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Australian Government Department of Health
***Evaluation of the Health Care
Homes program***

Interim evaluation report 2020

Volume 3: Evaluation progress

Revision history

Version	Date	Modification
0.1	12 October 2020	Initial draft.
0.2	25 November 2020	Comments from the Evaluation Working Group and the Department of Health incorporated.
0.3	15 March 2021	Amendments requested by NPS MedicineWise to correct references to MedicineInsight data.

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Acronyms

ACCHS	Aboriginal Community Controlled Health Service
AIHW	Australian Institute of Health and Welfare
CATI	Computer assisted telephone interview
CBDRH	Centre for Big Data Research in Health (University of New South Wales)
CHERE	Centre for Health Economics Research and Evaluation (University of Technology Sydney)
EWG	Evaluation Working Group
FTE	Full time equivalent
GP	General practitioner
HCH	Health Care Homes
HPA	Health Policy Analysis
HPOS	Health Professionals Online Services
LHN	Local Hospital Network
MBS	Medical Benefits Schedule
PBS	Pharmaceutical Benefits Schedule
PHN	Primary Health Network
POLAR	Population Level Analysis and Reporting
PRM	Predictive risk model
R1	Round 1 of the evaluation. R2, R3, R4, R5 refer to rounds 2 to 5 respectively.
RST	Risk stratification tool
SURE	Secure Unified Research Environment

1. Introduction

The Health Care Homes (HCH) trial is being evaluated by a consortium led by Health Policy Analysis. The consortium includes the Centre for Big Data Research in Health (University of New South Wales), the Centre for Health Economics Research and Evaluation (University of Technology Sydney) and other Australian and international experts. The researchers are listed in Appendix 1.

This document is the **Interim evaluation report 2020, Volume 3: Evaluation progress**. It is one of three volumes featuring the findings of the evaluation of the HCH trial up to 30 June 2020. The volumes are described in Table 1.

Table 1 – Interim evaluation report 2020: Description of volumes

Volume	Description
Volume 1: Summary report	Summarises the findings of the interim evaluation.
Volume 2: Main report	Presents the findings from the interim evaluation.
Volume 3: Evaluation progress	Describes progress with the evaluation and provides further information about evaluation data and the practice and PHN benchmark reports.

A detailed description of the evaluation methods is in the HCH Evaluation plan (Health Policy Analysis, 2019a). Briefly, the evaluation is seeking to answer the following key questions:

1. How was the HCH model implemented and what were the barriers and enablers?
2. How does the HCH model change the way practices approach chronic disease management?
3. Do patients enrolled in HCH experience better quality care?
4. What are the financial effects of the HCH model on governments, providers and individuals?

Additional key questions relating to the community pharmacy component are:

5. Is the community pharmacy component beneficial to the broader HCH coordinated care model and should it be included as part of any future roll out?
6. Do patients who received medication management services as part of the HCH trial experience better health outcomes than patients who did not?
7. What was the level of engagement between HCH practices and community pharmacy (care coordination)?
8. Is the inclusion of a pharmacy component in HCH financially viable?

These questions have many dimensions. Therefore, more detailed questions have been developed for each key question. The detailed questions are listed in Appendix 2 of this volume.

The evaluation is using mixed methods. Data sources are described in Table 3. Qualitative data are being collected through interviews and focus groups with patients and patient's carers/ families, GPs, other primary care staff, pharmacists and others. The interviews and focus groups are being undertaken in 20 locations across Australia. Quantitative data are also being used to investigate how things have changed for patients enrolled in HCH (using

before/after and interrupted time series analysis) and to compare patients enrolled in HCH with similar patients receiving usual care (quasi-experimental analysis). These are also described in Table 2.

For practical purposes, data collection for the evaluation has been organised into five 'rounds'. There are also three 'waves' of patient surveys. Table 2 shows the dates relating to these.

Table 2 – HCH evaluation: Data collection 'rounds' and patient survey 'waves'

Data collection round		Patient survey wave	
Round 1 (R1)	October 2017 to June 2018	Wave 1 (Baseline)	December 2017 to March 2019
Round 2 (R2)	July to December 2018		
Round 3 (R3)	January to June 2019		
Round 4 (R4)	July 2019 to June 2020	Wave 2	December 2019 to March 2020
Round 5 (R5)	July 2020 to June 2021	Wave 3	December 2020 to March 2021

Table 3 – Evaluation data sources

Data source	Key questions	Collection type	Report in which data are used and data collection round/ period		
			Interim 2019	Interim 2020	Final report 2021
Patient surveys	3, 6	Primary	Wave 1 (baseline)	n.a.	Waves 1, 2 and 3
Practice surveys	1, 2, 4	Primary	R1 R2	R4	R1 R2 R4 R5
Practice staff surveys	1, 2, 4, 5, 7	Primary	R1	n.a.	R1, R5
PHN surveys	1, 2, 4	Primary	R1 R2	R4	R1 R2 R4 R5
PHN interviews	1, 2, 4, 5, 7	Primary	R1 R2	R4	R1 R2 R4 R5
Case studies ¹	2, 4, 5, 6, 7	Primary	R2	R4	R1 R2 R4 R5
HCH program data ²	1, 4	Secondary	Oct 2017–Aug 2019	Oct 2017–Jun 2020	Oct 2017–Jun 2021
Community Pharmacy Health Outcomes Data	5, 6, 7, 8	Secondary	July 2018–June 2019	July 2018–June 2020	July 2018–June 2021
Risk stratification	2	Secondary	July 2018–June 2019	July 2018–June 2020	July 2018–June 2021
Practice extracts	2, 3	Secondary	Various to June 2019	Various to June 2020	Various to June 2021
Linked data ³	3, 4	Secondary	n.a.	n.a.	To be confirmed

¹ Case studies include patient interviews/ focus groups, practice interviews, related provider interviews (e.g. pharmacists, allied health), PHN interviews, LHN/ state & territory health authority interviews; ² Includes, amongst other issues, data from Services Australia on patients registered with the program; ³ Includes MBS, PBS, hospital, emergency department, aged care, and fact of death data.

Structure of this report

This volume is structured as follows:

- Chapter 2 summarises the progress of obtaining data for the evaluation up to 30 June 2020.
- Chapter 3 describes the completeness and quality of the data extracted from the practice clinical management systems supplied for the evaluation, and outlines the progress with the other data sources.
- Chapter 4 describes the benchmark reports developed by the evaluation team.

2. Evaluation progress

Table 4 summarises the progress of obtaining data for the evaluation up to 30 June 2020.

