

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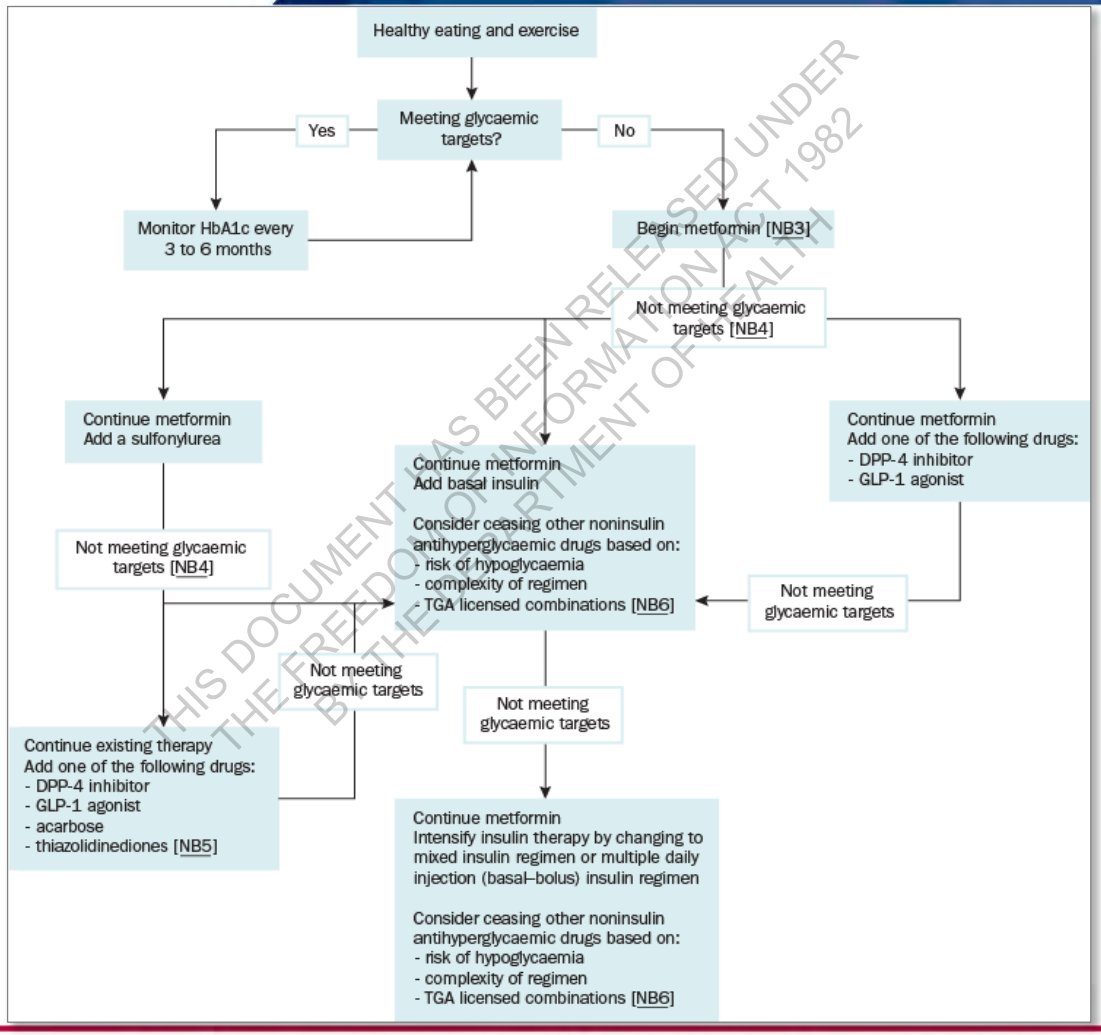
Glycaemic management in adults with Type 2 diabetes



AOU - Category I
People for whom 23vPPV vaccine is indicated

Patient group

- People for whom 23vPPV vaccine is indicated

Core recommendation 9

- Recommend 23vPPV in those aged 15-49 years with underlying conditions (chronic cardiac and lung disease, chronic liver disease, diabetes, alcoholism & tobacco smokers) increasing the risk of invasive pneumococcal disease, and all patients >50 years

(Ref: National Immunisation Handbook, 10th ed)

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AOU Category I
Prescribing omission description

- A prescribing omission will be determined if the patient is overdue for 23vPPV at age 15-49 or from age 50
- Record details of the prescribing omission in the logbook (5 options)

Patient group

- People with Acute Rheumatic Fever (ARF) or Rheumatic Heart Disease (RHD)

Core recommendation 10

- Recommend long-term prophylactic antibiotics (either benzathine penicillin every 21-28 days, or the less preferred option of daily oral penicillin V) for the prevention of recurrent rheumatic fever attacks
  (Ref: National Guide, 3rd Ed. 2018)
- 'Long-term' will be defined as treatment duration of at least 10 years

- A prescribing omission will be determined if there is an absence of chemoprophylaxis management in a patient with ARF/RHD, or an absence of treatment with penicillin with no evidence of penicillin allergy, who still requires chemoprophylaxis. The chemoprophylaxis may be for a period of 10 years or more.

- Record details of the prescribing omission in the logbook (3 options)

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The pharmacist will record in the logbook…

- Was there a prescribing omission for this patient?
- If omission of an indicated drug was identified, what type of medicine was omitted?
- Which of the core items in the 'prescribing omission checklist' does this omissions relate to?
- Is there another omission you want to enter?
- If there is another omission, for which of the following conditions does the omission apply?
- What reference was used to identify this prescribing omission?

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After recording the AOU in the logbook…

- A flagged entry in the ACCHS CIS is not required
- Communicate the findings of the AOU to the prescribing team

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Thank you!

Assessment of Underutilisation (AOU) Patient Survey

Patient ID: _____ Patient initials: _____ Date of survey: _____

Category	Patient	Core Recommendation	Prescribing omission (tick)
A	Patient with high calculated risk (>15%) of CVD	If high risk (calculated >15%) the patient should be prescribed both BP and lipid lowering therapy	*Absence of bp-lowering therapy ___ *Absence of lipid-lowering therapy ___ *Absence of both bp-lowering & lipid-lowering therapy ___ *Other (free text) ___
B	A patient in a clinically high-risk (>15%) category for CVD	If high risk (clinically determined) the patient should be prescribed both BP and lipid lowering therapy	*Absence of bp-lowering therapy ___ *Absence of lipid-lowering therapy ___ *Absence of both bp-lowering & lipid--lowering therapy ___ *Other (free text) ___
C	A patient with an established diagnosis of cardiovascular disease	The patient should be commenced on low-dose aspirin treatment (75-150mg) unless contraindicated. Consider alternative antiplatelet agents such as clopidogrel (75 mg) if aspirin hypersensitivity is present	*Low-dose aspirin (75-150mg) ____ *Clopidogrel (75mg) ____ *Other (free text) ____
D	A patient with Type 2 diabetes and micro- or macro - albuminuria	In people with type 2 diabetes and micro- or macro- albuminuria, an ACEI or ARB should be used to protect against progression of kidney disease	*ACEI ____ *ARB ____ *Other (free text) ____
E	A patient without diabetes who has CKD and macro-albuminuria	In adults without diabetes who have CKD and macroalbuminuria, advise treatment with an ACEI or ARB regardless of eGFR or BP level	*ACEI ____ *ARB ____ *Other (free text) ____
F	A patient with heart failure with a reduced left ventricular ejection fraction (HFrEF)	An ACE inhibitor or ARB is recommended in all patients with HFrEF unless contraindicated or not tolerated…	*ACEI ____ *ARB ____ *Other (free text) ____

G	A patient with T2DM who needs metformin	Metformin is the first-choice antihyperglycaemic drug in T2DM	*Metformin _____
H	A patient with T2DM who needs a second antihyper-glycaemic drug	If glycaemic targets are not met with lifestyle measures and the maximum tolerated dose of metformin, the next step is to add a second antihyperglycaemic drug	*Sulfonylurea _____ *DPP-4 inhibitor _____ *GLP-1 agonist _____ *Other (free text) _____
I	People for whom 23vPPV vaccine is indicated	Recommend 23vPPV in those aged 15-49 years and all patients >50 years	*>=15-49 years (without chronic disease- as per NT Schedule) _____ *>=15-49 years with chronic cardiac, lung, liver, or other chronic disease ___ *>=15-49 years without chronic disease but is alcohol dependent _____ *>=15-49 years without chronic disease but is a smoker _____ *>=50 years _____
J	People with Acute Rheumatic Fever (ARF) or Rheumatic Heart Disease (RHD) who still require antibiotic prophylaxis *long term= at least 10 years	Recommend long-term prophylactic antibiotics (either benzathine penicillin every 21-28 days or the less preferred option of daily oral penicillin V) for the prevention of recurrent rheumatic fever attacks	*Benzathine penicillin _____ *Oral penicillin _____ *Other (free text) _____
Other	Is there another prescribing omission you would like to record?	Reference used to identify omission:	*No _____ *Yes _____ If Yes, for which of the following conditions does the omission apply? *CVD _____ (Circle: CHD, stroke, HT, dyslipidaemia, PVD, CHF, Other) *Diabetes _____ *CKD _____ *Other chronic condition _____ Description of the omission:

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Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Core Role 5 - Preventive Health Care

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Preventive Health Care

- Preventable chronic disease is the largest contributor to the health differential between Indigenous and non-Indigenous Australians
- Practice pharmacist to promote preventive interventions with every participant contact
- ACCHS primary team may refer to 'The National Guide' or other references
- SNAP = Smoking, Nutrition, Alcohol & Physical activity

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Preventive Health Care activities

- Tailor activities to local context
- Work with ACCHS staff to clarify pharmacists role in asking about SNAP risk factors
- Aim for provision of standardised information used by all staff
- Remember annual health assessments for Aboriginal people (MBS 715)

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The 5As model for behavioural and other interventions related to lifestyle risk factors

Assess – Ask about/assess behavioural health risk(s) and factors affecting choice of behaviour change goals or methods.

Advise – Give clear, specific and personalised behaviour-change advice, including information about personal health harms and benefits. This recognises that the practitioner can be a catalyst for action and enhance motivation for change.

Agree* – Collaboratively select appropriate treatment goals and methods based on the client's interest in and willingness to change their behaviour. This involves joint consideration of treatment options, consequences and client preferences, and setting management goals.

Assist – Using behaviour change techniques (self-help and/or counselling), aid the patient in achieving agreed-upon goals by acquiring the skills, confidence and social/environmental supports for behaviour change, supplemented with adjunctive medical treatments when appropriate (e.g. pharmacotherapy for tobacco dependence).

Arrange – Schedule follow-up contacts (in person or via telephone) to provide ongoing assistance/support and to adjust the treatment plan as needed, including referral to more intensive or specialised treatment. Follow-up visits often involve repeating the preceding four As.

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Smoking

- Screening
- Behavioural
- Chemo-prophylaxis
- Environmental

- **Ask** all adult patients if they smoke tobacco
- **Assess** level of nicotine dependence & willingness to quit
- **Advise** all patients who smoke to quit
- **Assist** smoking cessation
- **Arrange** follow-up visit
- Recommend smoking cessation pharmacotherapies
- Routinely update smoking status of all patients
- Support comprehensive public health approaches to tobacco control

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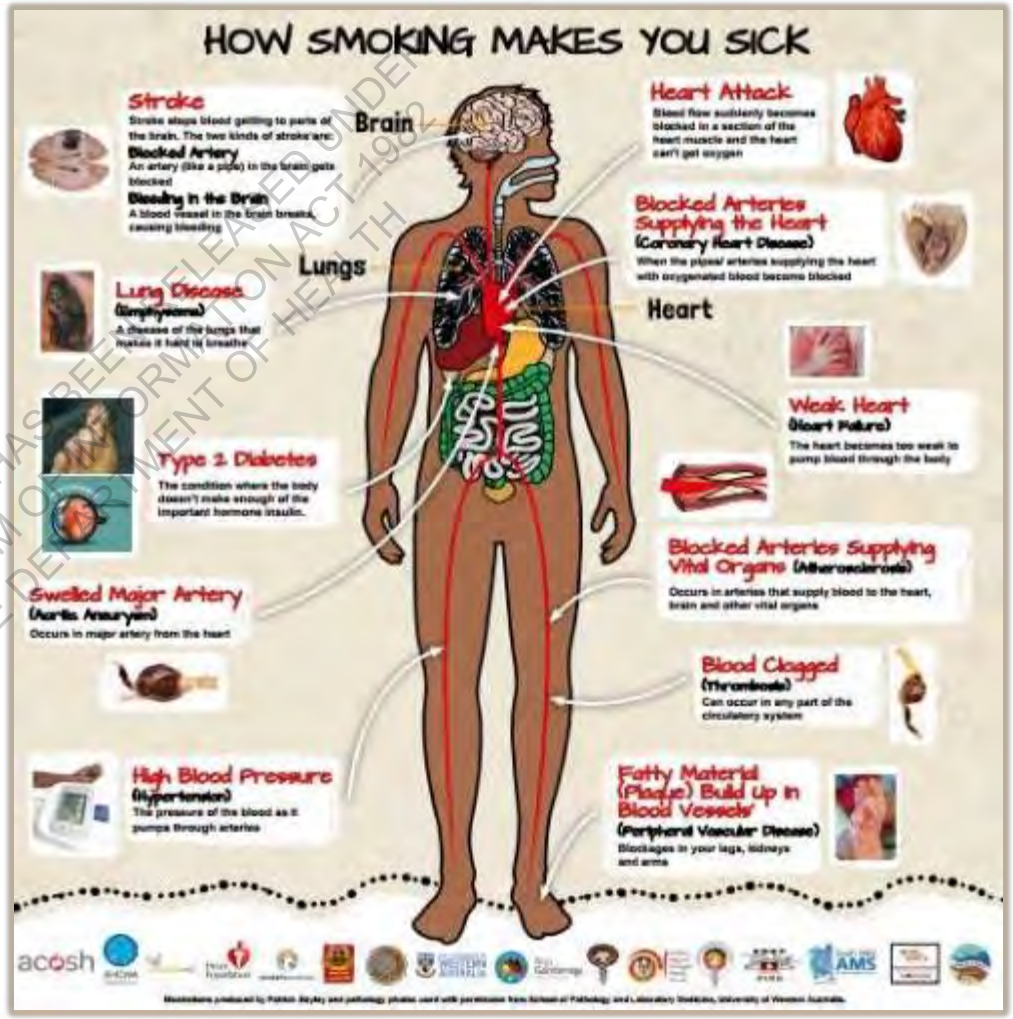
Follow the path to a Healthy Body



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Nutrition – Overweight and Obesity

- Screening
- Behavioural
- Chemo-prophylaxis
- Environmental

- Consider assessment of BMI & waist circumference
- Provide advice to promote healthy eating and physical activity
- Advise that modest weight loss of 5% or more has multiple health benefits
- Consider referral to specialist services if available
- Assess risk:benefit of orlistat on an individual basis
- Support community-based interventions to increase access to healthy and nutritious food

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Combining measures to assess obesity and disease risk* in adults

Classification	Body mass index (BMI) (kg/m2)	Disease risk (relative to normal measures) Waist circumference Men 94–102 cm Women 80–88 cm	Disease risk (relative to normal measures) Waist circumference Men >102 cm Women >88 cm
Underweight	<18.5	---	---
Healthy weight	18.5–24.9	---	Increased
Overweight	25.0–29.9	Increased	High
Obesity	30.0–39.9	High to very high	Very high
Severe obesity	>40	Extremely high	Extremely high

*Risk of type 2 diabetes, elevated blood pressure and cardiovascular disease (CVD)

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Alcohol

- Screening
- Behavioural
- Environmental

- Ask about the quantity and frequency of alcohol consumption to detect risky/high risk drinkers
- Consider medical conditions which may be worsened by alcohol consumption
- Offer brief interventions (FLAGS) for the reduction of alcohol consumption as first-line treatment
- Support community-led strategies to reduce alcohol supply

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Physical Activity

- Screening
- Behavioural
- Environmental

- Assess current level of physical activity and sedentary behaviours
- For patients who are insufficiently active, give targeted advice and written information
- Consider the needs of patients with chronic medical conditions
- For osteoporosis prevention, encourage regular weight-bearing and resistance exercise
- Support community-based physical activity programs and encourage use of public facilities that promote activity

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Recording pharmacist activities

- Ensure that height, weight, smoking status and recent BP are recorded in patient's medical records
- Ensure that patient is up to date with age-appropriate health checks
- Unless already clinically at high risk of CVD, check that absolute CV risk status has been assessed and recorded
- GRHANITE will extract de-identified biometric measures from the CIS
- Enter details of preventive health activities in the logbook under Education & training