Table 4 – Evaluation progress, by data source

Data source	Evaluation round ¹				
	1	2	3	4	5
Patient surveys: Wave 1: 2,018 patients completed surveys, with a raw response rate of 64.6%. Wave 2: From a total follow up sample of 1,762 wave 1 patients, 1,275 surveys were completed and an additional 584 patient surveys were conducted (out of a sample size of 970 additional patient contacts). There was a total of 1,859 completed surveys, with a raw response rate of 68.0%. See Table 5 for details.	C	C		C	TC
Practice surveys: Round 1 survey responses: Part A 178, Part B 170. Round 2 surveys responses: 106. Round 4 responses: 57. See Table 6 for dates of surveys and response rates.	C	C		C	TC
Practice staff surveys: Round 1 surveys were completed between March and August 2018. 529 staff responded from 146 practices. These included 100 GPs, 125 practice nurses/nurse practitioners, 131 receptionists, and 128 practices managers. 425 surveys are from staff of practices continuing in the HCH trial as at 30 June 2020. The next round of practice staff surveys is planned for March 2021.	C				TC
Practice exit interviews/surveys: Methods for conducting exit interviews and surveys changed over time. By September 2018, interviews had been conducted with eight individuals covering 17 practices (some individuals spoke on behalf of multiple practices). Written reasons for withdrawal were provided by three other practices. These responses were incorporated into the <i>Interim evaluation report 2019</i> (Health Policy Analysis, 2019b). An online exit survey was subsequently used, although responses to this have been low (7 practices). Since the <i>Interim evaluation report 2019</i> , a further 13 practices withdrew from the trial. From the 13 withdrawn practices, the evaluation team received exit surveys or conducted interviews with 10.	C	C	C	C	TC
PHN survey: Round 1 surveys were completed in August 2018 (all 10 PHNs responded). Round 4 PHN surveys were completed in the first half of 2020. Nine of the 10 PHNs completed the survey.	C			C	TC
PHN interviews: Round 1 interviews occurred between January and June 2018. Round 2 interviews occurred between November and December 2018. Round 4 interviews started in July 2019 and continued through to October 2019. All 10 participating PHNs were interviewed in all rounds.	C	C		C	TC
Case studies: Round 2 patient and carer/ family interviews/ focus groups and practice interviews were undertaken between September and October 2018, with the exception of ACCHS in the NT. Ethics approval was subsequently obtained for the case studies of the NT ACCHS and interviews with two sites occurred in October 2019. Round 4 patient and carer/ family interviews/ focus groups and practice interviews were undertaken between November 2019 and March 2020. The next round of case studies with all case study sites (including the NT ACCHS) will be undertaken between March and May 2021.		C		C	TC

Data source	Evaluation round ¹				
	1	2	3	4	5
Practice data extracts: Data are being received via third party extraction software as follows: Pen CS (this includes data from the NT ACCHS), Polar GP, and SONIC. Ongoing data extracts are being received from these sources. Data for comparator practices is from MedicinesInsight. MedicinesInsight has supplied two extracts.	C	C	C	C	IP
HCH program data: Weekly reports on HCH enrolment numbers have been provided to the evaluators. Approval to access the more detailed specified data was obtained in October 2018, and data to 30 June 2020 has been supplied.		C	C	C	IP
Linked data. The first round of data covering the period from 1 July 2015 to 30 June 2017 was received at the end of 2019. The second instalment covering the period from 1 July 2017 to 30 June 2019 is expected before the end of 2020.			C	IP	TC
Other data sources: De-identified risk stratification data from Precedence, covering the period up until the end of June 2020, has been received. Data on participation and evaluation of training activities collected by AGPAL was also supplied and reported in the <i>Interim evaluation report 2019</i> . Guildlink is supplying the Community Pharmacy Health Outcomes Data. Data to 30 June 2020 was received.		C	C	C	TC

¹See Table 2, p. 3

3. Evaluation data

Patient surveys

The patient survey aims to obtain perspectives on patients' relationship with their HCH, addressing the key evaluation question: "Do patients enrolled in HCH experience better quality care". The more detailed questions it seeks to answer are:

- Did patients enrolled in the HCH program have improved access to primary care services, including alternates to face-to-face contacts?
- How did use of services from within the HCH practice change?
- Did the HCH model result in increased continuity in the provision of primary care?
- Were the patients enrolled in the HCH program and their families/ carers more engaged in managing patients' health needs?
- What strategies resulted in the greatest impact on patient activation?
- Did patients enrolled in HCH report improved experiences of primary care, including coordination of their care and communication with their primary care providers?

The survey incorporates items from the following instruments:

- Patient Assessment of Chronic Illness Care (13-item version) (Gibbons et al., 2017)
- Patient Activation Measure (PAM) (13-item version) (Hibbard et al., 2005)
- EQ-5D-5L (Herdman et al., 2011)
- Consumer Assessment of Healthcare Providers and Systems (CAHPS) Clinician and Group adult survey (CG-CAHPS) (Agency for Healthcare Research and Quality, 2015) – selected items only
- Care Coordination Quality Measure for Primary Care (CCQM-PC) (Agency for Healthcare Research and Quality, 2016) – selected items only.

PAM and EQ-5D-5L are proprietary tools for which Health Policy Analysis has obtained licenses for the HCH evaluation. The survey is in Appendix F of the evaluation plan (Health Policy Analysis, 2019a).

The survey was translated into five languages: Arabic, Italian, Greek, Chinese and Tamil. The first four languages were chosen as they are the most common in Australia according to Australian Bureau of Statistics data as well as advice from a culturally and linguistically diverse public relations specialist. Tamil was nominated by one of the PHNs due to a particular cluster of Tamil speakers in its region. These five languages were the same as those into which the patient information and consent form was translated.

To preserve the psychometric properties of the tools, Health Policy Analysis obtained official translations of tools where available (e.g. PACIC, EQ-5D-5L). For others, a translation service was used.

Only patients aged 18 years and over were invited to be surveyed. This is because additional ethical and legal issues apply to children, and the costs of addressing these were estimated to be greater than the benefits for the evaluation, as children were expected to be a small proportion of HCH enrolees. Patients of the NT ACCHS were not surveyed (see 'Case studies' below).

Health Policy Analysis subcontracted The Social Research Centre (a business unit of the Australian National University) to administer the surveys via a computer assisted telephone interview (CATI).

The patient surveys are being conducted in three waves. In wave 1, patients were approached to complete a survey around four to six weeks following enrolment. In wave 2, patients surveyed during wave 1 were followed up. In addition, in wave 2, an additional cohort of patients not surveyed in the first round was included. The additional cohort targeted patients referred to community pharmacy as part of the HCH trial. Wave 3 will follow up patients interviewed in the two previous waves.

The targets were to survey 2,000 patients in wave 1 and 2,500 in waves 2 and 3. Therefore, additional numbers were invited to achieve these targets. Table 5 shows the response rates.

Table 5 – HCH evaluation patient survey response rates

Wave	Time frame	Patients surveyed	Invited	Completed surveys	Response rate
Wave 1 (Baseline)	December 2017 to March 2019	Sample drawn from HCH practices	3,125	2,018	65%
Wave 2	December 2019 to March 2020	Wave 1 patients	1,762 ¹	1,275	72%
		Additional patients drawn from those referred to community pharmacists	970	584	60%
		Total wave 2	2,732	1,859	68%

Source: The Social Research Centre. ¹ Number decreased from 2,018 wave 1 patients due to various factors, including number disconnected, patient deceased, etc.

Practice surveys

Surveys of HCH practices have been conducted in round 1, 2 and 4. A further survey will be conducted in round 5 (March 2021). The surveys aim to capture:

- baseline information about the practice
- key features of the practice relevant to HCH approach
- the capabilities of the practice prior to joining the program (e.g. participation in other chronic disease management and related initiatives)
- changes implemented as a result of participation in HCH
- practice experience of and feedback on HCH
- practice perspectives on the effectiveness of HCH.

The questions included in each survey are in Appendix C of the evaluation plan (Health Policy Analysis, 2019a). The surveys are administered online using the Qualtrics application, through the evaluation app.

Table 6 shows the response rates for the surveys. Response rates have been declining as the trial has progressed. Strategies to maximise completion of surveys have included:

- Letting practices know upfront about the approximate time frames during which surveys would be issued.
- Letter to practices during each survey round outlining the importance of the survey and details about completion.

- Setting a generous time window for completion of the survey (usually two months, although extensions have been granted in all cases).
- Reminder letter to practices not completing the survey within the time frame allocated.
- Assistance to individual practices to access the HPA evaluation portal to complete the survey (e.g. reissue lost/ forgotten passwords, issue logins to additional people in the practice).
- Inclusion in the survey tool of a skip function for questions that are conditional on a previous answer (to minimise respondents going through questions that are not relevant to them).
- Where questions in the survey referred to responses that the practice had given in an earlier survey round, those responses were provided in the survey tool for easy reference.
- Letters to PHNs letting them know which of their practices had not completed a survey, and asking them to follow up.
- Department of Health reminders to PHN practice facilitators at regular meetings and email correspondence with this group to follow up with practices with outstanding surveys.

Table 6 – HCH evaluation practice survey response rates

Evaluation round	Dates that the bulk of the practices completed the survey [A]	Number of practices responding, at the end of [A] <i>(Total responses, if different)</i>	Number of practices active, at the end of [A]	Response rate, at the end of [A]	Number of practices that responded that were still in the HCH trial at 30 June 2020
1 Part A	December 2017 to July 2018	163 <i>(178)</i>	179 <i>(end of July 2018)</i>	91.1%	110
1 Part B		158 <i>(170)</i>		88.3%	109
2	November 2018 to February 2019	106	159 <i>(end of February 2019)</i>	66.7%	87
4	November 2019 to March 2020	57	123 <i>(end of March 2020)</i>	46.3%	56

Similar strategies to the above will be used to maximise the return rates for the final survey round. In addition, HPA will run webinars using AGPAL's platform on the findings of the most recent evaluation, pointing out how the data being collected from practices (including surveys) is being used for the evaluation and its importance. The webinars will be for practice staff as well as for the PHN practice facilitators.

Case studies

The case studies are providing a more comprehensive view of the implementation of HCH. They have involved visits to selected locations within each of the 10 participating PHNs, studying two practices in each location. The following groups are being interviewed:

- Patients and their carers and family, and where appropriate, community members (involving enrollees of the practices being interviewed).
- Staff of the selected practices, speaking on behalf of the practice as well as the individual perspectives of GPs, nurses, allied health professionals and technical and administrative staff employed by the practice.
- External allied health and other service providers that the practices being interviewed refer patients to.
- PHN representatives.
- Local Hospital Network (LHN) and state/territory health authority representatives (associated with all 10 PHNs).

Practices included in the case studies were selected to maximise diversity across the dimensions of the sampling frame established for the HCH trial (which include practice size, location and type). PHNs reviewed the practices selected by Health Policy Analysis, and in some cases suggested alternatives to better fit the strata features. Practices that withdraw from HCH in subsequent interview rounds were replaced by an alternative within the PHN.

The first round of visits was between September and October 2018. The second was between November 2019 and March 2020. A third round will occur between March and May 2021.

Incentive payments for participation include:

- Patients and their carers/ family – a \$30 gift voucher for participation in an interview or focus group.
- Practices – \$1,000 per round.
- Allied health and other related providers – \$160 for participation in a one-hour interview or focus group.

Table 7 provides information about the case study interviews for rounds 2 and 4.

Table 7 – HCH evaluation case studies: Interviews for rounds 2 and 4

Informants interviewed or participating in focus group	Round 2	Round 4
Practices interviewed		
Active at the cutoff date for the report	(31 August 2019) 14	(30 June 2020) 18 ¹
Withdrawn at the time of the report	(31 August 2019) 4 ¹	(30 June 2020) 0
<i>Total</i>	18	18 ²
Practice staff interviewed		
GPs	24	24
Nurses	13	14
Practice managers	14	14
Receptionist	6	5
Other	8	5
<i>Total</i>	65	62
Patients and carers		
Patients	42	40 ³
Carers	4	2
<i>Total</i>	44	42
PHNs	10	10

¹ Notes: Four practices that withdrew in Round 2 were replaced with four other HCH practices. ² Figure does not include two HCH ACCHSs in NT Aboriginal communities that were interviewed in Round 4. More information on these sites is detailed in Chapter 6 of Volume 2. ³ Figure does not include nine patients from two HCH ACCHS sites in NT Aboriginal communities that were interviewed in Round 4. More information on these sites is detailed in Chapter 6 of Volume 2.

Extracts from practice clinical management systems

Extracts from practice clinical management systems were provided for the HCH evaluation.

Practice data is being used to evaluate the quality of chronic illness care provided for HCH patients (e.g. recording of HbA1c tests in patients with diabetes) and patient health outcomes (e.g. HbA1c results). Practice data extracts will also be used to compare outcomes in HCH patients with those of non-enrolled counterparts in the same practice and in non-HCH practices.

This section describes the sources of practice data extracts, how the data are being collected and managed for the evaluation, the patient information that is extracted, and how the capture of patient information varies between data sources. It also examines the extent to which practices flag HCH patients in their clinical management systems.

Key points:

- Practice data extracts are being provided for the evaluation from four sources: Pen CS, Population Level Analysis and Reporting (POLAR), Sonic Clinical Services (Sonic) and MedicinesInsight. For this reporting period (January 2020 to June 2020), practice extracts were received from 114 HCH practices (including 13 NT ACCHSs), among the 120 practices participating in the HCH as at 30 June 2020. Practice data extracts for 417 non-HCH comparator practices were received from MedicinesInsight in August 2019 (covering the period from 1 December 2015 to 30 June 2019).
- Practice extracts from the four data sources contain information about patient demographic characteristics, service encounters, diagnoses, clinical observations, pathology results, prescriptions and MBS billing. However, there are variations between sources and in how the data are subsequently processed which could lead to differences in the conditions or clinical measures observed.
- Within the same data source, there are also variations between practices in the availability of data items (e.g. some MBS billing, patient conditions and observations are absent from entire extracts provided by several practices).
- As at 30 June 2020, there are some discrepancies between the number of HCH patients identified in practice data extracts and the number of enrolled patients registered in HPOS.

Sources of practice data extracts

As of 17 September 2020, practice extracts for the evaluation have been obtained from four sources: Pen CS, POLAR, Sonic and MedicinesInsight. At the start of the evaluation, the Department and the evaluation consortium explored options for obtaining extracts from practice clinical management systems for the evaluation. The approach in obtaining practice data was guided by three criteria:

- Leveraging existing arrangements for data sharing. This was important so as not to introduce new processes for practices, and to use existing licences for data extraction where available so as not to add cost.

- Creating infrastructure or processes that would have value beyond the evaluation.
- Selecting an approach that is compatible with most of the clinical management systems used by practices.

A survey of PHNs was conducted early 2017 by the Department and HPA to explore the extent to which the practices were already sharing their data with the PHNs. Most of the PHNs were using Pen CS software for their extracts, covering the licensing costs for their practices. Therefore, Pen CS data were leveraged for the evaluation.

The NT ACCHSs agreed for their data relating to HCH patients to be extracted for evaluation. All ACCHSs were provided with instructions on how to do this. ACCHSs used the Pen CS platform to supply data directly to the evaluators. As at 17 September 2020, extracts from 13 ACCHSs were transferred to the Secure Unified Research Environment (SURE) environment for data analysis (covering the period to 30 June 2020).

Within South East Melbourne PHN, POLAR software, developed by Outcome Health, was being used to share data between GP practices and the PHN. The evaluation therefore leveraged the data extracted through POLAR software for participating HCH practices within this PHN.

Eleven HCH practices who are part of Sonic Clinical Service's Independent Practitioner Network agreed to provide extracts for HCH patients in 2019. For those Sonic practices, data relating to HCH patients were extracted directly from their Best Practice clinical management system and delivered to the evaluation team.