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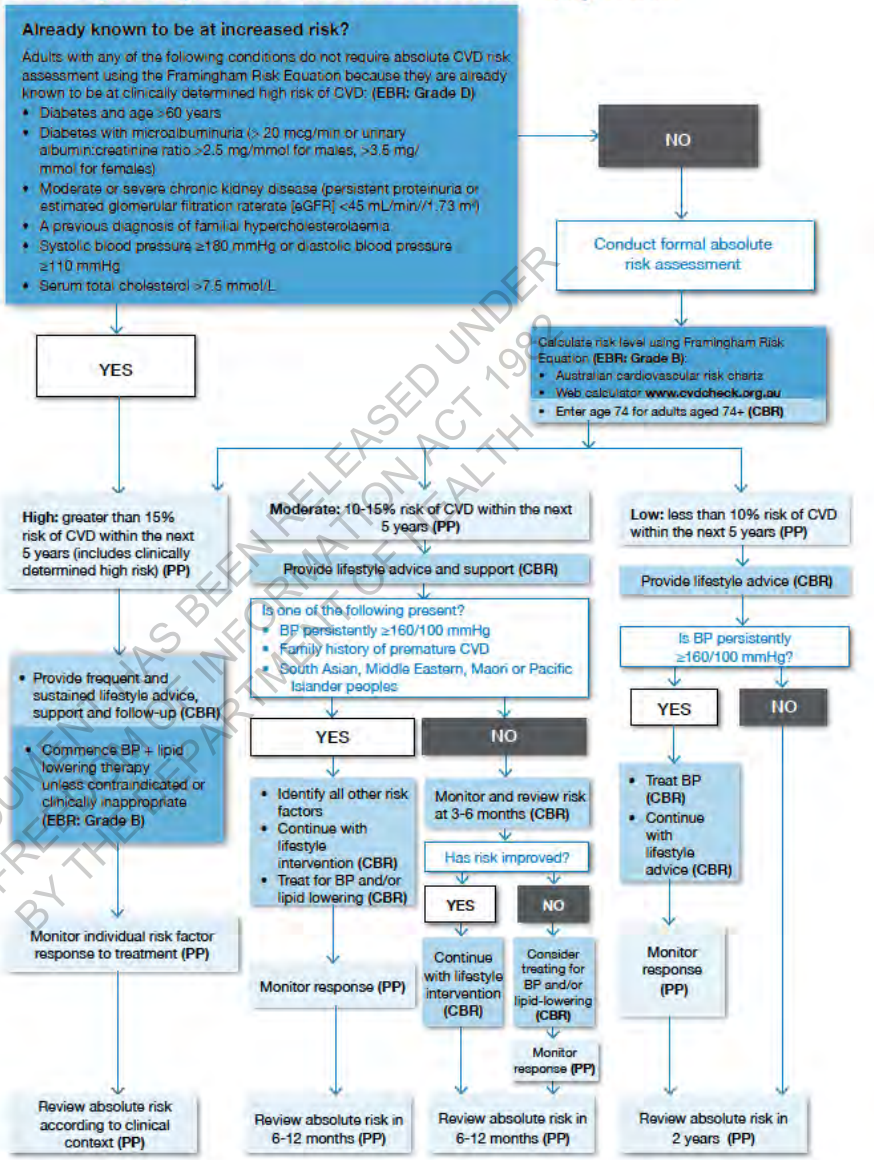
Risk Assessment and Management Algorithm: Adults aged 45 years and over without known history of CVD



EBR: Evidence-based recommendation (Graded A-D) CBR: Consensus-based recommendation PP: Practice point

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Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC)

Core Role 6

Drug Utilisation Review

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Background of DUR

- Provides a comprehensive and cyclical process of review, evaluation and intervention
- Plays a key role in helping health care systems understand, interpret, evaluate and improve the prescribing, administration and use of medicines
- Pharmacists play a key role
- Pharmacists can then, in collaboration with prescribers and other members of the health care team, initiate action to improve medicine therapy for patients

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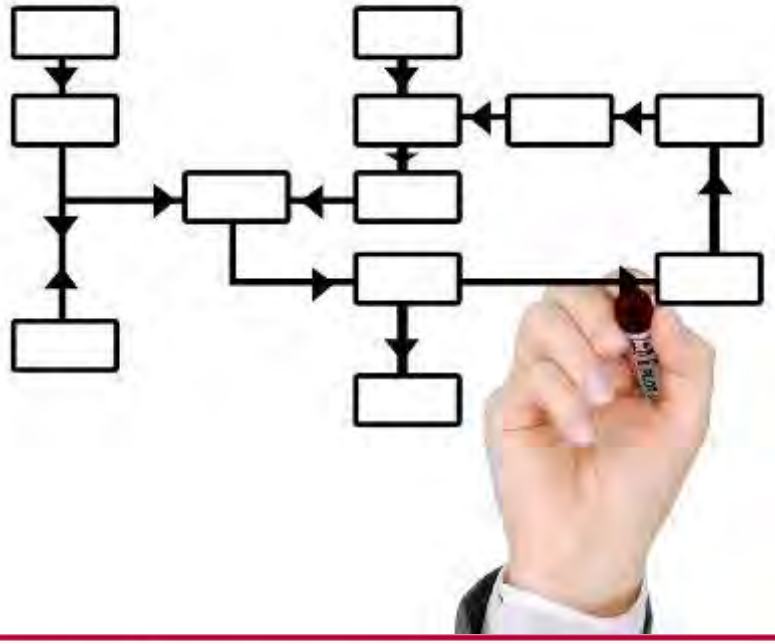
The DUR process

- DUR may be applied to a medicine or therapeutic class, disease state or condition, or a medicine-use process (such as monitoring)
- A DUR usually involves retrospective review of patient medicine use
- Using this information, the pharmacist can then encourage prescribers to utilise the indicated medicines



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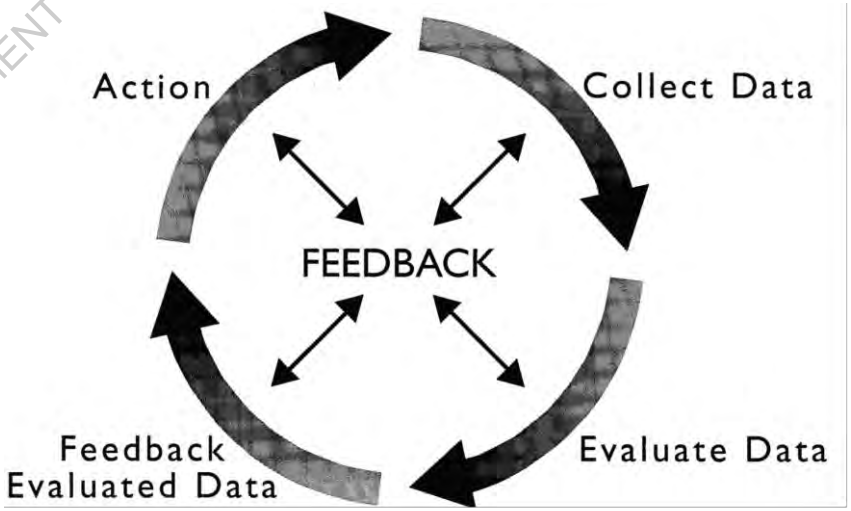
DUR steps…

- Identify priority issue for DUR
- Identify best-practice evidence to support DUR
- Define criteria for best practice
- Define data collection method
- Collect data
- Evaluate
- Provide feedback of results
- Action
- Assess results of action



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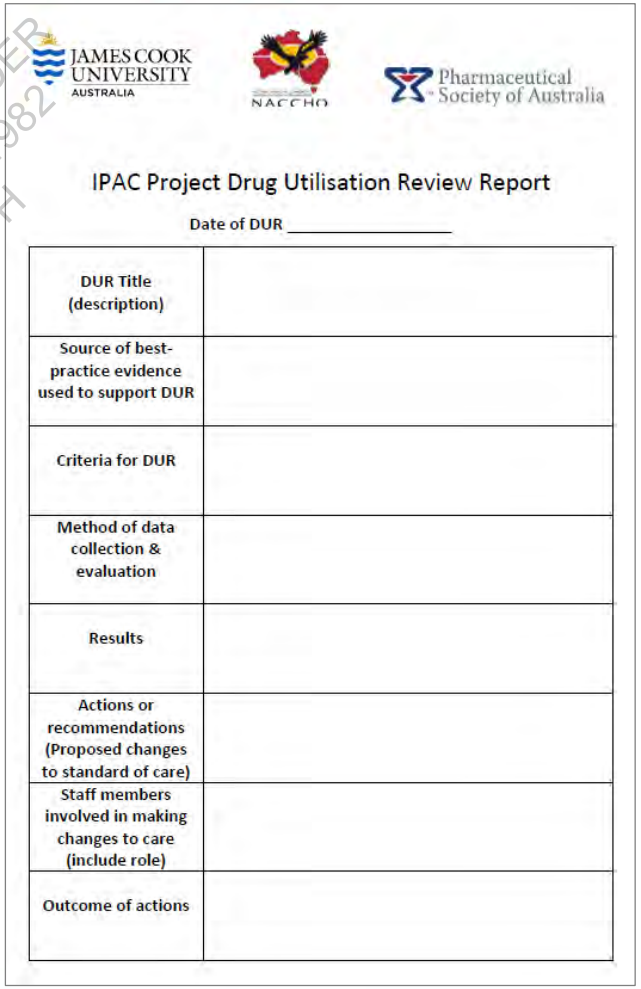
DUR and the IPAC practice pharmacist

- Conduct DUR after identification of a priority issue within the ACCHS
- Only one DUR is expected to be reported over the project period
- Aim is to recommend interventions in collaboration with practice staff to improve the standard of care at the practice
- The practice pharmacist may also undertake QUM activities

Recording details of the DUR in logbook

- Date of logbook entry for the DUR
- Date of delivery of the DUR
- Title of the DUR
- Who initiated the idea for the priority issue
- Time taken to complete the DUR
- Upload of the DUR report
- What outcome measures were agreed in the DUR?
- What changes were made in the clinic as a result of completing the DUR?



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IPAC Project Drug Utilisation Review Report

Date of DUR _____

DUR Title (description)	
Source of best-practice evidence used to support DUR	
Criteria for DUR	
Method of data collection & evaluation	
Results	
Actions or recommendations (Proposed changes to standard of care)	
Staff members involved in making changes to care (include role)	
Outcome of actions	

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Thank you!

IPAC Project Drug Utilisation Review Report

Date of DUR _____

DUR Title (description)	
Source of best-practice evidence used to support DUR	
Criteria for DUR	
Method of data collection & evaluation	
Results	
Actions or recommendations (Proposed changes to standard of care)	
Staff members involved in making changes to care (include role)	
Outcome of actions	

Additional notes:

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Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC)

Core Role 7

Education and Training

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Background

- Pharmacists can provide valuable medication-related education for Aboriginal and Torres Strait Islander people and health professionals
- Particularly needed in remote areas
- Education or training sessions will be co-designed to ensure relevance

- Education may be provided in various ways
- Practice pharmacists may also participate in community events and promotion of the clinic's health programs

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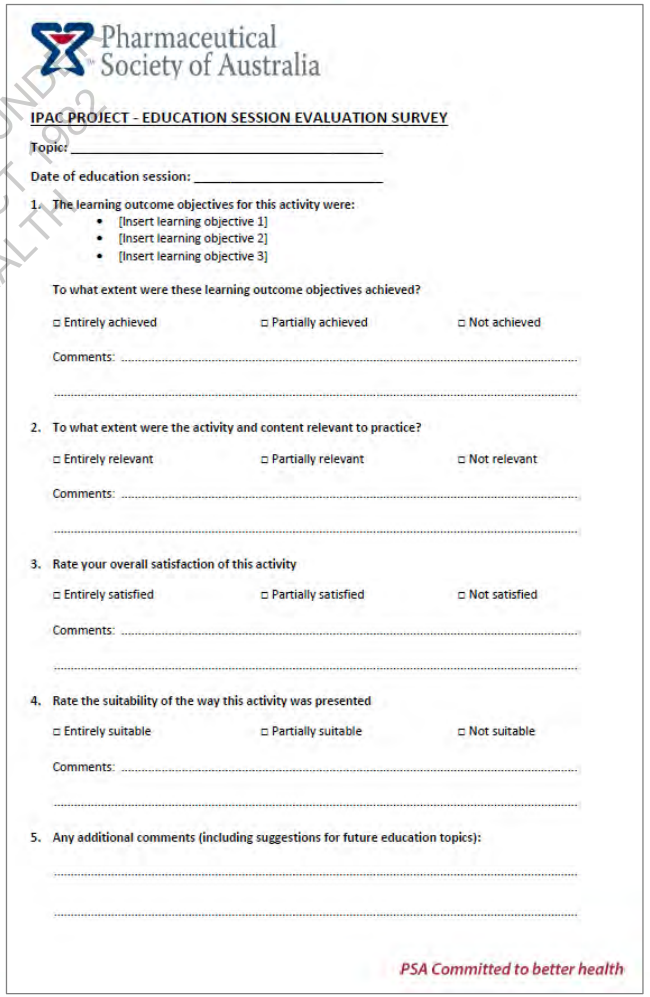
Evidence-based education

- Use available resources to plan, implement and evaluate evidence-based education sessions
- Consider the National Prescribing Service
- Also Heart Foundation, Kidney Health Australia, Diabetes Australia
- Use culturally appropriate educational resources whenever available, such as Australian Indigenous HealthInfoNet

When planning an education session, consider…

- Target audience
- Time allotted
- Learning objectives
- Structure
- Case studies if appropriate
- Suggested references & resources
- Revise key points
- Seek evaluation from participants



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IPAC PROJECT - EDUCATION SESSION EVALUATION SURVEY

Topic: _____

Date of education session: _____

1. The learning outcome objectives for this activity were:
   - [Insert learning objective 1]
   - [Insert learning objective 2]
   - [Insert learning objective 3]

   To what extent were these learning outcome objectives achieved?

   □ Entirely achieved □ Partially achieved □ Not achieved

   Comments: .....

2. To what extent were the activity and content relevant to practice?

   □ Entirely relevant □ Partially relevant □ Not relevant

   Comments: .....

3. Rate your overall satisfaction of this activity

   □ Entirely satisfied □ Partially satisfied □ Not satisfied

   Comments: .....

4. Rate the suitability of the way this activity was presented

   □ Entirely suitable □ Partially suitable □ Not suitable

   Comments: .....

5. Any additional comments (including suggestions for future education topics):

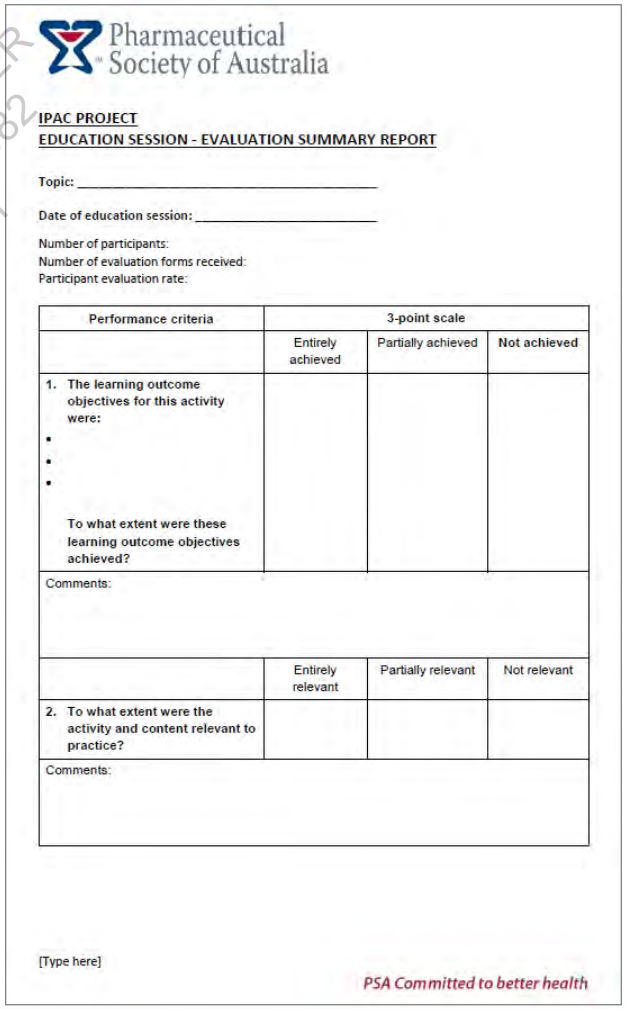
   .....

   .....

PSA Committed to better health

Recording Education and Training activities in the logbook

- Pharmacist can enter multiple 'events'
- Type of activity
- Evidence-based source of information
- Date of activity
- Date of data entry
- Time taken to undertake the activity
- Upload example of educational material prepared (PDF)



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IPAC PROJECT
EDUCATION SESSION - EVALUATION SUMMARY REPORT

Topic: _____

Date of education session: _____

Number of participants:
Number of evaluation forms received:
Participant evaluation rate:

Performance criteria	3-point scale		
	Entirely achieved	Partially achieved	Not achieved
1. The learning outcome objectives for this activity were: • • • To what extent were these learning outcome objectives achieved?			
Comments:			
	Entirely relevant	Partially relevant	Not relevant
2. To what extent were the activity and content relevant to practice?			
Comments:			

[Type here]

PSA Committed to better health

Pharmaceutical Society of Australia

Thank you!

IPAC PROJECT - EDUCATION SESSION EVALUATION SURVEY

Topic: _____

Date of education session: _____

1. **The learning outcome objectives for this activity were:**
   - [Insert learning objective 1]
   - [Insert learning objective 2]
   - [Insert learning objective 3]

   To what extent were these learning outcome objectives achieved?

   □ Entirely achieved □ Partially achieved □ Not achieved

   Comments: .....

   .....

2. **To what extent were the activity and content relevant to practice?**

   □ Entirely relevant □ Partially relevant □ Not relevant

   Comments: .....

   .....

3. **Rate your overall satisfaction of this activity**

   □ Entirely satisfied □ Partially satisfied □ Not satisfied

   Comments: .....

   .....

4. **Rate the suitability of the way this activity was presented**

   □ Entirely suitable □ Partially suitable □ Not suitable

   Comments: .....

   .....

5. **Any additional comments (including suggestions for future education topics):**

   .....