MedicineInsight is a quality improvement program developed and managed by NPS MedicineWise. The initial exploration indicated that about 25 practice members of MedicineInsight were also participating in HCH. Therefore, the Department negotiated with NPS MedicineWise to use MedicineInsight data as a source of data for both HCH and comparator practices. NPS MedicineWise obtained consent from member practices for their data to be used for the HCH evaluation and provided data from the practices who gave consent.¹ In the initial MedicineInsight data extract delivered in September 2018, there were three HCH practices. In the second extract delivered in August 2019 (covering the period from 1 December 2015 to 30 June 2019), there were four HCH practices. These practices were excluded from the comparator dataset.

As at 17 September 2020, the evaluation team received extracts for 114 HCH practices (Figure 1) through Pen CS (13 NT ACCHS and 82 other practices), POLAR (10 practices), Sonic (9 practices), or MedicineInsight (4 practices), noting that the four MedicineInsight HCH practices also supplied data via Pen CS. Practice data extracts were not available for 6 HCH practices. The latest MedicineInsight extract, received on 31 August 2019, also included 417 non-HCH practices.

¹ MedicineInsight's processes for collecting data from practices meets the definition of non-identifiable data in the NHMRC National Statement on Ethical Conduct in Human Research. Practices consent to use of non-identifiable data for research through a practice agreement. However an important requirement for the evaluation was the capability to identify practices enrolled in the HCH program within the MedicineInsight extract. To enable this NPS MedicineWise sought and obtained explicit and informed consent from HCH enrolled practices so that consenting practices could be flagged and identified in the MedicineInsight data extract.

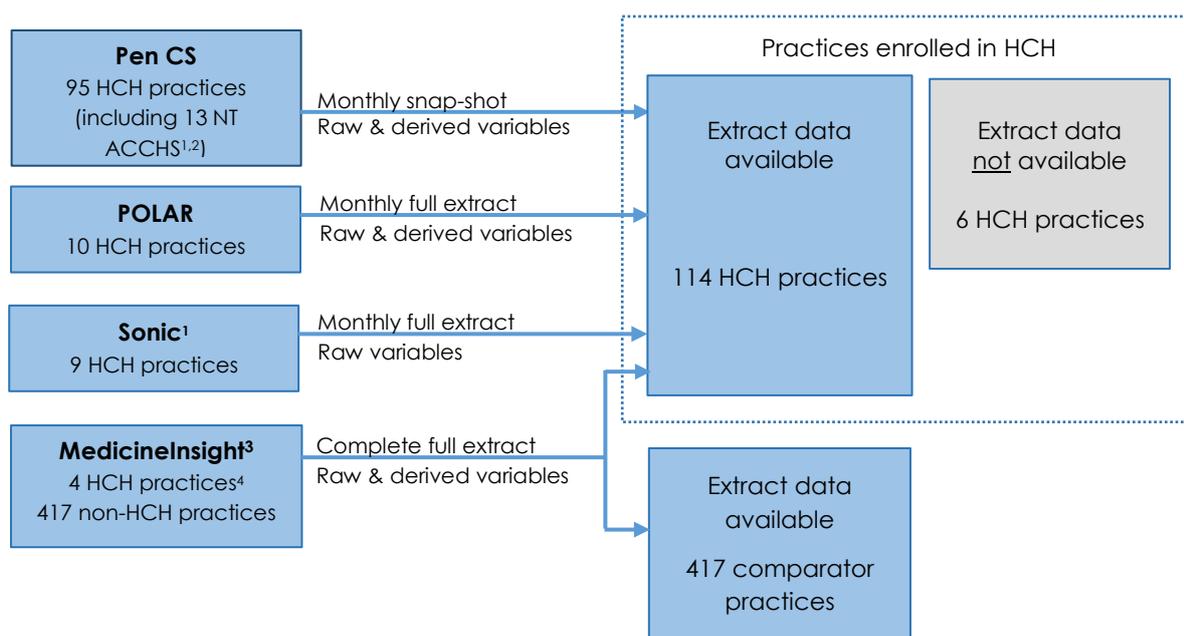


Figure 1 – Data sources and numbers of practices providing extracts for the evaluation, as at 17 September 2020

¹Extracts from NT ACCHS and Sonic practices relate to HCH patients only. ²Three groups of three, four, and three NT ACCHS provided their combined practice extracts. ³MedicineInsight extracts were received on 31 August 2019 and covered the period from 1 December 2015 to 30 June 2019. ⁴The four HCH practices that supplied data via MedicineInsight also supplied data through Pen CS.

Pen CS extracts

Pen CS data extraction software captures a snap-shot of a patient's data from the practice clinical information system on a monthly basis. At the time of the extraction, information from the most recent record of the patient is collected. For example, if a patient had three GP visits within a data extraction period and had blood pressure measured and recorded in each visit, only the most recent blood pressure measurement would be included in the data extract. If a patient did not have any contact with the GP within the current extract period, the data included in the extract reflects the last observed record (e.g. the last recorded blood pressure measurement). For this reason, a single recorded value (e.g. blood pressure, HbA1c result, smoking status) may be duplicated across multiple snap-shot extracts, requiring steps to resolve the duplication.

In addition to the extraction of raw information (e.g. patient age, systolic and diastolic blood pressure), Pen CS extraction software derives a range of indicators such as whether a patient condition is active, and whether a clinical observation or a pathology test has been completed. The software also calculates the number of times that a clinician in the practice has used the practice clinical information system during a defined period. Pen CS software also identifies whether a patient meets criteria for being a "practice active patient" at the time of extraction.

For the HCH evaluation, Pen CS extracts are transferred to a secure server managed by Health Policy Analysis. Data are processed to remove duplicate records across extracts and combined into longitudinal tables. The longitudinal tables are updated quarterly and transferred to the SURE environment for data analysis.

POLAR extracts

The POLAR software (Outcome Health) extracts data from the practice clinical information system monthly. The software retrieves patient data that were recorded in the clinical information system within the extraction period. For example, if a patient had three GP visits during the period and had blood pressure measured and recorded in each visit, each of the three measurements would be included in the data extract. For some information, such as smoking status and alcohol use, if the practice does not update the information at each visit, the patient's most recently recorded status is extracted.

In addition to the retrieval of raw information (e.g. patient age, systolic and diastolic blood pressure), POLAR also derives variables, such as mapping of extracted patient diagnosis information to Systematized Nomenclature of Medicine – Clinical Terms (SNOMED–CT). The SNOMED–CT coded textual descriptions are provided in the data extracts.

For the HCH evaluation, POLAR data are delivered monthly to South East Melbourne PHN, who then transfer the data directly into the SURE environment for analysis. Within the SURE environment, the monthly extracts are combined to create longitudinal tables.

Sonic extracts

Eleven HCH practices are part of Sonic Clinical Service's Independent Practitioner Network. For those Sonic practices, patient information (for HCH patients only) is extracted directly from the Best Practice clinical management system via a Structured Query Language (SQL) query. Similar to POLAR data, patient information recorded in the clinical information system within the extraction period is extracted. For example, if a patient had three GP visits during the period and had blood pressure measured and recorded in each visit, each of the three measurements would be included in the data extract.

Sonic data for the HCH evaluation are delivered monthly to the secure data server managed by Health Policy Analysis, before being transferred to the SURE environment, without prior data processing or preparation. Patient diagnoses are provided as a free-text field, based on which the evaluation team creates multiple flags for patient conditions.