   .....

IPAC PROJECT
EDUCATION SESSION - EVALUATION SUMMARY REPORT

Topic: _____

Date of education session: _____

Number of participants:
Number of evaluation forms received:
Participant evaluation rate:

Performance criteria	**3-point scale**		
	Entirely achieved	Partially achieved	**Not achieved**
1. The learning outcome objectives for this activity were: • • • **To what extent were these learning outcome objectives achieved?**			
Comments:			
	Entirely relevant	Partially relevant	Not relevant
2. To what extent were the activity and content relevant to practice?			
Comments:			

	Entirely satisfied	Partially satisfied	Not satisfied
3. Rate your overall satisfaction of this activity			
Comments:			
	Entirely suitable	Partially suitable	Not suitable
4. Rate the suitability of the way this activity was presented			
Comments:			

5. Summary of additional comments (including suggestions for future education topics:

.....

.....

.....

.....

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Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC)

Core Role 8

Medicines Information Service

NATIONAL ABORIGINAL COMMUNITY CONTROLLED HEALTH ORGANISATION
NACCHO

JAMES COOK UNIVERSITY AUSTRALIA

PSA is the peak national body for pharmacists

Pharmaceutical Society of Australia

Medicines Information Service

The practice pharmacist will provide medicines related information to staff within the service and respond to enquiries by clinicians.

- Such enquiries may include:
- Ad-hoc medicine queries
- PBS queries
- Information requests involving dose titration
- Interactions
- New and emerging drugs
- Out of stock items

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Recording in the logbook

- Multiple discrete ‘events’ can be recorded
- Date of activity
- Date of data entry
- Type of activity
- How the request for information was received
- Which clinical reference was used to source the advice
- Which staff were supported
- Time taken
- Evidence of an outcome

Pharmaceutical Society of Australia

Thank you!

Pharmaceutical Society of Australia

Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Core Role 9 - Medicines Stakeholder Liaison

NATIONAL ABORIGINAL COMMUNITY CONTROLLED HEALTH ORGANISATION
NACCHO

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Medicines Stakeholder Liaison

- The practice pharmacist will perform an important liaison role with community pharmacy
- The practice pharmacist will build networks and relationships
- The practice pharmacist will develop a single <u>written</u> stakeholder liaison plan with community pharmacies & other relevant service providers

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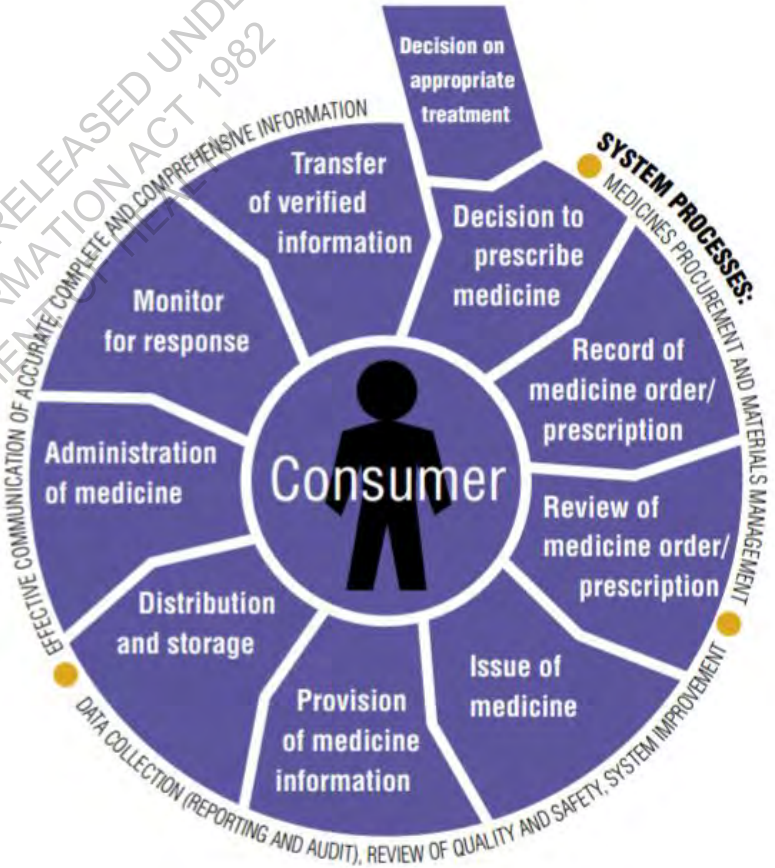
Also consider in the Stakeholder Liaison Plan

- Hospitals
- Other GP service providers
- Tertiary referral centres (e.g. Renal units)
- Aged care facilities (private or run by ACCHS)
- Pathology providers



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Recording details of the Stakeholder Liaison Plan in the logbook

- Who are the stakeholders in the plan?
- Was the plan co-designed with other ACCHS staff?
- Was the plan approved by the ACCHS CEO?
- Time taken to develop the plan
- Evidence of a stakeholder plan
- Date the plan was completed/signed by stakeholder
- Evidence this plan led to an outcome

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Recording contact (an 'event') with community pharmacy in the logbook

- Date of data entry
- Date of contact with community pharmacy
- Was contact initiated by you or community pharmacy/pharmacist?
- Please specify the reason contact was made with community pharmacy/pharmacist
- How was contact made?

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Thank you!

IPAC Project - MEDICINES STAKEHOLDER LIAISON PLAN

Complete a plan for each stakeholder

Name of Stakeholder / Service Provider	
Name of primary Stakeholder contact person (include phone number)	
Type of service provider	• **Community pharmacy provider** _____ • **Hospital** _____ • **Other GP service provider** _____ • **Tertiary referral centre** _____ • **Aged Care Facility** _____ • **Pathology provider** _____ • **Other (please specify):**
Nature of involvement in providing medication related services to the ACCHS	• **S100 provider** _____ • **S100 support provider** _____ • **QUMAX arrangement** _____ • **Dispensing pharmacist** _____ • **HMR provider** _____ • **Tertiary referral centre** _____ • **Local hospital** _____ • **Other (please specify):**
Preferred method(s) of engagement	• **Phone** _____ • **Email** _____ • **Face-to-face** _____ • **Other (please specify)**
Outline any suggested areas for improvement in workflow/liaison	

Evidence of Outcome

Actions undertaken to improve workflow/liaison	
Evidence that actions have led to improvement in workflow/liaison	
Feedback from Stakeholder / Service Provider	
Feedback from ACCHS	

Date of plan finalisation: _____ / _____ / _____

Signature of Stakeholder representative: _____

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Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Core Role 10 - Transitional Care

NATIONAL ABORIGINAL COMMUNITY CONTROLLED HEALTH ORGANISATION
NACCHO

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Transitional Care

- Aims to optimise management of medication for patients across the continuum of care
- Practice pharmacist will facilitate ad-hoc care coordination
- This will help to ensure seamless care by relaying all relevant information
- Improved transitional care coordination is anticipated to lead to improved discharge summary management and medicines reconciliation

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Recording transitional care in the logbook

- Patient ID not required
- Multiple ‘events’ can be recorded
- Which agency did you engage with to support the transitional care of your patient?
- How was the contact made?
- Specify the reason(s) contact was made with this agency
- What was the date of this contact?
- Time taken

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Thank you!

Insert ACCHS Logo

Integrating Pharmacists into ACCHs to improve chronic disease management (IPAC)

<ACCHO NAME>

Pharmacist Work Plan

Date completed:

The following work plan has been developed in consultation between the project pharmacist <name> and the health service, with facilitation by NACCHO representative <name >. This plan was developed after an assessment of the needs of the health service, existing pharmacy support through S100 or QUMAX and with consideration of the skills of the pharmacist. The 10 core roles of the IPAC project form the basis of this work plan. The specific needs of the project evaluation has been incorporated into the work plan which may seem to be extra to the normal role of a pharmacist. It is recommended that an initial review be done 3 months into the project and the plan revised as necessary. A report against the work plan will form part of the final evaluation. Key Actions need to be SMART.

S- Be Specific about what you want to achieve.
M- Ensure your result is Measurable. Have a clearly defined outcome and ensure this is measureable (KPIs).
A- Make sure it is Achievable.
R- Check that its Realistic, it must be possible taking account of time, ability and finances.
T- Make sure it is Time restricted, an achievable time frame, deadlines and milestones to check progress.

This plan will be developed with input from the pharmacist (or contracted community pharmacy) and the health service. Copies will be provided to the health service, pharmacist (or contracted community pharmacy), PSA and the NACCHO project team members.

The purpose of the work plan are to:

a. Clarify the specific role of the pharmacist within the health service according to identified need.
b. Clarify the work requirements of the project evaluation
c. Allow review of the performance of the pharmacist in meeting the needs of the health service and the goals of the project.
d. Identify learning needs of the project pharmacist

Key Action Steps	Timeline	Expected Outcome	Data Source and Evaluation Methodology	Resource needs	Comments
Define each action step on its own row. Define as many action steps as necessary by adding rows to the table.	*An expected completion date (month and year) must be defined for each action step.*	*An expected outcome must be defined for each action step.*	*An evaluative measure must be defined for each action step.*	Resources needed to enable actions and outcomes eg learning needs, equipment, software,	*Comments are optional.*
Core Role 1: Medication Management Reviews					
Provision of or facilitation of HMR	Throughout project	Completed HMR including Item 900 claim	No of Item 900 claims - MBS	Contact with local HMR accredited pharmacists. Clinical mentoring as required	<detail local arrangements>
Provision of non-HMR where HMR is not possible	Throughout project	Completed non-HMR including GP follow up	No of non-HMR recorded - log book No of related MBS items by AHW	Clinical mentoring as required	<Total enrolled patient target>
Core Role 2: Team-based collaboration					
Refinement of a process of obtaining patient consent	<Agreed process within 1 month start of pharmacist>	>80% of patients receiving services have provided consent for collection of data	No of enrolled patients - log book.	Consent forms & process	Development of a process for obtaining consent to be commenced by NACCHO project officer. However, review may be necessary if this is found to less than optimal
Enrolment of patients in project and obtaining informed consent	Average 4 new patients/day in first half of project Average 4 encounters/day by end of project	Participation consent obtained from [xxx/FTE] patients for project	No of enrolled patients as % of target - logbook		

Key Action Steps	Timeline	Expected Outcome	Data Source and Evaluation Methodology	Resource needs	Comments
Participation on team clinical meetings	Throughout project	Pharmacists participates in all relevant clinical team meetings	No of case conferences attended - MBS No of non-claimable clinical team meetings attended – logbook	MBS claiming rules for these items numbers	
Core Role 3: Medication adherence assessment & support					
Conduct N-MARS assessment on all patients at least twice during the project	Phase 1: 9 months Phase 2: 15 month	All patients enrolled for project evaluation have had at least 2 nMARS assessments	No of patients for whom 1 or 2 nMARS has been recorded in Log Book. nMARS flagged in CIS		
Core Role 4: Medication appropriateness audit, and Assessment of Underutilisation					
Provide MAI and AOU assessment on [30 patients per FTE] pharmacist, twice during the project and selected at random	Phase 1: 3 months Phase 2: 12-15 month	All randomized <*add target quantity for site*> patients have had 2 MAI and AOU assessments	No of randomised patients for whom 1 or 2 MAI and AOU have been recorded in Log Book MAI flagged in CIS	Access and familiarity with references in MAI and AOU	
Core Role 5: Preventative health care					
Participate in concurrent preventive health programs offered by the AHS with other staff	Throughout project	Significant and relevant contribution to the ACCHS's preventive health programs	No of activities participated in and recorded in log book (in Education & training)	Education materials, education in public health principles	
Core Role 6: Drug Utilisation Review					
Provide at least 1 drug utilisation review in response to practice specific issues.	15 months	At least one DUR performed, documented and fed back to staff	No of DUR Details of DUR from log book	Education on the design & implementation of DUR	

Key Action Steps	Timeline	Expected Outcome	Data Source and Evaluation Methodology	Resource needs	Comments
Core Role 7: Education and training					
Develop a structured education plan based on assessment of practice staff needs and revised as necessary	Plan:3 months Review: 7 months	Education plan developed	Review of education plan – pdf in logbook	Access to existing programs NPS, GP synergy, AHW training etc, Knowledge and assessment of other programs service and staff are already doing	
Provide group education sessions	Throughout project	Education plan achieved	No of activities for staff education; PDF of education materials and evaluations - log book	Training in group education	
Mentor training for Aboriginal 'Medicines Workers' involved in onsite supply	Throughout project	Medicines workers more confident and competent in medicines supply activities	Certificate of achievement Qualitative feedback from clinic staff	Contact with available trainers; copies of educational material	Only relevant where onsite supply of meds
Core Role 8: Medicines information service					
Ad hoc response to drug information queries by staff	Throughout project	Staff obtain a timely response to all drug information queries	No and type of staff drug info queries - log book	Access to online literature database AMH, TG, complementary medicines reference, contact with other drug info services such as Mothersafe phoneline	

Core Role 9: Medicines stakeholder liaison					
Liaise with stakeholders and document plan for ongoing interaction. Priority should be based on need.	In first 3 months for regular stakeholders, then as required	Stakeholder plan has been developed that meets the needs of both parties	Liaison Plan and Outcomes documents - logbook		
Liaise with community pharmacy re dispensing and supply services	As required	Service from community pharmacy meets the needs of the health service	No of service related contacts with pharmacy and outcome of contact - log book	Knowledge of s100/QUMAX business rules. Awareness of ACHHS work plan	
Core Role 10: Transitional care					
Communicate with other agencies re clinical or supply management issues eg RCF, hospital, community pharmacy	Throughout project	Continuity of Care to and from other agencies is facilitated	No of patient-related interagency contacts - log book		

Signed…… Date……
Manager, ACCHS

Signed…… Date…….
NACCHO IPAC project Officer

Signed…… Date…….
IPAC pharmacist

Signed…… Date…….
Contracted community pharmacist (if applicable)

IPAC Project

Pharmacist Logbook Instructions

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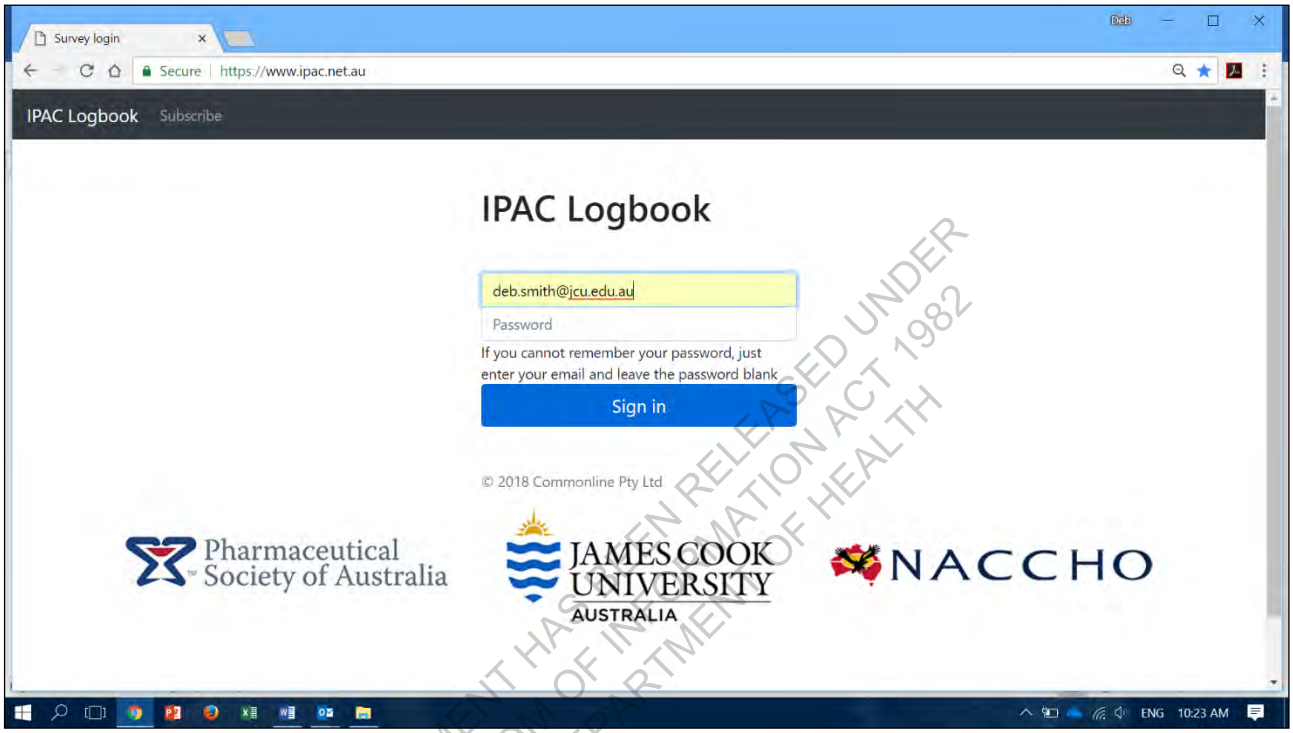
1. Introduction

The Pharmacist Logbook is an internet based application, which can be accessed from any connected device. The Logbook is to be used to record data for each of the core roles the pharmacist will undertake as part of the IPAC Project. It has been developed by Commonline Pty Ltd and is being administered by JCU.

The web address is www.ipac.net.au



2. Account Confirmation and Setting Password

The PSA will advise JCU of your name and email address to set up an account.