MedicineInsight extracts

MedicineInsight software regularly extracts data from practice clinical information systems. The software retrieves patient data recorded in the clinical information system during the period of extraction. For example, if a patient had three GP visits during the period and had blood pressure measured and recorded in each visit, each of the three measurements would be included in the data extract. For some information, such as smoking status and alcohol use, if the practice does not update the information at each visit, the patient's most recently recorded status is extracted.

In addition to the extraction of raw information (e.g. patient age, systolic and diastolic blood pressure, diagnosis and diagnosis active status), MedicineInsight also derives a range of variables, such as multiple patient condition flags, and a flag for whether a patient meets criteria for being a 'practice active patient' at the time of extraction.

The initial data extract from MedicineInsight was delivered in September 2018. Subsequently, NPS MedicineWise advised that complete longitudinal data extracts, rather than updates, would facilitate better identification of individual patients over time. In June 2019 a revised agreement between the Department and NPS MedicineWise was executed. The second

extract was delivered in August 2019, and covered the period from December 2015 to June 2019.

Patient information within practice extracts

All four data sources provide information about patient demographic characteristics, clinical encounters and provider, diagnoses, clinical observations, pathology results and prescriptions (Table 8). Three data sources provide information about MBS billing.

Table 8 – Type of patient information included within practice extracts

	Source of practice data extracts ¹			
	Pen CS	POLAR	Sonic ²	MedicineInsight
Demographic characteristics	√	√	√	√
Clinical encounters and providers ³	√	√	√	√
Diagnoses	√	√	√	√
Clinical observations	√	√	√	√
Pathology results	√	√	√	√
Prescriptions	√	√	√	√
Immunisations	√	√	√	√
MBS billing	√	√		√

¹A tick indicates table(s) relating to patient information are present in the practice extract data. ²Sonic data relate to HCH patients only. ³Providers are users of practice clinical information system, with designation defined by the practice. Provider designation is not available in Sonic extracts.

Patient demographics include age and sex of the patient as well as pensioner, Aboriginal and Torres Strait Islander status and deceased status. No personally identifiable information (e.g. name, date of birth, postcode) is included in any of the data extracts.

Clinical encounter, in general practice setting, refers to an interaction between a patient and the service. However, there is no consistent definition of an encounter for general practice electronic health data in Australia (NPS MedicineWise, 2018). An encounter record may occur as a result of patient clinical consultation or administrative process such as reviewing or updating a patient record. Clinical encounter data includes (where available) information on the date of the encounter, type of encounter and reason for encounter, and clinical service provider (i.e. user of clinical information system, with designation defined by and within the practice).

Diagnoses can be entered into the GP's clinical information system through several approaches. A clinician can select a relevant term from a structured and pre-coded system, such as 'Docle' in Medical Director or 'Pyefinch' in Best Practice. A clinician can also describe a patient's diagnostic information in the free-text field of the diagnosis screen or reason for visit or reason for prescription. Progress notes may contain further diagnostic information, but these are not extracted as they may contain confidential information.

Clinical observations refer to physiologic measurements at the time of the encounter, such as blood pressure, heart rate, body height, body weight and waist circumference. There are also assessments of lifestyle factors (e.g. smoking, alcohol, physical activity), examination of mental health, hearing or screening for cardiovascular and diabetes risk. The source of these within practice management systems will differ by system.

Pathology results include results of investigations such as blood sugar, HbA1c, cholesterol and tests for kidney functioning. Pathology results ordered by the practice or elsewhere (e.g. hospitals, outpatient clinics or specialists) may be manually entered into the practice systems

or transferred electronically from pathology labs. Scanned or PDF copies of pathology reports are not extracted (NPS MedicineWise, 2018; Pen CS, 2019).

Prescription data contain medicines prescribed by a provider and/or scripts printed out from the practice system. Over the counter medicines and those prescribed by providers elsewhere are only included if manually entered into the practice system (NPS MedicineWise, 2018).

MBS billing data contain billing claims from the practice for services provided to the patient. The data includes the MBS item number which was billed.

None of the sources of practice extracts can extract clinical information stored in scanned or PDF documents, such as specialist letters or hospital discharge summaries.

All data collections contain unique IDs for the practice and unique IDs for the patient. Currently, it is not possible for the data extraction software to identify a patient who visited two or more practices (NPS MedicineWise, 2018). Neither is it possible to identify patients whose records were extracted by different software. Therefore, data for a patient were analysed within the practice and within the data source. For the HCH practices, however, based on practice name, it is possible to identify the practices whose data were extracted by two extraction tools (e.g. by both Pen CS and MedicinesInsight, in the case of the latter, where the practice consented – see footnote 1).

Variation in patient information

Practice data extracts were examined to explore the consistency of patient information between data sources and between practices. Where variation in data capture was observed (e.g. when extracts from a practice did not include a table such as MBS billing, an observation such as pulse measurement or a patient condition such as bipolar or schizophrenia), clarification was sought from Pen CS, South East Melbourne PHN (for POLAR extracts), Sonic Clinical Services and MedicinesInsight.

It is recognised that the patient data extracted will depend on several factors, including:

- completeness and quality of data in the extractable fields of the source practice clinical management system
- version and compatibility of the practices' clinical and billing systems
- policies and procedures of the extraction, manipulation and provision of data from the different providers
- licence coverage of the practice for the data extraction software
- version and compatibility of the extraction software with the practice systems.

Demographic information

Patient age, gender, Indigenous status and pension status are available across all four data sources. While Pen CS, POLAR and MedicinesInsight data are extracted for patients of all ages, MedicinesInsight only provides data for the evaluation for patients aged 15 years and older (children are not in scope of the evaluation). Sonic data are provided for HCH patients only. In the Pen CS data, patient geographic location was mapped to Statistical Area Level 2. In the MedicinesInsight data, patient geographic location was mapped to categories of Australian Statistical Geography Standard Remoteness Area and deciles of Socio-Economic

Indexes for Areas. POLAR and Sonic data extracts do not include information on patient geographical location.

Clinical encounter and provider

Pen CS extraction software calculates the number of times that a GP in the practice has used the practice clinical information system for a patient in the last three, six and 12 months. Pen CS software also calculates the number of times that other health providers such as registered nurses, Aboriginal Health Workers, dietitians, psychologists, podiatrists, midwives and medical students have used the practice clinical information system in the last six months, noting that the designation of the system user is defined by the practice.

Extracts provided by POLAR, Sonic and MedicineInsight include unit record data for patient encounters, with information about date of encounter and mode of encounter (e.g. visit, consultation, procedure, telehealth, and administrative purpose). While POLAR and MedicineInsight data include the designation of providers (e.g. nurse, GP, admin staff), Sonic extracts do not contain this field.

Patient observation and pathology test information

The extraction and availability of data items relating to patient clinical observations and pathology test results varies among the data sources. Pen CS extraction software derives a single variable to represent each type of clinical observation or pathology test result (e.g. microalbumin creatine ratio, spirometry). Derived variables for measurement of pulse, spirometry, physical activity and amount of alcohol consumption are absent from entire Pen CS extracts provided by several practices.

With POLAR, Sonic and MedicineInsight extracts, raw information about patient observations and pathology test results are extracted. Thus, a test for microalbumin creatine ratio, for example, could have different labels, as reported by the lab (e.g. 'albumin/creatinine' or 'albumin/creatinine ratio (ACR)'). While Pen CS data contain information about physical activity, and dates of smoking and alcohol consumption reviews, such information is not included in POLAR, Sonic or MedicineInsight extracts.

Prescription medicine information

The four data sources have different approaches to the extraction and presentation of prescription data. Within Pen CS, medicines present in the patient's current medication list are mapped into categories (Pen CS, 2019), such as 'ACE inhibitors', 'beta blockers', and sub-categories such as 'beta-blockers antihypertensives' and 'beta-blockers for myocardial infarction'. Since 2019, Pen CS has extracted medicine names (generic and brand names) from practices that use Medical Director, Best Practice or Zedmed.

The POLAR data provided for the evaluation contain only generic and brand names of prescribed medicines. Sonic provides brand name, strength, dose, units of the medication and script date. MedicineInsight data include details of prescribed medicines, including names (generic and brand names), strength, dose, form, quantity, route of administration and number of repeats.

MBS billing data

The process of extracting MBS billing data is supported when the practice uses integrated clinical and practice management software from the same vendor, and the billing system is compatible with the clinical management system. When a practice changes clinical and/or

billing software, this can affect the completeness of billing data over time. Extracts provided by several Pen CS, POLAR and MedicineInsight practices for the evaluation do not contain MBS billing data for the entire time period.

Patient condition flags

Pen CS software extracts patient diagnosis information that is recorded in the pre-coded system embedded in the GP practice clinical systems e.g. 'Docle' in Medical Director or 'Pyefinch' in Best Practice. The extracted information is then mapped to more than 80 condition categories. Chronic conditions (e.g. diabetes, chronic renal failure, COPD) are classified as 'active' even if they were flagged as inactive in the practice clinical system. Conditions such as acute renal failure, asthma and cancer are categorised as 'active' only if they were flagged as active within the practice clinical management system (Pen CS, 2019).

Within POLAR, pre-coded and free-text description of diagnoses are extracted from the practice clinical management system and mapped to SNOMED-CT (Outcome Health, 2019). The POLAR extracts include a single field containing SNOMED-CT concept textual descriptions (rather than the SNOMED-CT ID codes) and another field indicating whether the diagnosis is active or inactive. Because patient condition flags similar to those created by Pen CS and MedicineInsight were not readily available in POLAR extracts, the evaluators developed methods to identify a range of patient condition from textual descriptions of diagnoses (Appendix 3).

Sonic patient diagnoses are provided as a free-text field for HCH patients only. The evaluation team queried this field to identify patients with medication conditions, using the method presented in Appendix 3.

MedicineInsight extracts both pre-coded diagnoses (e.g. those selected by clinicians through Docle or Pyefinch) and free-text fields (description of diagnosis, reasons for encounter and reasons for prescription). Using this information, MedicineInsight creates flags for more than 60 different conditions. Both the derived patient conditions flags and the text terms contained in each of the three fields (diagnosis, reasons for encounter and reasons for prescription fields) are provided for the evaluation (NPS MedicineWise, 2018).

The predictive risk model (PRM) that is part of the risk stratification tool (RST) that practices used was reviewed to determine whether patient conditions listed in the PRM could be identified using derived patient condition flags in Pen CS, POLAR, Sonic and MedicineInsight data. As presented in Table 9 many PRM conditions could be identified from practice extract data, but this varied among sources. Several PRM conditions, particularly conditions of the digestive system, are not captured by patient condition flags in the extracts.

Table 9 – Practice data extract capture of patient conditions contributing to the HCH predictive risk model (PRM)

Condition group	Condition	Source of practice data extract ¹			
		Pen CS	POLAR	Sonic	Medicine Insight
Respiratory	Asthma	√	√	√	√
	Chronic obstructive pulmonary disease (COPD)	√	√	√	√
Atrial fibrillation	Atrial fibrillation	√	√	√	√
Cardiovascular	Coronary heart disease	√	√	√	√
	Stroke	√	√	√	√
	Transient ischaemic attack	√	√	√	√
	Congestive heart failure	√	√	√	√
	Rheumatic heart disease	√	√	√	√
Osteoarthritis	Osteoarthritis	√	√	√	√
Osteoporosis	Osteoporosis	√	√	√	√
Rheumatoid arthritis	Rheumatoid arthritis		√	√	√
Mental health	Depression	√	√	√	√
	Anxiety	√	√	√	√
	Bipolar disorder	√	√	√	√
	Schizophrenia	√	√	√	√
	Dementia	√	√	√	√
	Learning difficulties		√		
Cancer	Cancer	Any	Specific	Any	Any
Digestive	Crohn's disease		√	√	√
	Ulcerative colitis		√	√	√
	Coeliac disease	√	√	√	
	Steatorrhea				
	Malabsorption syndrome		√	√	
	Chronic liver disease		√	√	√
	Pancreatitis		√	√	
Hypertension	Hypertension	√	√	√	√
Blood fats	Hyperlipidaemia	√	√	√	√
	Hypercholesterolaemia		√	√	√
	Hypertriglyceridemia		√	√	√
Chronic kidney	Chronic kidney disease	√	√	√	√
Diabetes type 1	Diabetes type 1	√	√	√	√
Diabetes type 2	Diabetes type 2	√	√	√	√
Venous thromboembolism	Venous thromboembolism		√	√	√
Other	Falls		√	√	
	Epilepsy		√	√	√

¹A tick indicates a patient with a condition could be identified from the practice extract data based on derived patient condition flags. Pen CS, POLAR and Sonic data were received by 17 September 2020 and MedicineInsight data were received on 31 August 2019, covering the period from 1 December 2015 to 30 June 2019. See Appendix 3 for method to identify patient morbidities from POLAR and Sonic extracts.

Between-source variations may lead to differential identification of patients with a condition, which is likely relevant for the comparisons of evaluation outcomes between enrolled patients and their counterparts in non-HCH comparator practices. To understand the likely

implications, we estimated prevalence of 21 conditions which are part of the PRM for HCH and commonly identifiable across data sources (Table 11). For Pen CS and POLAR, the analysis was conducted in cohorts of 'practice active patients', regardless of their HCH enrolment. NT ACCHSs were not included because Pen CS flags for patient mental health conditions, atrial fibrillation and cancer are absent for most ACCHSs. For Sonic, analysis relates to HCH patients only. For MedicineInsight, analysis was conducted for 'practice active patients'.

According to the Royal Australian College of General Practitioners, a 'practice active patient' is defined as "a patient who has attended the practice/service three or more times in the past 2 years" (The Royal Australian College of General Practitioners, 2017). Through consultations with NPS MedicineWise, it was realised that defining a GP consultation using information from the practice 'encounter' table would be challenging, because an encounter record may be generated for an administrative task (e.g. reviewing or updating a patient contact detail) and multiple encounter records relating to a single GP visit can be generated in a day. Hence, slightly different approaches have been used to flag a patient as 'practice active patient'.

Table 10 – 'Practice active patient' definition by extraction software

Pen CS	POLAR	Sonic	MedicineInsight
<p>A patient who had three or more progress notes recorded in two years.</p> <p>This flag was provided for evaluation.</p>	<p>A 'practice active patient' indicator was not included in the data extracts provided for the evaluation. The evaluation team identified patients who had at least three different dates recorded as date of encounter, observation, pathology test, prescription or MBS billing, for two years (from July 2018 to June 2020).</p>	<p>Sonic data relate to HCH patient only. It is assumed that all Sonic patients are 'practice active patients'.</p>	<p>A patient who had encounters on at least three days in the last two years, who was marked as 'active' and not marked as 'deceased' in the practice clinical management system.</p> <p>This flag was provided for the evaluation.</p>

As the MedicineInsight data are provided for patients aged 15 years and older, we similarly restricted the age of patients in the Pen CS, POLAR and Sonic data for comparison with the MedicineInsight data. As seen in Table 11, the prevalence of most conditions was higher among the active patient cohort identified in the MedicineInsight source than the prevalence identified in the Pen CS and POLAR cohorts. This Table has been included as a means of describing the data received from the different sources, and there may be various explanations for the differences, such as the different populations managed by the practices represented in the different data sources.