You will be required to set your own password. To set your password, go to the IPAC Logbook Landing Page (www.ipac.net.au) and enter your email address. Leave the password field blank and click **'Sign In'**

An email will be sent to your registered address with a link to set your password. Click the link and enter a strong password (**min 10 characters**) in the password field. Click **'Sign In'**

Your password should be a combination of letters and numbers that is not easy to guess. It must be kept confidential and not shared with anyone to ensure the security and integrity of the system.

3. Forgotten Password or to Change Password

Similar to the instructions above, go to the IPAC Logbook Landing Page (www.ipac.net.au) and enter your email address. Leave the password field blank and click **'Sign In'**

Again an email will be sent to your registered address with a link to reset your password. Click the link and enter a strong password in the password field. Click '**Sign In'**

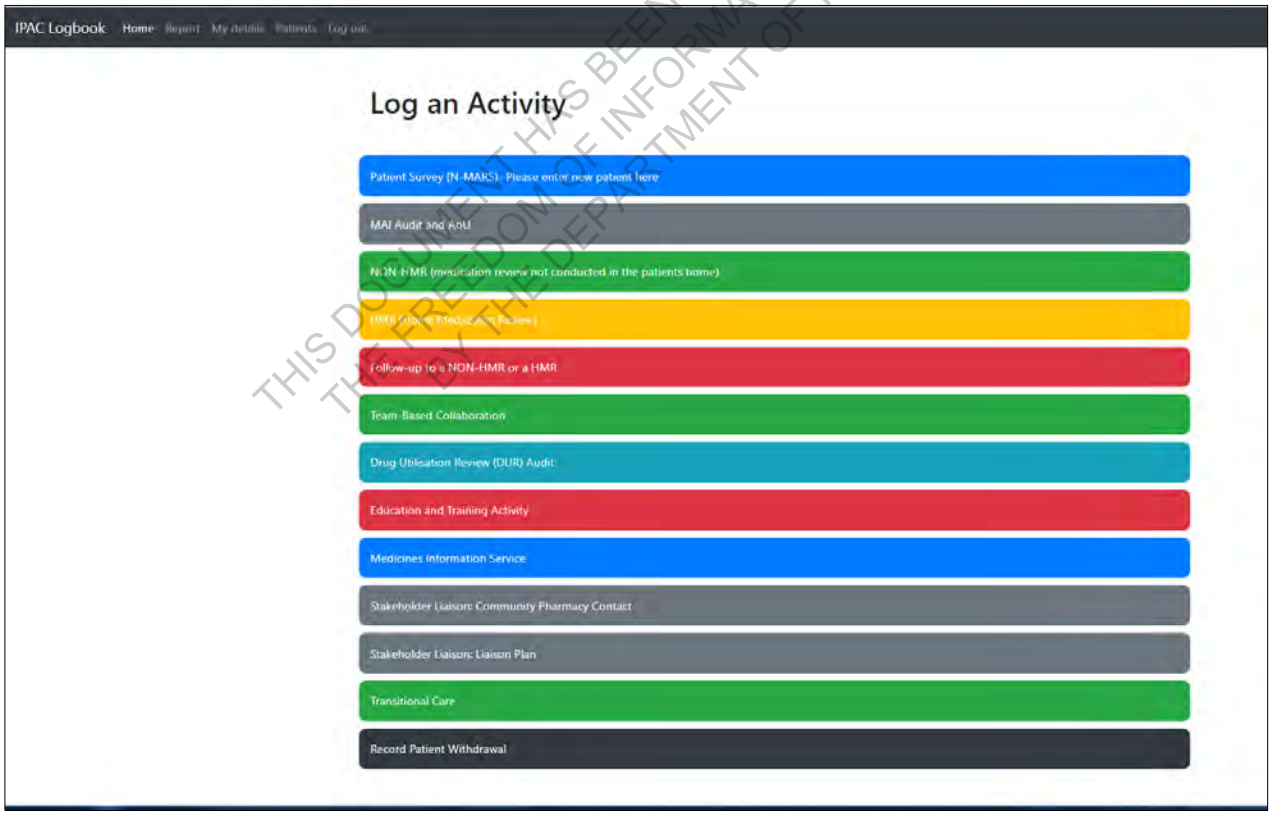
4. General Data Entry

Once you log in to the system you will be presented with a menu of categories.

Simply click on the Activity in which you wish to enter data and the relevant fields will automatically be displayed. Enter the information required.

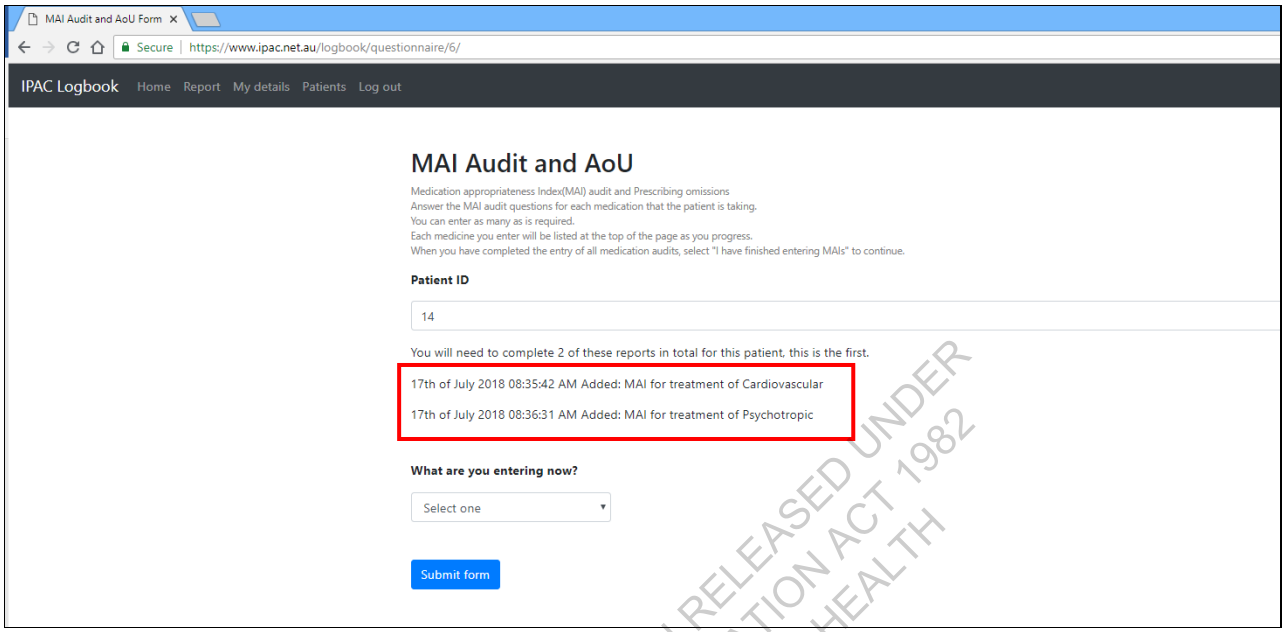
The program is intuitive and will only display the fields which are required.

Your entry will not be saved until you click the SUBMIT button at the bottom of each form.



For the MAI, as it is a longer activity, the system will save each MAI audit for a medication entered when the submit button is clicked. If you get interrupted, or need to break, you may log out of the system.

The next time you login to complete the MAI, enter the Patient ID and select the appropriate patient and a list of medication categories you have already entered will display. You can then continue to enter the data for that patient.



The screen will also note how many 'reports' have been completed for the patient (line above the red box).

Note:
For each site the practice pharmacist will conduct the MAI for 30 consented participants per 1 FTE pharmacist (eg. If pharmacist FTE=0.3, conduct the MAI for 10 participants)

An MAI is to be completed twice for each participant, once at baseline (during first 3 months of intervention phase) and again 12 months later (still within intervention phase).

5. Entering Patients

You cannot just enter a patient. You need to enter an activity associated with that patient at the same time.

If you select a category that is related to individual patient activity, you will be prompted to **enter or select** the patient before you can continue to the questions. Logbook activities that require a Patient ID include:

- Patient survey (N-MARS)
- HMR
- Non-HMR
- Follow up to a HMR or non-HMR
- Record Patient Withdrawal

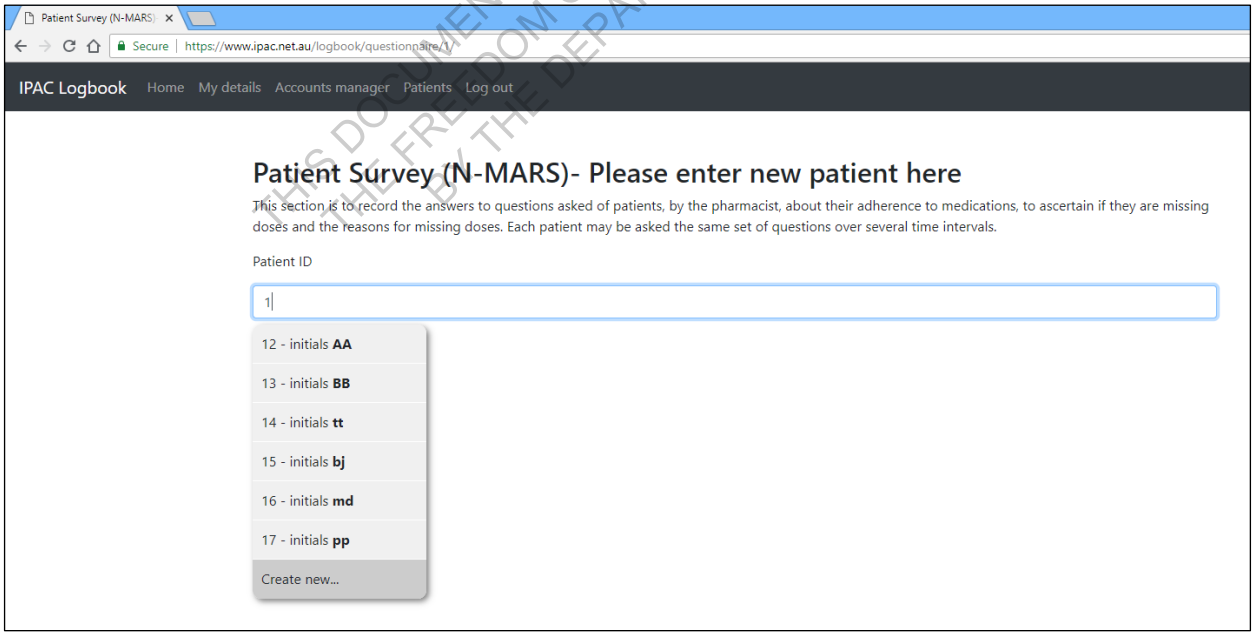
Entering a Patient ID is optional for:

- Team-Based Collaboration
- Transitional Care

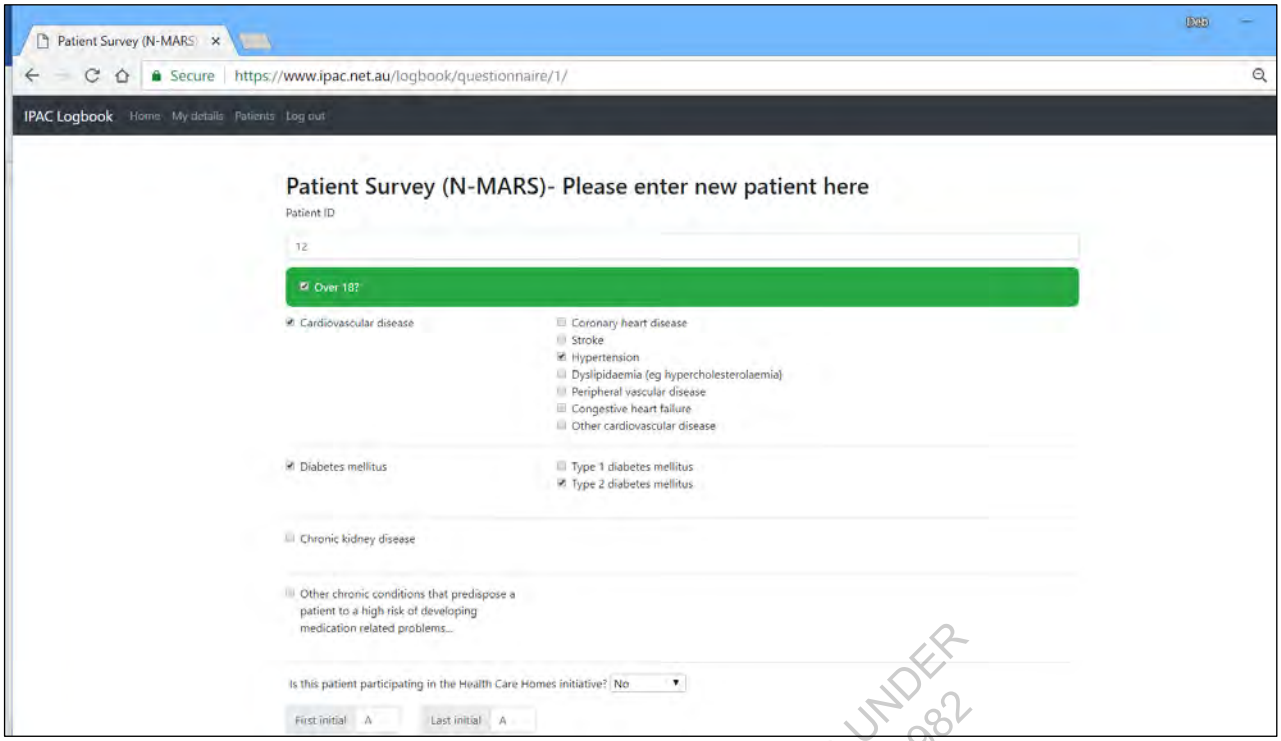
The **Patient ID number** is required to enter data for patient related activity. This number is found in the ACCHS clinical information system (CIS) - Communicare or Best Practice – and is to be **entered exactly** (no spaces, no letters). This number will be used to link patient data documented in the logbook with the data extracted from the CIS. See CIS instructions on where to locate this number. You are able to enter initials in the logbook to help you select the correct patient when follow-up activities have been undertaken.

To enter a new patient, firstly select the activity for which you wish to enter data and start typing the Patient ID number. If the patient ID number has already been entered in the system you may select the record from the drop down box (see below).

However if the patient is not yet in the logbook, select **CREATE NEW** at the bottom on the drop down box.



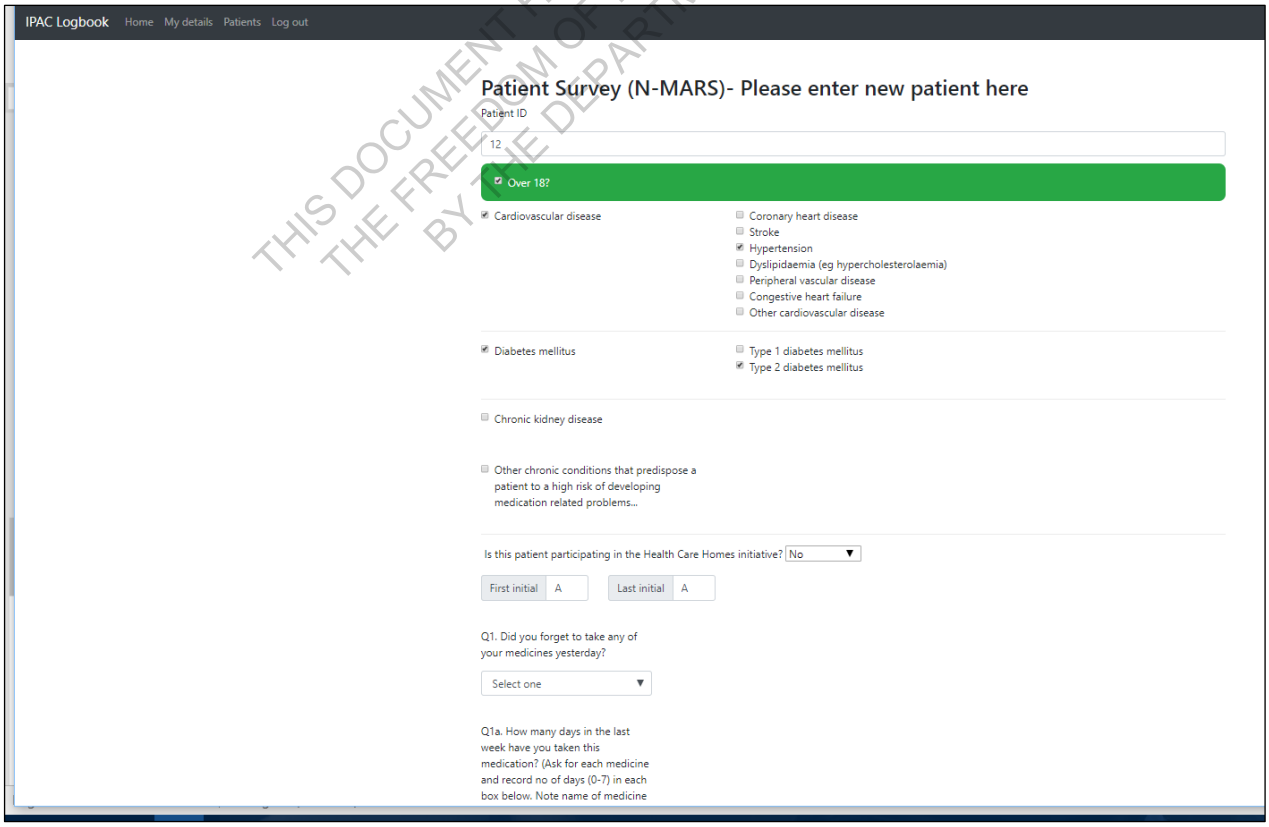
The following screen will appear and you can enter their details