Table 11 – Prevalence of patient conditions by data sources, as at 30 June 2020²

Active patients/ prevalence	Practice active patients ¹ of all ages			Practice active patients ¹ aged 15 years and older ²			
	Pen CS ³	POLAR ⁴	Sonic ⁵	Pen CS ³	POLAR ⁴	Sonic ⁵	Medicine- Insight ⁶
Number of 'practice active patients' (n)	635,181	69,981	558	523,719	58,048	557	1,700,590
Prevalence (%)							
Asthma	8.5	9.2	5.4	8.7	9.4	5.4	13.9
COPD	1.9	1.5	8.8	2.3	1.8	8.8	3.7
Atrial fibrillation	1.6	1.4	6.1	1.9	1.7	6.1	3.0
Coronary heart disease	2.6	1.9	9.0	3.2	2.3	9.0	5.4
Stroke	1.0	0.6	2.3	1.2	0.7	2.3	1.6
Congestive heart failure	0.7	0.7	2.5	0.8	0.9	2.5	1.5
Osteoarthritis	6.1	5.8	16.8	7.3	7.0	16.9	13.7
Osteoporosis	3.2	1.8	8.2	3.9	2.2	8.3	4.8
Anxiety	7.7	6.8	4.3	9.0	8.1	4.3	16.9
Depression	9.5	9.0	7.9	11.5	10.8	7.9	20.7
Bipolar disorder	0.6	0.5	1.1	0.8	0.6	1.1	1.2
Schizophrenia	0.5	0.6	2.0	0.6	0.8	2.0	0.8
Dementia	0.5	0.2	1.1	0.6	0.3	1.1	0.6
Cancer (any)	3.7	3.1	15.6	4.4	3.7	15.6	15.3
High blood pressure	12.3	12.6	16.8	14.9	15.1	16.9	24.4
High cholesterol	11.0	10.2	11.8	13.4	12.3	11.8	18.7
Diabetes type 1	0.4	0.3	0.7	0.5	0.4	0.7	0.7
Diabetes type 2	4.4	2.8	25.4	5.3	3.3	25.5	6.3
Chronic kidney disease	1.2	0.4	5.9	1.4	0.5	5.9	1.4

¹According to the RACGP, practice active patient is a patient who has attended the practice/service three or more times in the past 2 years. ²MedicineInsight data were provided in August 2019 (covering the period from 1 December 2015 to 30 June 2019), for patients aged 15 years and older. ³Pen CS defines as having at least three progress notes recorded in two years. ⁴In POLAR data, patients had at least three different dates recorded as of an encounter, observation, pathology test, prescription or MBS billing in two years (from July 2018 to June 2020) and not marked as 'deceased'. ⁵Sonic data included HCH patients only, all of which are assumed to be 'active'. ⁶MedicineInsight defines as having encounters on at least three days in the last two years, who was marked as 'active' and not marked as 'deceased'.

Practice recording of HCH enrolments

The practice needs to flag HCH enrolled patients in their clinical management system to enable clinicians in the practice to identify the patients. The practice also needs to flag HCH patients in such a manner that allows the flags to be extracted by the relevant extraction software. Pen CS practices were instructed to record patient tier and withdrawal status in Topbar, which is a Pen CS clinical decision support system, and for those that don't have TopBar, using the CAT 4 application. POLAR and Sonic practices were requested to follow Australian Association of Practice Management guidance on using practice management software for HCH recording and reporting (Australian Association of Practice Management, 2019). MedicineInsight practices were requested to record the HCH risk tier in the patient diagnosis screen of the practice clinical system using a specific text string.

To assess the accuracy of practice recording of HCH enrolments, the total number of HCH patients and risk tier identified in practice extracts were compared the HCH registrations in the HPOS system. The HPOS data with information about patient age, sex, tier, dates of enrolment and withdrawal are provided quarterly for the evaluation by the Department of Health and Services Australia. Because the four HCH practices in MedicineInsight also supplied data through Pen CS, for greater consistency, Pen CS extracts for these practices are reported in this section.

As presented in Table 12, 101 practices (87 Pen CS, 5 POLAR and 9 Sonic) provided data that contained flags for HCH enrolees, while 13 practices (8 Pen CS and 5 POLAR) provided data for the evaluation but the data contained no flags for HCH enrolees. From the 101 practices with HCH flags, 9,119 HCH patients were identified (8,267 Pen CS, 294 POLAR and 558 Sonic patients). When the counts of HCH patients in the practice data were compared to HPOS registrations, five individual practices and one group of three ACCHSs had matching counts. Fourteen practices had a lower number of HCH patients identified from practice data than the HPOS registration.

Table 12 – Total HCH enrolments identified in practice extract data compared to the HPOS registration, as at 30 June 2020

Measure	No. practices	Total no. patients	
		Practice extract data ¹	HPOS registration ²
Presence of flags for HCH enrolees in practice extract data			
Practice data not available for evaluation ³	6	–	157
Practice data with no flags for enrolees ⁴	13	–	430
Practice data with flags for HCH enrolees ⁵	101	9,119	8,372
Number of HCH enrolees identified in practice extract data versus HPOS registration			
Equal number of enrolees in each source ⁶	6	170	170
Fewer HCH enrolees in practice data			
Between 1 and 9 enrolees	11	836	873
10 or more enrolees	3	40	129
More HCH enrolees in practice data			
Between 1 and 9 enrolees ⁷	49	3,774	3,596
10 or more enrolees	25	4,299	3,604

¹Data relate to 101 practices with flags for HCH enrolees in extract data. ²Data relate to 120 practices participating in the HCH as at 30 June 2020 and their currently enrolled patients. ³This includes a practice that shares Pen CS database with another location. ⁴Thirteen practices without flags for HCH enrolees include 8 Pen CS and 5 POLAR practices. ⁵These 101 practices include 87 Pen CS (8,267 patients), 5 POLAR (294 patients) and 9 Sonic (558 patients). ⁶This includes one group of three ACCHS practices sharing Pen CS data, and 5 individual practices. ⁷This includes one group of three ACCHS practices, one group of four ACCHS practices sharing Pen CS data, and 47 individual practices.

The South East Melbourne PHN advised that the absence of patient enrolment flags in the POLAR extracts for five practices might be due to practices flagging patients in MBS billing software (e.g. Zedmed) which was incompatible with the extraction software, or practices using their own approaches so that flags are not extractable. The evaluation team has developed a template spreadsheet for practices to enter de-identified patient unique ID, the most recent patient tier and active/withdrawn enrolment status. The South East Melbourne PHN has assisted the practices to complete this process. At the time of this report, five practices had provided their completed spreadsheets.

Figure 2 and Figure 3 show cumulative number of active HCH enrolees and tiers recorded in HPOS registrations (120 practices and 8,959 patients) in comparison to those identified in practice extracts that contained flags for HCH enrolees (101 practices and 9,119 patients).