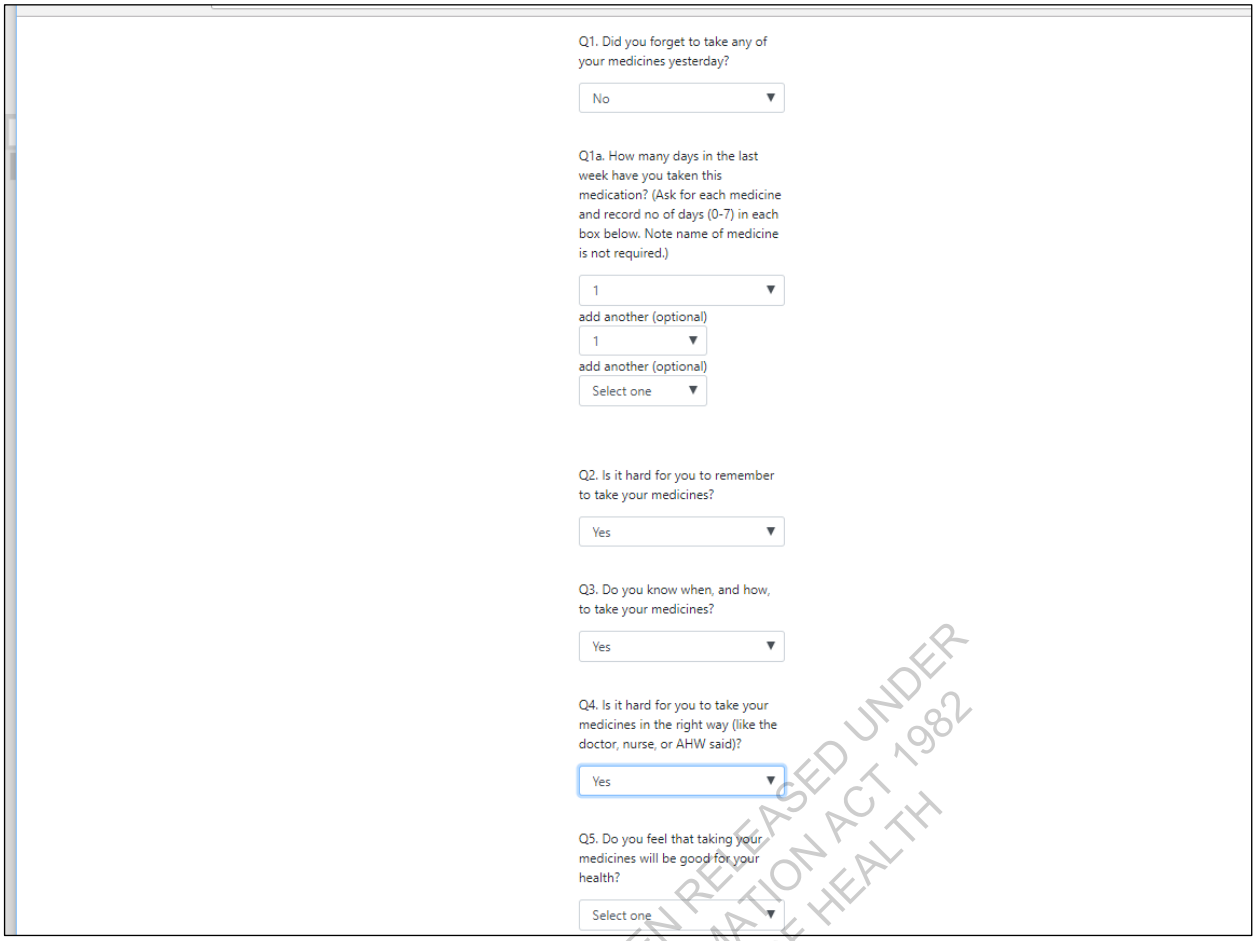


Once you have entered the patients' details, the system will continue and display the questions relevant to that activity.

The new patient details will not be saved, until the full entry is complete.

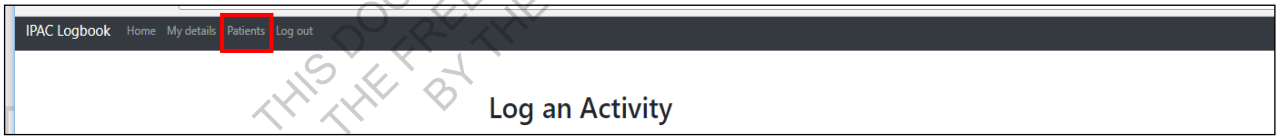
Continuing to enter data and click SUBMIT. For example for a Patient Survey (N-MARS)… see the following screenshots.



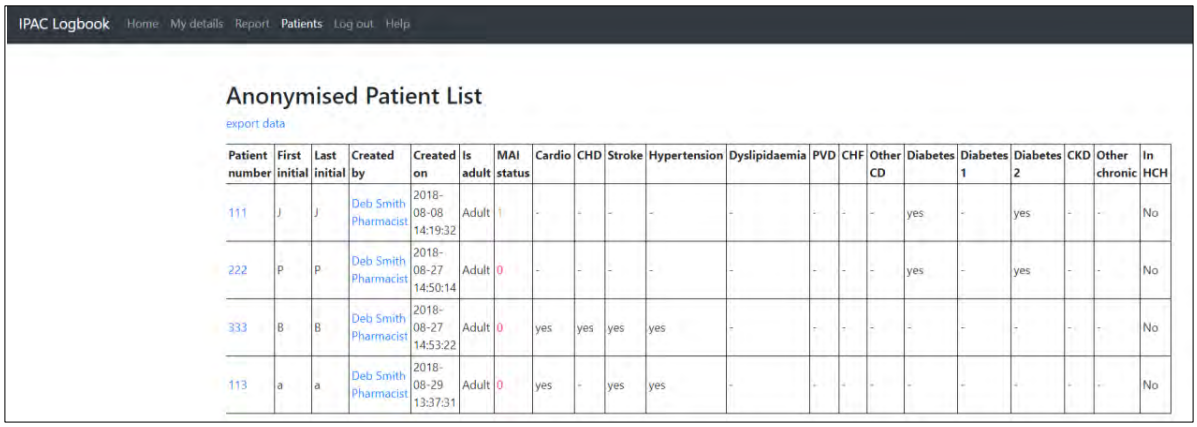


6. Editing Patient Details

To edit a patients details, Click on PATIENTS on the top menu:

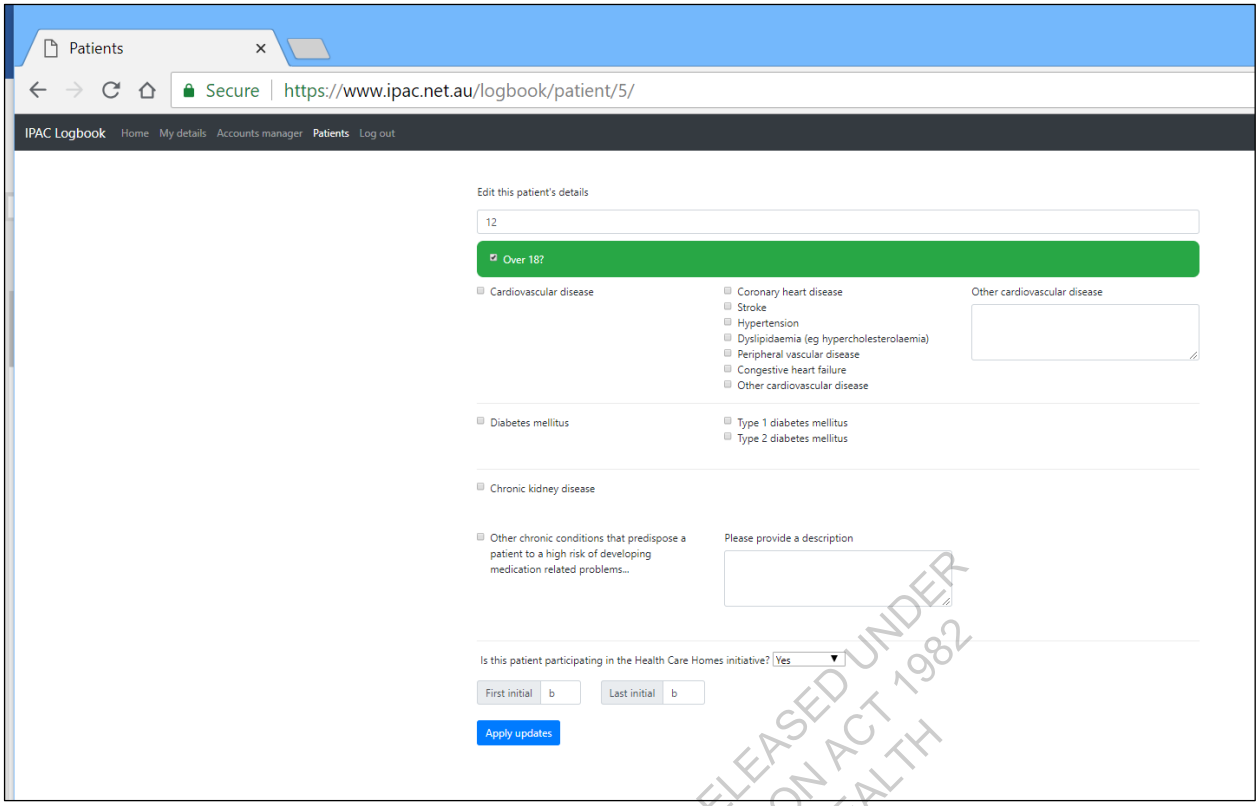


You will obtain a list of patients that you have entered into the system. Click on the number of the patient you wish to edit, eg. 222.



Patient number	First initial	Last initial	Created by	Created on	Is adult	MAI status	Cardio	CHD	Stroke	Hypertension	Dyslipidaemia	PVD	CHF	Other CD	Diabetes	Diabetes 1	Diabetes 2	CKD	Other chronic	In HCH
111	J	J	Deb Smith Pharmacist	2018-08-08 14:19:32	Adult	1	-	-	-	-	-	-	-	-	yes	-	yes	-	-	No
222	P	P	Deb Smith Pharmacist	2018-08-27 14:50:14	Adult	0	-	-	-	-	-	-	-	-	yes	-	yes	-	-	No
333	B	B	Deb Smith Pharmacist	2018-08-27 14:53:22	Adult	0	yes	yes	yes	yes	-	-	-	-	-	-	-	-	-	No
113	a	a	Deb Smith Pharmacist	2018-08-29 13:37:31	Adult	0	yes	-	yes	yes	-	-	-	-	-	-	-	-	-	No

You can then edit the patients' details as required and click APPLY CHANGES to save.



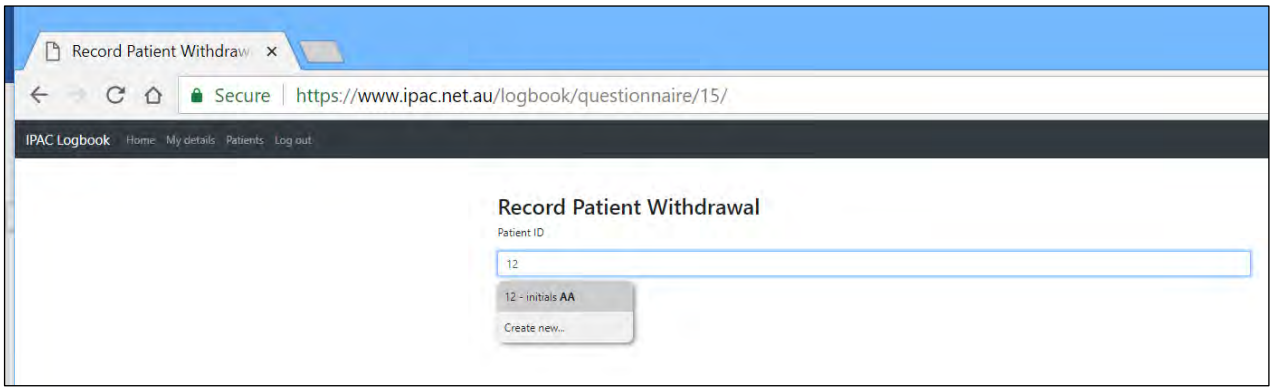
7. Withdrawing Patients

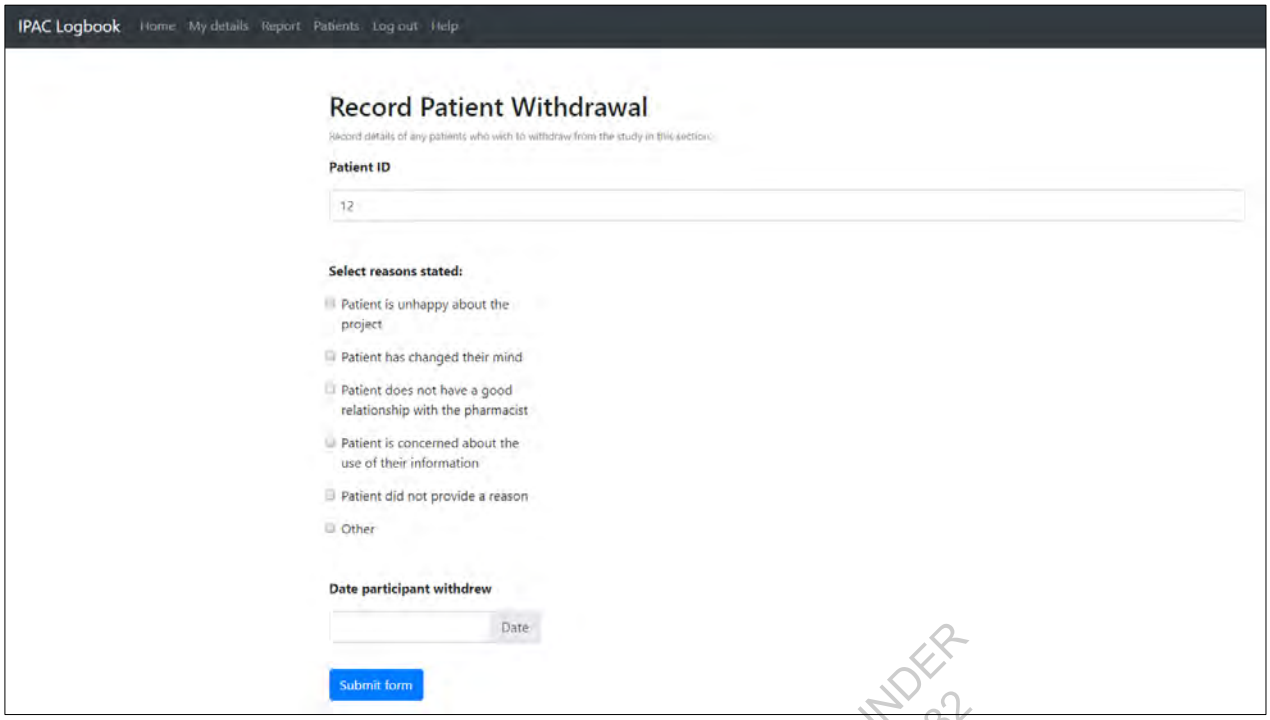
If a patient chooses to withdraw from the project, this is recorded in the logbook.

Click on RECORD PATIENT WITHDRAWAL, and identify the patient by selecting their Patient ID.

If the patient has not had any logbook activity entered about them as yet, still CREATE NEW patient in the system to record their withdrawal, as we need to remove their data from the CIS data extraction.

Select reason/s for withdrawal. If the patient does not wish to provide a reason – please select this option.





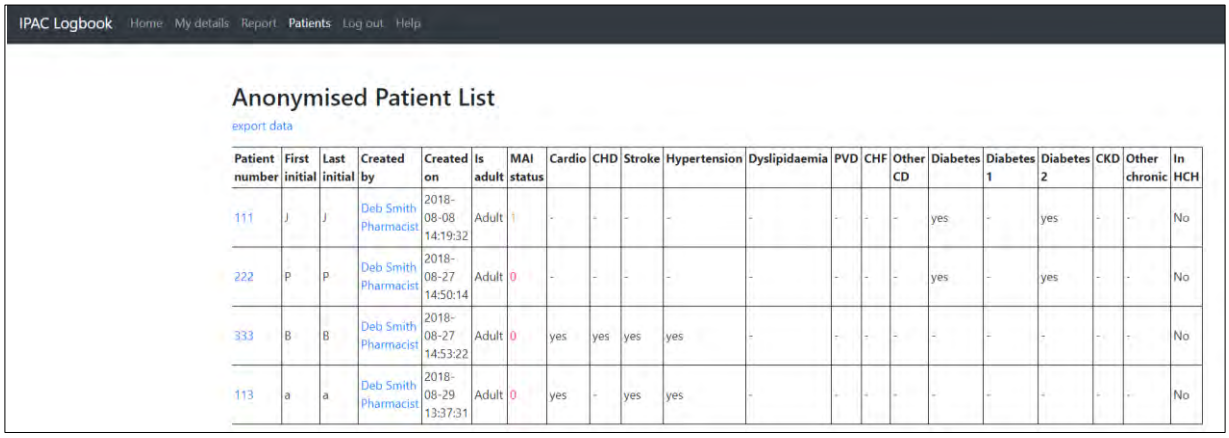
If a patient has withdrawn from the project, but provides consent at a later stage please advise the JCU Team via email (erik.biros@jcu.edu.au and/or deb.smith@jcu.edu.au) and ensure you include the patient ID number.

8. Monitoring Patient Activity

Click on PATIENTS in the top menu. This resulting screen will provide:

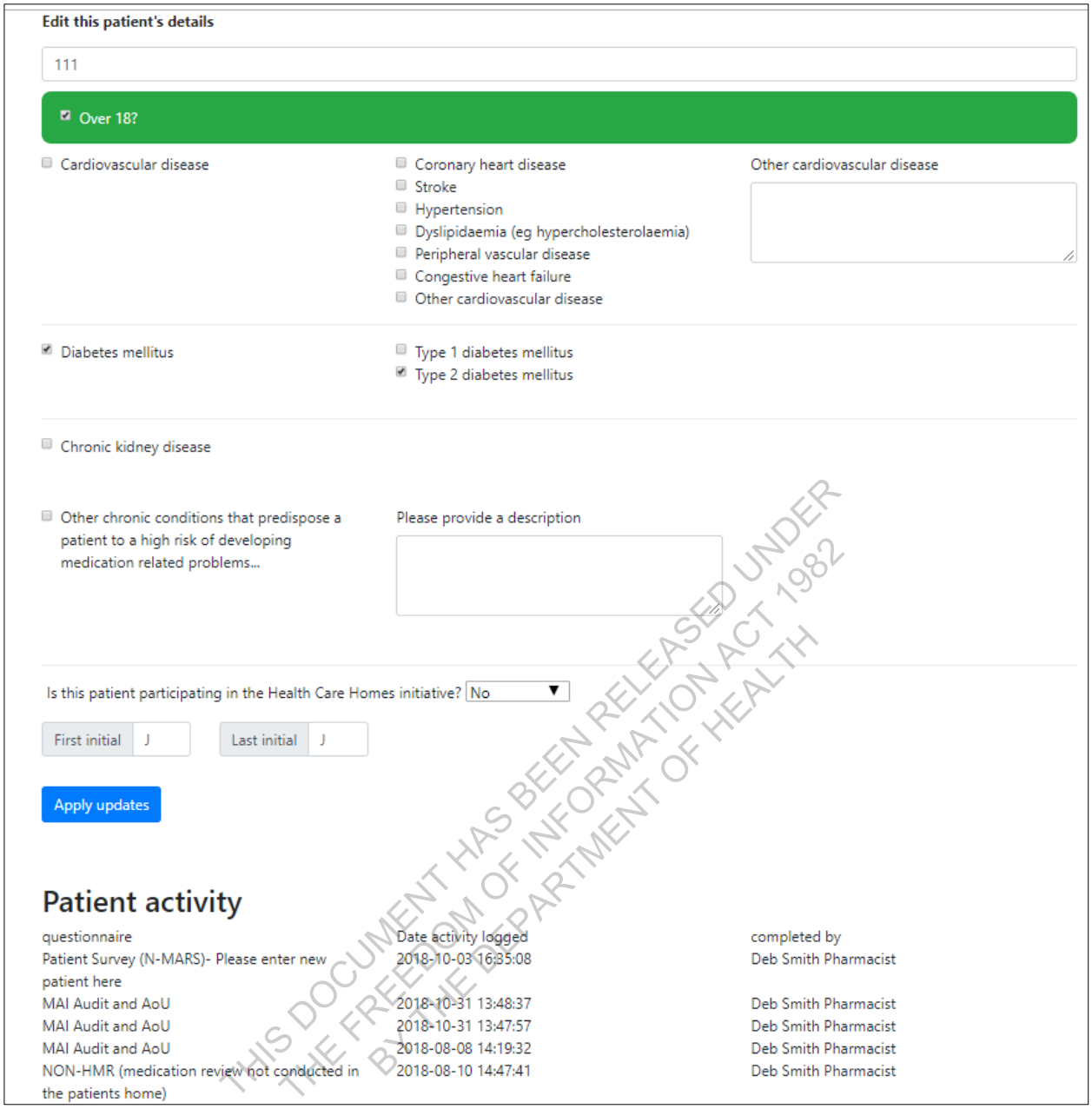
- a list of the patients for whom you have entered activity in the logbook
- an overview of the conditions that your patients have
- whether they participate in the Health Care Homes Initiative
- how many MAIs have been completed

You can click on the patient number in this section to change any of their details including initials (if they get married or change their name) and ID number if an error has been made.



Patient number	First initial	Last initial	Created by	Created on	Is adult	MAI status	Cardio	CHD	Stroke	Hypertension	Dyslipidaemia	PVD	CHF	Other CD	Diabetes	Diabetes 1	Diabetes 2	CKD	Other chronic	In HCH
111	J	J	Deb Smith Pharmacist	2018-08-08 14:19:32	Adult	1	-	-	-	-	-	-	-	-	yes	-	yes	-	-	No
222	P	P	Deb Smith Pharmacist	2018-08-27 14:50:14	Adult	0	-	-	-	-	-	-	-	-	yes	-	yes	-	-	No
333	B	B	Deb Smith Pharmacist	2018-08-27 14:53:22	Adult	0	yes	yes	yes	yes	-	-	-	-	-	-	-	-	-	No
113	a	a	Deb Smith Pharmacist	2018-08-29 13:37:31	Adult	0	yes	-	yes	yes	-	-	-	-	-	-	-	-	-	No

Clicking on a patient number will also give you a list of the activities completed for this patient.



Edit this patient's details

111

Over 18?

Cardiovascular disease

Coronary heart disease
Stroke
Hypertension
Dyslipidaemia (eg hypercholesterolaemia)
Peripheral vascular disease
Congestive heart failure
Other cardiovascular disease

Other cardiovascular disease

Diabetes mellitus

Type 1 diabetes mellitus
Type 2 diabetes mellitus

Chronic kidney disease

Other chronic conditions that predispose a patient to a high risk of developing medication related problems...

Please provide a description

Is this patient participating in the Health Care Homes initiative? No

First initial J

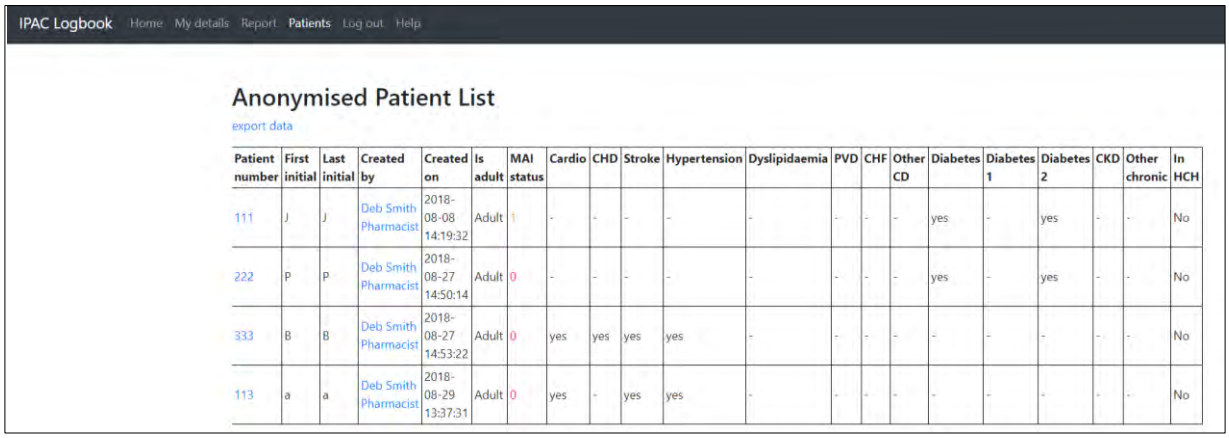
Last initial J

Apply updates

Patient activity

questionnaire	Date activity logged	completed by
Patient Survey (N-MARS)- Please enter new patient here	2018-10-03 16:35:08	Deb Smith Pharmacist
MAI Audit and AoU	2018-10-31 13:48:37	Deb Smith Pharmacist
MAI Audit and AoU	2018-10-31 13:47:57	Deb Smith Pharmacist
MAI Audit and AoU	2018-08-08 14:19:32	Deb Smith Pharmacist
NON-HMR (medication review not conducted in the patients home)	2018-08-10 14:47:41	Deb Smith Pharmacist

To export the patient list into excel - Click on 'export data' under the heading 'Anonymised Patient List'.



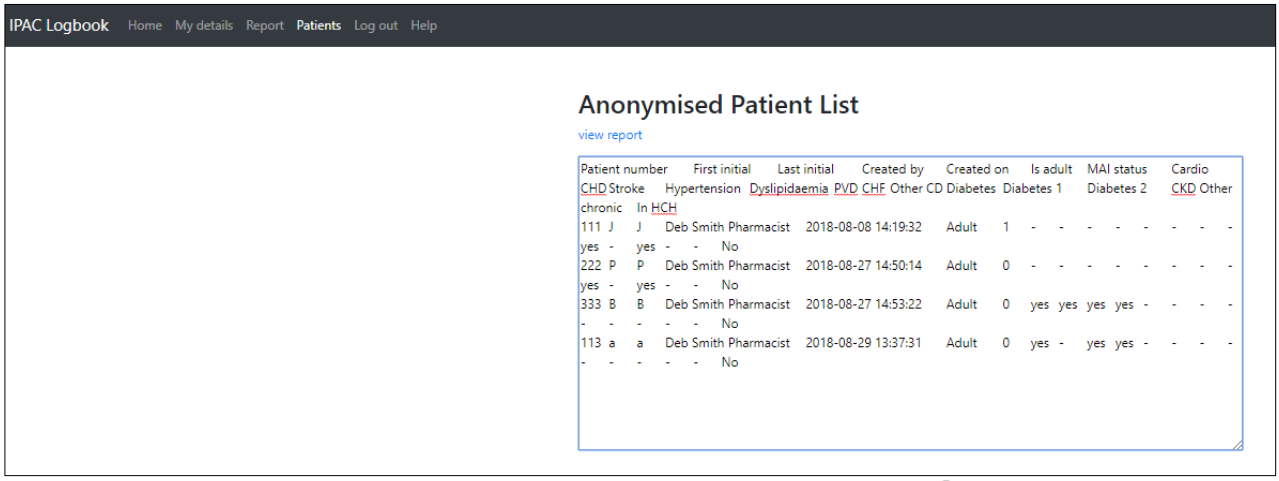
IPAC Logbook Home My details Report Patients Log out Help

Anonymised Patient List

export data

Patient number	First initial	Last initial	Created by	Created on	Is adult	MAI status	Cardio	CHD	Stroke	Hypertension	Dyslipidaemia	PVD	CHF	Other CD	Diabetes	Diabetes 1	Diabetes 2	CKD	Other chronic	In HCH
111	J	J	Deb Smith Pharmacist	2018-08-08 14:19:32	Adult	1	-	-	-	-	-	-	-	-	yes	-	yes	-	-	No
222	P	P	Deb Smith Pharmacist	2018-08-27 14:50:14	Adult	0	-	-	-	-	-	-	-	-	yes	-	yes	-	-	No
333	B	B	Deb Smith Pharmacist	2018-08-27 14:53:22	Adult	0	yes	yes	yes	yes	-	-	-	-	-	-	-	-	-	No
113	a	a	Deb Smith Pharmacist	2018-08-29 13:37:31	Adult	0	yes	-	yes	yes	-	-	-	-	-	-	-	-	-	No

Put your cursor anywhere in the box, hit CTRL A to 'select all' then copy (CTRL C) and paste (CTRL V) into excel. It will dump all of the data nicely into the spreadsheet. You can then manipulate it as you wish.



IPAC Logbook Home My details Report Patients Log out Help

Anonymised Patient List

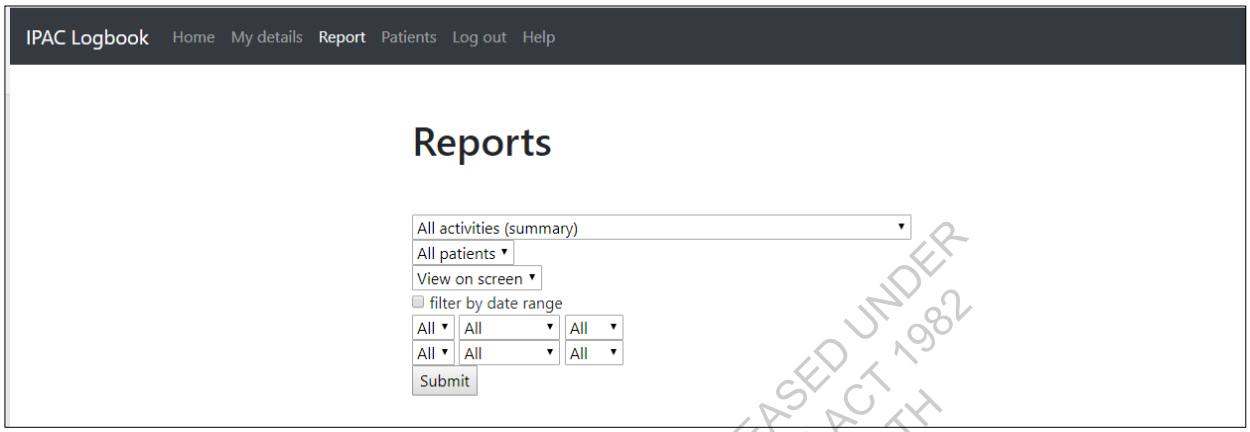
view report

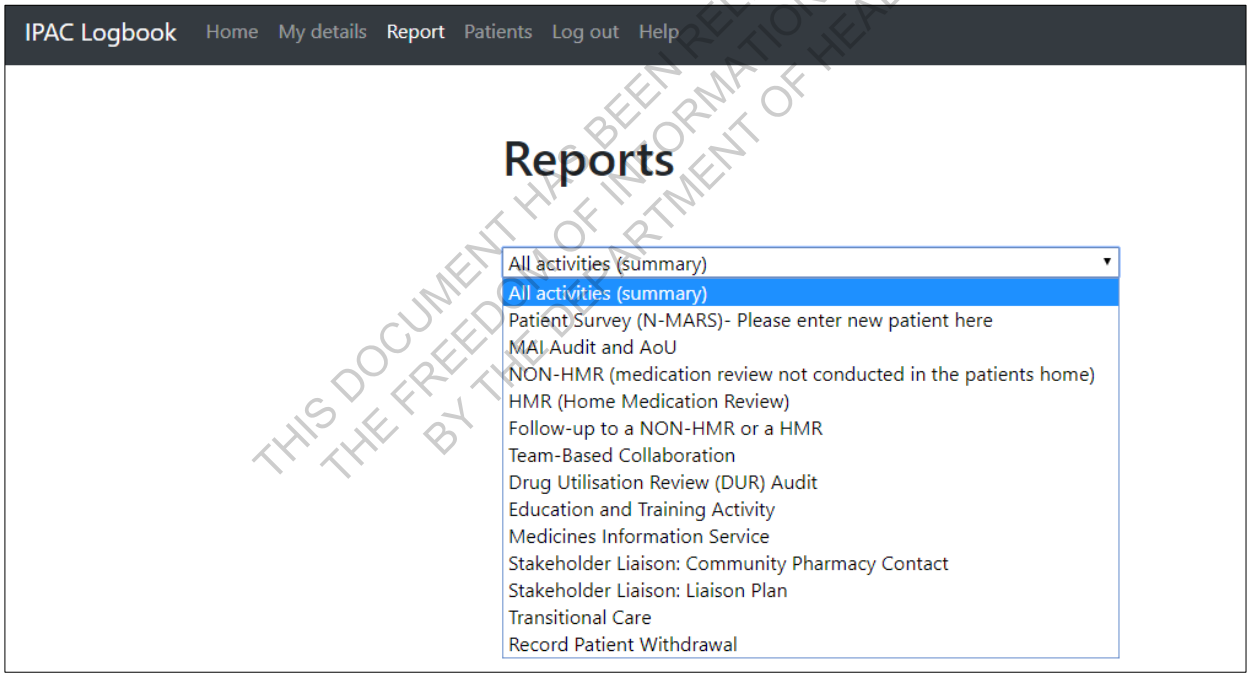
Patient number	First initial	Last initial	Created by	Created on	Is adult	MAI status	Cardio
CHD Stroke	Hypertension	Dyslipidaemia	PVD CHF Other CD	Diabetes	Diabetes 1	Diabetes 2	CKD Other
chronic	In HCH						
111	J	J	Deb Smith Pharmacist	2018-08-08 14:19:32	Adult	1	- - - - - - -
yes -	yes	- -	No				
222	P	P	Deb Smith Pharmacist	2018-08-27 14:50:14	Adult	0	- - - - - - -
yes -	yes	- -	No				
333	B	B	Deb Smith Pharmacist	2018-08-27 14:53:22	Adult	0	yes yes yes yes - - - -
- -	-	- -	No				
113	a	a	Deb Smith Pharmacist	2018-08-29 13:37:31	Adult	0	yes - yes yes - - - -
- -	-	- -	No				

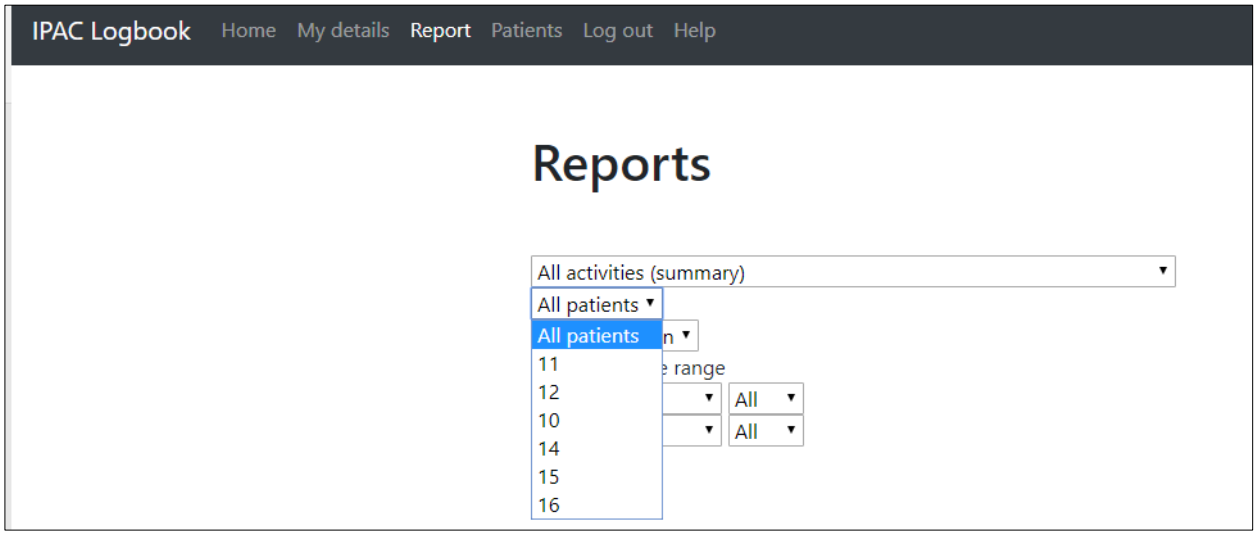
9. Monitoring All Activity

Click on REPORT in the top menu. You will be able to run various reports through this screen and filter the results by:

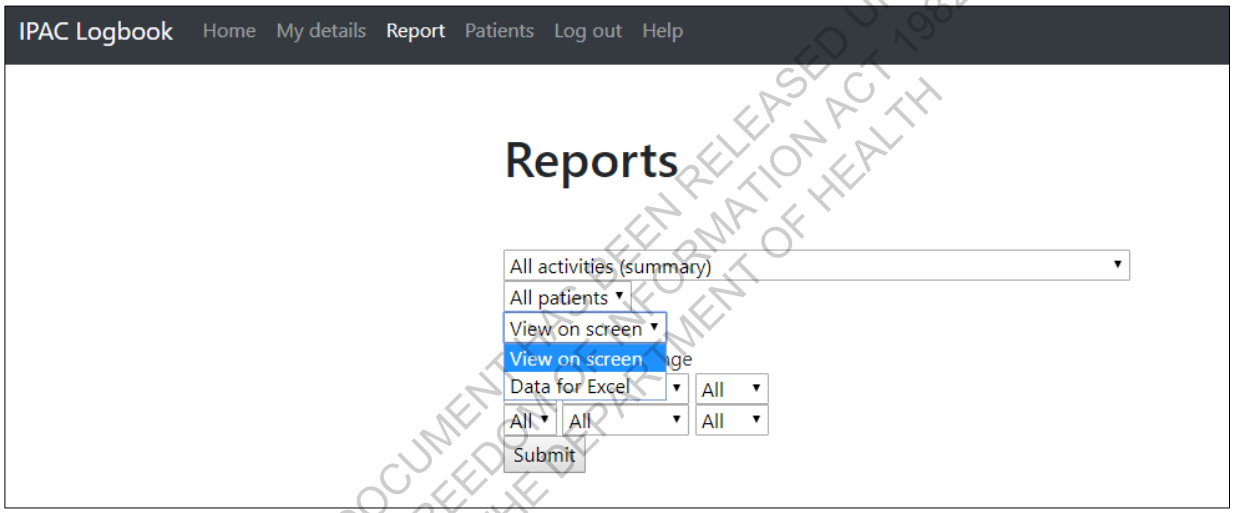
- Activity – select a single activity/category or leave as 'All activities (summary)' to run for everything
- Patient – select a single patient or leave as 'All patients'
- Date – click the 'filter by date range' and enter details or leave blank to obtain all data



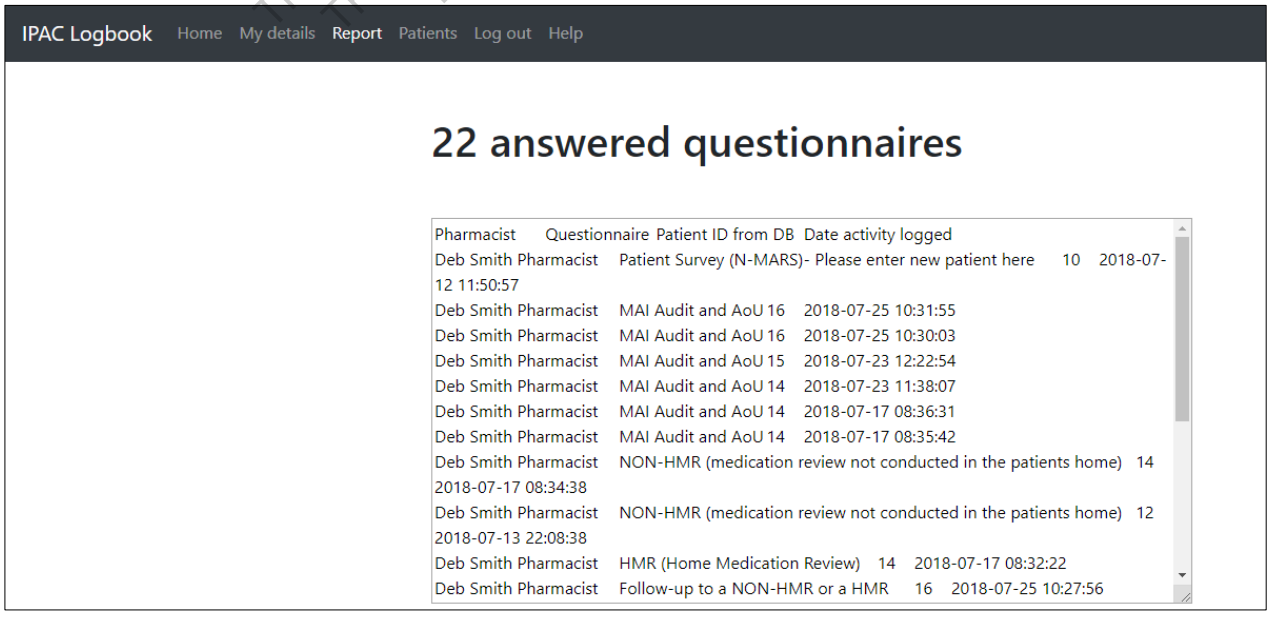




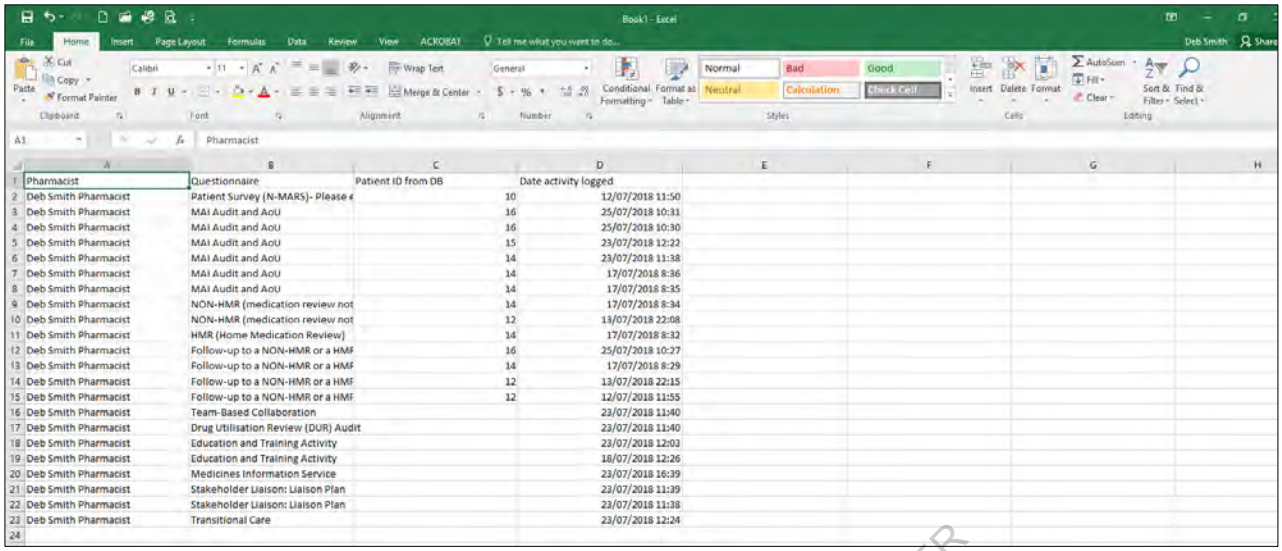
The drop down box 'VIEW ON SCREEN' will display your results in a table on the computer screen. It also has an option 'DATA FOR EXCEL'. Select this option if you want to dump your report into excel.



If you select 'DATA FOR EXCEL' the results will appear in a box as follows:



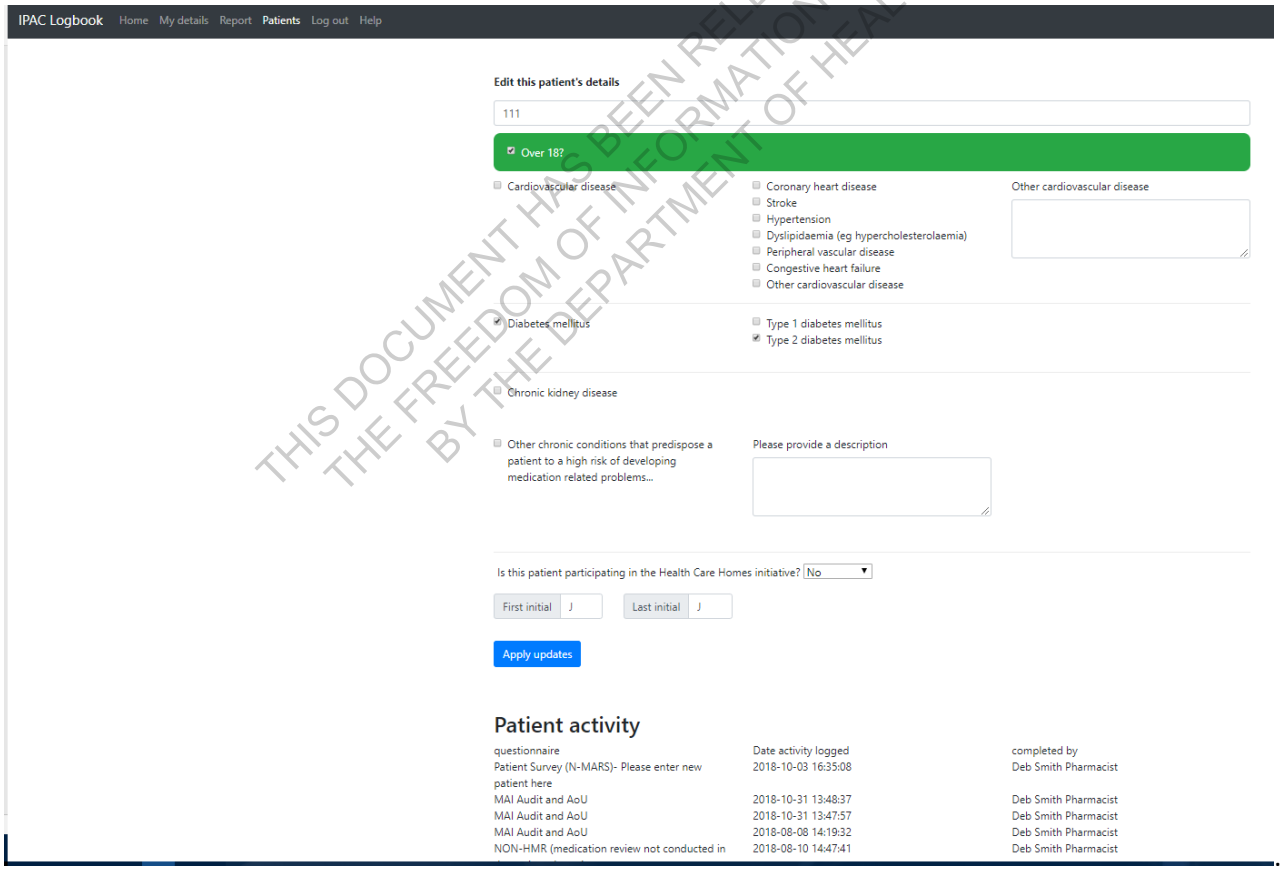
Put your cursor anywhere in the box, hit CTRL A to 'select all' then copy (CTRL C) and paste (CTRL V) into excel. It will dump all of the data nicely into the spreadsheet. You can then manipulate it as you wish.



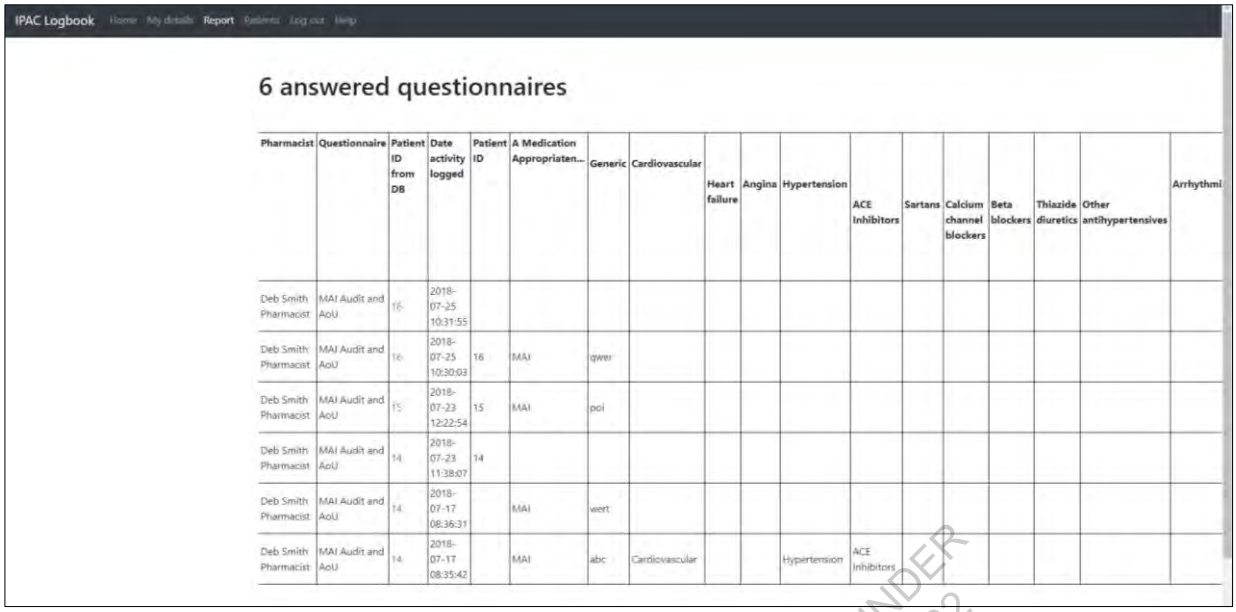
Pharmacist	Questionnaire	Patient ID from DB	Date activity logged
Deb Smith Pharmacist	Patient Survey (N-MARS)- Please e	10	12/07/2018 11:50
Deb Smith Pharmacist	MAI Audit and AoU	16	25/07/2018 10:31
Deb Smith Pharmacist	MAI Audit and AoU	16	25/07/2018 10:30
Deb Smith Pharmacist	MAI Audit and AoU	15	23/07/2018 12:22
Deb Smith Pharmacist	MAI Audit and AoU	14	23/07/2018 11:38
Deb Smith Pharmacist	MAI Audit and AoU	14	17/07/2018 8:36
Deb Smith Pharmacist	MAI Audit and AoU	14	17/07/2018 8:35
Deb Smith Pharmacist	NON-HMR (medication review not	14	17/07/2018 8:34
Deb Smith Pharmacist	NON-HMR (medication review not	12	13/07/2018 22:08
Deb Smith Pharmacist	HMR (Home Medication Review)	14	17/07/2018 8:32
Deb Smith Pharmacist	Follow-up to a NON-HMR or a HMF	16	25/07/2018 10:27
Deb Smith Pharmacist	Follow-up to a NON-HMR or a HMF	14	17/07/2018 8:29
Deb Smith Pharmacist	Follow-up to a NON-HMR or a HMF	12	13/07/2018 22:15
Deb Smith Pharmacist	Follow-up to a NON-HMR or a HMF	12	12/07/2018 11:55
Deb Smith Pharmacist	Team-Based Collaboration		23/07/2018 11:40
Deb Smith Pharmacist	Drug Utilisation Review (DUR) Audit		23/07/2018 11:40
Deb Smith Pharmacist	Education and Training Activity		23/07/2018 12:03
Deb Smith Pharmacist	Education and Training Activity		18/07/2018 12:26
Deb Smith Pharmacist	Medicines Information Service		23/07/2018 16:39
Deb Smith Pharmacist	Stakeholder Liaison: Liaison Plan		23/07/2018 11:39
Deb Smith Pharmacist	Stakeholder Liaison: Liaison Plan		23/07/2018 11:38
Deb Smith Pharmacist	Transitional Care		23/07/2018 12:24

Other Reports:

By selecting a patient ID, a report will be generated for that specific patient:



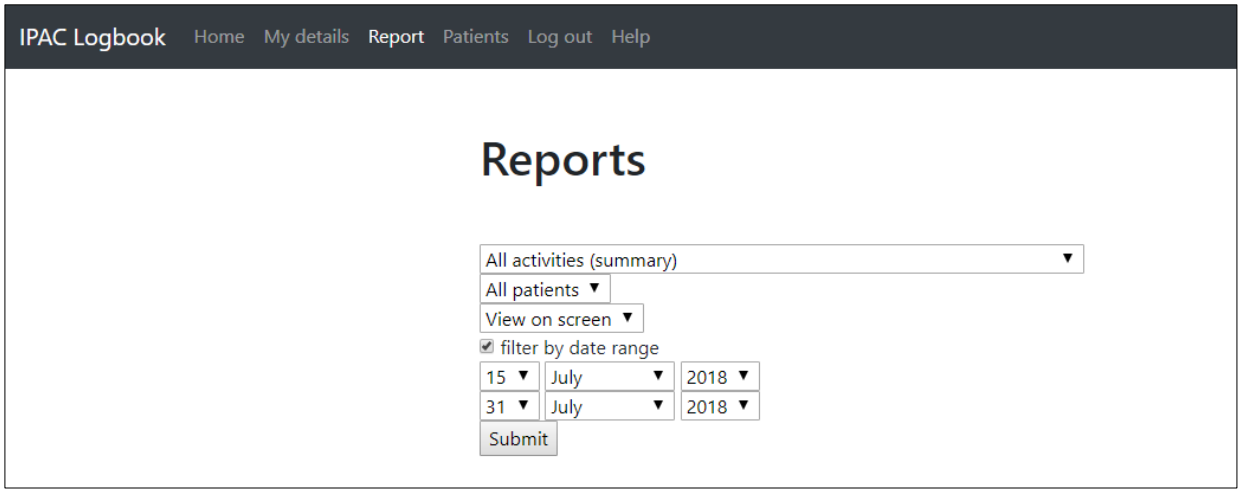
By selecting an activity (in this case MAI), a report will be generated and all data you have entered for that activity will displayed:

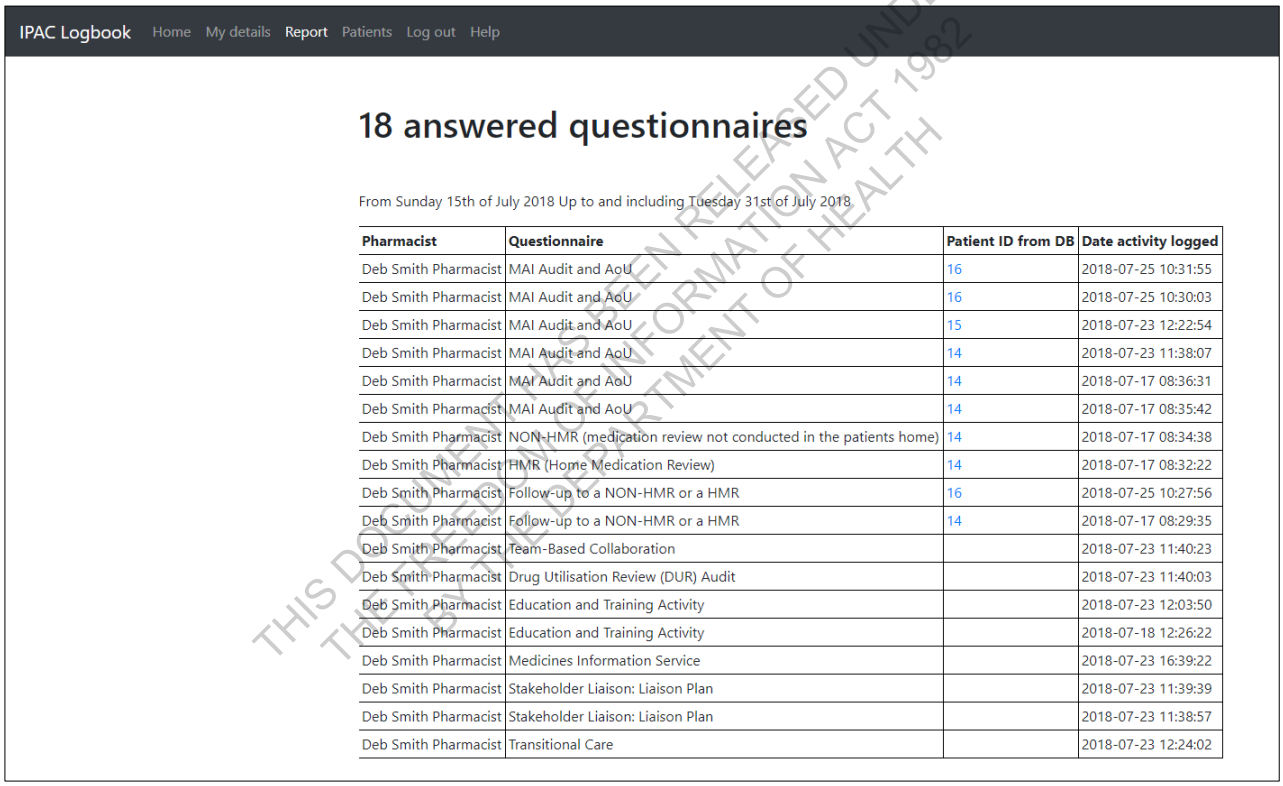


Pharmacist	Questionnaire	Patient ID from DB	Date activity logged	Patient ID	A Medication Appropriaten...	Generic	Cardiovascular	Heart failure	Angina	Hypertension	ACE Inhibitors	Sartans	Calcium channel blockers	Beta blockers	Thiazide diuretics	Other antihypertensives	Arrhythmi
Deb Smith Pharmacist	MAI Audit and AoU	16	2018-07-25 10:31:55														
Deb Smith Pharmacist	MAI Audit and AoU	16	2018-07-25 10:30:03	16	MAI	qwer											
Deb Smith Pharmacist	MAI Audit and AoU	15	2018-07-23 12:22:54	15	MAI	poi											
Deb Smith Pharmacist	MAI Audit and AoU	14	2018-07-23 11:38:07	14													
Deb Smith Pharmacist	MAI Audit and AoU	14	2018-07-17 08:36:31		MAI	wert											
Deb Smith Pharmacist	MAI Audit and AoU	14	2018-07-17 08:35:42		MAI	abc	Cardiovascular			Hypertension	ACE Inhibitors						

Some of the resulting tables are very long, however they will assist you to monitor what activity you have entered.

To report activity within a specified time period, click the filter by date range box and enter details. The date range box will display results according to when the activities were logged.





Pharmacist	Questionnaire	Patient ID from DB	Date activity logged
Deb Smith Pharmacist	MAI Audit and AoU	16	2018-07-25 10:31:55
Deb Smith Pharmacist	MAI Audit and AoU	16	2018-07-25 10:30:03
Deb Smith Pharmacist	MAI Audit and AoU	15	2018-07-23 12:22:54
Deb Smith Pharmacist	MAI Audit and AoU	14	2018-07-23 11:38:07
Deb Smith Pharmacist	MAI Audit and AoU	14	2018-07-17 08:36:31
Deb Smith Pharmacist	MAI Audit and AoU	14	2018-07-17 08:35:42
Deb Smith Pharmacist	NON-HMR (medication review not conducted in the patients home)	14	2018-07-17 08:34:38
Deb Smith Pharmacist	HMR (Home Medication Review)	14	2018-07-17 08:32:22
Deb Smith Pharmacist	Follow-up to a NON-HMR or a HMR	16	2018-07-25 10:27:56
Deb Smith Pharmacist	Follow-up to a NON-HMR or a HMR	14	2018-07-17 08:29:35
Deb Smith Pharmacist	Team-Based Collaboration		2018-07-23 11:40:23
Deb Smith Pharmacist	Drug Utilisation Review (DUR) Audit		2018-07-23 11:40:03
Deb Smith Pharmacist	Education and Training Activity		2018-07-23 12:03:50
Deb Smith Pharmacist	Education and Training Activity		2018-07-18 12:26:22
Deb Smith Pharmacist	Medicines Information Service		2018-07-23 16:39:22
Deb Smith Pharmacist	Stakeholder Liaison: Liaison Plan		2018-07-23 11:39:39
Deb Smith Pharmacist	Stakeholder Liaison: Liaison Plan		2018-07-23 11:38:57
Deb Smith Pharmacist	Transitional Care		2018-07-23 12:24:02

If you need any assistance contact Deb Smith: deb.smith@jcu.edu.au

IPAC Pharmacist folder of resources (compiled for PSA upload)

Link to IPAC Project – Pharmacists Training http://learn.psa.org.au/course/view.php?id=3949

EVIDENCE BASED GUIDELINES

- National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people – 'The National Guide'
  https://www.racgp.org.au/download/Documents/Guidelines/National-guide-3rd-ed.pdf
- Remote Primary Health Care Manuals (including CARPA Standard Treatment Manual)
  https://www.remotephcmanuals.com.au/home.html
- Remote Health Atlas (Northern Territory)
  https://health.nt.gov.au/professionals/remote-health-atlas
- NT Immunisation Schedule 2018 (adult)
  https://nt.gov.au/wellbeing/healthy-living/immunisation/adult-vaccinations
- Primary Clinical Care Manual 9th Ed (Queensland Government)
  https://publications.qld.gov.au/dataset/primary-clinical-care-manual-9th-edition/resource/06f04fcb-6eb6-45eb-9770-c4a79a715b62
- Chronic Conditions Manual 1st Ed 2015 (Queensland Government)
  https://publications.qld.gov.au/dataset/chronic-conditions-manual
- The Australian Immunisation Handbook 10th Ed
  http://www.immunise.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook10-home

IPAC PROJECT CONSENT

Individual patient consent for participation in IPAC project:

- Master Participant Consent form for IPAC (Vic & Qld sites)
- Master Participant Information brief for IPAC (Vic & Qld sites)
- Master NT Top End Participant Consent form for IPAC Project
- Master NT Top End Participant Information brief for IPAC Project
- Master NT CA Participant Brief for IPAC Project
- Master NT CA Consent form for IPAC Project

GP consent for participation in the IPAC project (for qualitative analysis only)

- Master Vic GP Participation brief (Vic & Qld sites)
- Master Vic GP Consent form for IPAC (Vic & Qld sites)
- Master NT Top End Participant Consent form for IPAC Project
- Master NT Top End Consent form for IPAC Project
- Master NT CA GP Participation brief (for NT sites)
- Master NT CA GP Consent form for IPAC (For NT sites)

CLINICAL INFORMATION SYSTEMS

- Communicare - IPAC Procedures
- Best Practice - IPAC Procedures
- Best Practice training webinar (link)
- My Health Record PSA Guidelines for Pharmacists http://www.psa.org.au/wp-content/uploads/My-Health-Record-Guidelines-for-Pharmacists.pdf

CORE ROLES

Core role 1 – Medication Management Reviews

- PSA Guidelines for pharmacists providing Home Medicines Review (HMR) services
- HMR flowchart
- Non-HMR criteria

Core role 2 – Team Based Collaboration

- Australian Cardiovascular Risk charts 2018
- MBS Fact Sheet
- MBS flowchart for Chronic Disease - Aboriginal and Torres Strait Islander Health Check (715)

Core role 3 – Medication Adherence Assessment and Support

- N-MARS Patient Survey form

Core role 4 – Medication Appropriateness Audit (MAI & AOU)

- MAI Patient Survey form
- MAI examples
- AOU Patient Survey form
- Therapeutic Guidelines – Suggested approach for glycaemic management in adults with Type 2 diabetes (algorithm)
- NT pneumococcal vaccination & re-vaccination schedule 2018

Core role 5 – Preventive Health care

- The National Guide Lifecycle Chart - Adult https://www.racgp.org.au/download/Documents/Guidelines/Adult-chart-National-guide-3rd-web-final.pdf
- RACGP 'Red book' – Guidelines for preventive activities in general practice 9th ed https://www.racgp.org.au/your-practice/guidelines/redbook/
- Australian Cardiovascular Risk charts 2018
- RACGP SNAP Guide https://www.racgp.org.au/your-practice/guidelines/snap/

Core role 6 – Drug Utilisation Review

- DUR report template

Core role 7 – Education and Training

- How to make an oral case presentation to healthcare colleagues https://www.pharmaceutical-journal.com/learning/learning-article/how-to-make-an-oral-case-presentation-to-healthcare-colleagues/20200876.article
- IPAC Project Education Session Evaluation form
- IPAC Project Education Session Evaluation Summary Report

Core role 8 – Medicines Information Service

- SHPA Medicines Information Services https://www.shpa.org.au/medicines-information-services
- PBS Schedule http://www.pbs.gov.au/pbs/home;jsessionid=11z8y3hxiba5q14bw10g4gbf2e

Core role 9 – Medicines Stakeholder Liaison

- Medicines Stakeholder Liaison – Purpose of Plan
- Medicines Stakeholder Liaison - Plan and Outcomes

Core role 10 – Transitional Care

- NPS learning module 'Get it Right – Taking a Best Possible Medication History' https://learn.nps.org.au/mod/page/view.php?id=5436

DISEASE STATE SPECIFIC INFORMATION

- Australian Indigenous HealthInfoNet https://healthinfonet.ecu.edu.au/
- Kidney Health Australia – Indigenous Resources http://kidney.org.au/your-kidneys/support/indigenous-resources
- Kidney Health Australia – Caring for Australasians with Renal Impairment (KHA-CARI) Guidelines http://www.cari.org.au/
- Kidney Health Australia - Chronic Kidney Disease Management Handbook http://kidney.org.au/health-professionals/prevent/chronic-kidney-disease-management-handbook
- Kidney Health Australia – download free smartphone app CKD GO!
- Diabetes Australia – Aboriginal and Torres Strait Islander people https://www.diabetesaustralia.com.au/aboriginal-and-torres-strait-islanders
- Stroke Foundation https://strokefoundation.org.au/
- The Heart Foundation – Aboriginal Health Resources for Health Professionals https://www.heartfoundation.org.au/for-professionals/aboriginal-health-resources

- Lung Foundation Australia – Indigenous Support
  https://lungfoundation.com.au/patient-support/indigenous/
- National Asthma Council Australia - Asthma in Aboriginal and Torres Strait Islander peoples
  http://www.asthmahandbook.org.au/populations/atsi-peoples

OTHER USEFUL RESOURCES

- PSA Career Pathway – Aboriginal and Torres Strait Islander Health Services Pharmacist
  http://www.psa.org.au/my-career-and-cpd-plans/career-pathways/aboriginal-health-pharmacist
- Aboriginal Interpreter Service available for the NT
  https://nt.gov.au/community/interpreting-and-translating-services/aboriginal-interpreter-service
- National Translating and Interpreting Service (TIS) - free for doctors and health services:
  https://www.tisnational.gov.au
- Aboriginal and Torres Strait Islander Health Performance Framework 2017 Report
  https://www.pmc.gov.au/sites/default/files/publications/indigenous/hpf-2017/tier3/315.html

LEGISLATION related to the practice of pharmacy

- Victoria
  http://www.psa.org.au/practice-support-and-tools/psa-information-framework/legislation-victoria
- Northern Territory
  http://www.psa.org.au/practice-support-and-tools/psa-information-framework/legislation-northern%20territory
- Queensland
  http://www.psa.org.au/practice-support-and-tools/psa-information-framework/legislation-queensland
- Pharmacy Board of Australia Guidelines
  http://www.pharmacyboard.gov.au/Codes-Guidelines.aspx
- Professional practice standards and guidelines published by the Pharmaceutical Society of Australia (PSA)
  http://www.psa.org.au/wp-content/uploads/Professional-Practice-Standards-V5-PDF-5.5mb.pdf

Pharmaceutical Society of Australia

Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC)

PHARMACISTS' TRAINING

JAMES COOK UNIVERSITY AUSTRALIA

NACCHO

Pharmaceutical Society of Australia

Learning Objectives

1/ Describe the key attributes required to practice as a culturally aware pharmacist

2/ Define the 10 core pharmacist roles which are fundamental to the IPAC Project

3/ Recognise the ways in which data will be captured in the IPAC Project for the purposes of evaluation

Pharmaceutical Society of Australia

IPAC Project
Pharmacists' Training Day 1

9:00-9:30	Welcome!
9:30-10:00	IPAC Project Overview
10:00-10:30	IPAC Project Consent Process
10:30-10:45	Morning Tea
10:45-12:30	Core Roles
12:30-1:00	Lunch
1:00-3:00	Core Roles
3:00-3:15	Afternoon Tea
3:15-4:00	Activity Workplan
4:00-5:00	Logbook, Resources, Lines of Communication

JAMES COOK UNIVERSITY AUSTRALIA

NACCHO

IPAC Project
Pharmacists' Training Day 2

9:00-9:15	Check-in!
9:15-10:15	Pharmacists working with Aboriginal People – s47F &s47F
10:15-10:30	Morning Tea
10:30-12:30	Pharmacists working with Aboriginal people
12:30-1:00	Lunch (full Project Team invited to attend)
1:00-3:00	Pharmacists working with Aboriginal People
3:00-3:15	Afternoon Tea
3:15-4:00	Clinical Information Systems – Best Practice & Communicare

Pharmaceutical Society of Australia

Thank you!

JAMES COOK UNIVERSITY AUSTRALIA

NACCHO

PSA is the peak national body for pharmacists