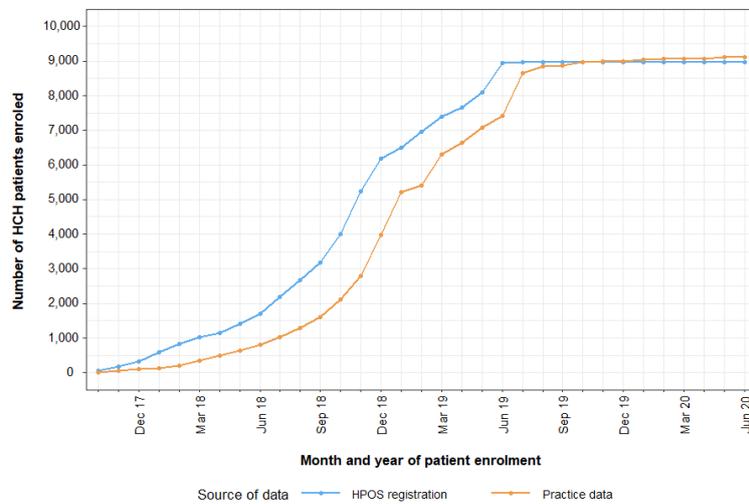


Figure 2 – Cumulative number of active HCH enrolees recorded in practice extracts compared with HPOS registrations, at 30 June 2020

HPOS registration data relate to 120 practices while practice data relate to 101 practices that have flags for HCH enrolees in extracts. For Pen CS, month and year of enrolment are derived from date of practice extracts.

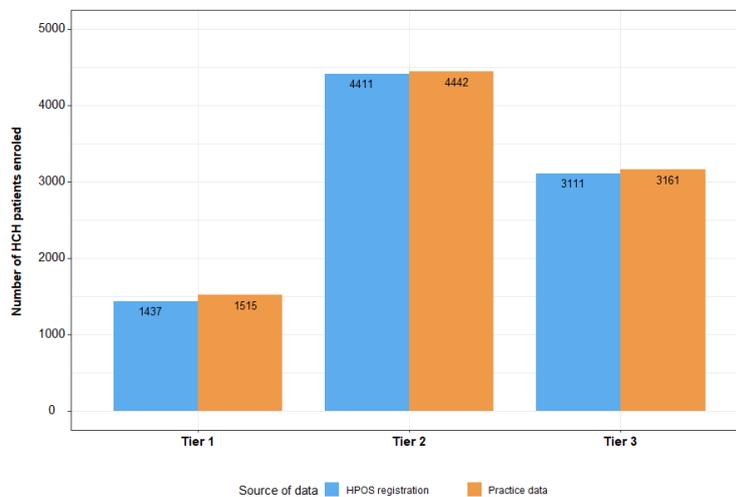


Figure 3 – Number of patients in each tier identified in practice extracts compared with HPOS registrations, at 30 June 2020

HPOS registration data relate to 120 practices while practice data relate to 101 practices that have flags for HCH enrolees in extracts.

Linked data

The Commonwealth and state and territory governments entered into *Bilateral Agreements on Coordinated Care*, which set out reforms to improve patient health outcomes and reduce avoidable demand for health services. HCH is a key Commonwealth activity under

these Agreements. The Commonwealth and jurisdictions also agreed to share data and develop a linked data set to contribute to the evidence base for improving primary care, including through the evaluation of initiatives set out in the Bilateral Agreements, such as HCH.

The Department of Health commissioned the AIHW to create the Bilaterals data set linking MBS, PBS, hospital (emergency attendances and admissions) fact of death and aged care data. Following ethics approval, the evaluation team worked with the Department of Health and the AIHW to agree on the number of non-HCH patients for which data would be obtained, from which to draw comparator patients. A sample of 100,000 patients from each PHN was settled on as the minimum required to evaluate HCH.

A propensity scoring approach will be used to match HCH enrollees with comparators. One of the challenges is stratifying HCH enrollees and comparators into risk groups. To do this, Health Policy Analysis obtained a license from Johns Hopkins University for the Adjusted Clinical Group® (ACG®) system.

An issue for the evaluation is that limited follow-up data may be available for the final report of the evaluation. Table 13 shows the current timeline of when these data will be available. Options are being explored to reduce the time lag for linked data to be available.

Table 13 – Plan for linked data being available for the evaluation

Expected date of data drop	HCH patients	MBS/PBS data ²	Hospital data ²	Aged care ²	National Death Index ²
October 2019	Enrolled to 30 June 2019 ¹	July 2015 – June 2017	July 2015 – June 2017	July 2015 – June 2017	July 2015 – June 2018
March 2021	Enrolled to 30 June 2019 ¹	July 2017 – June 2019	July 2017 – June 2019	July 2017 – June 2019	July 2017 – June 2019
Second half of 2021 ³	Enrolled to 30 June 2019 ¹	To be confirmed	To be confirmed	To be confirmed	To be confirmed

¹ This will be for all patients enrolled in HCH. ² Each subsequent data drop incorporates data in scope of previous drop in case of any updates. ³ The third data drop is yet to be negotiated.

HCH program data

The Department of Health maintains a database of participating practices that includes geographic location, type of practice (i.e. independent, corporately owned, or ACCHS), information technology systems used, and other characteristics to assess eligibility for the program. These data were provided for the evaluation.

The Department of Health also negotiated with Services Australia to receive the following data related to the administration of HCH:

- Summary of enrolments by practice and risk tier. These data are derived from the HCH registrations in the Health Professional Online Services (HPOS) system.
- Claims made by enrolled patients separate to the bundled payment from HCH and non-HCH practices (by MBS Item No.).
- MBS claims by practices for HCH enrollees.

- Demographic and socio-economic characteristics of enrolled patients (HCH start and end dates, age, sex, SEIFA, concession card status, risk tier over time).

These data are also being used for the evaluation.

4. Benchmark reports

The chapter describes the benchmark reports that have been provided to HCH practices and PHNs.

Aims of the benchmark reports

The benchmark reports were initially proposed by the EWG as a way to give something back to the practices for supplying practice data extracts for the HCH evaluation. They were also aimed at helping practices identify areas for improvement in their data such as the completeness and quality of data collected.

The practice and PHN benchmark reports provide the following information:

- An assessment of completeness of practice data, including the recording of HCH enrolled patients.
- An indication of quality of care processes, that is, whether the practices have recorded key health measures (e.g. smoking status, body height, body weight) and timeliness of patient examinations and tests (e.g. blood pressure, pulse, lipids, kidney function, HbA1c).
- An understanding of profile of HCH patients such as distribution of patient age, sex, risk tier, diagnoses, and recording of key health measures in the practice (or in the PHN) in comparison to HCH patients in other practices (or other PHNs).

Contents

A sample of practice benchmark reports is provided in Appendix 4. The reports contain three sections:

- a summary of background information (e.g. purpose and data sources used) and key findings
- a profile of HCH patients based on Health Professionals Online Services (HPOS) registration data (i.e. the Medicare web-based portal)
- a profile of HCH patients based on the practice data extracts.

In each report, data are presented for HCH patients in the practice, HCH patients in similar practices (i.e. practices of similar practice size and geographical remoteness), and HCH patients in all other HCH practices. The practice size is based on the number of full-time equivalent GPs working in the practice while the practice remoteness is the Monash Modified remoteness categories of the practice geographic location.

In the report, data are presented for practices in the PHN and all other PHNs combined.

Data from HPOS include patient demographic (i.e. age, sex) and enrolment characteristics (i.e. date of patient enrolment and risk tier). The number of HCH patients, timing of patient enrolment and risk tier identified in practice data extracts are compared to that in HPOS registration. This informs the practice whether HCH patients have been accurately flagged in their local systems.

For HCH patients identified in the practice extracts, further information is presented, including:

- recording of patient clinical assessments (e.g. smoking status, height, weight),
- patient measurements (e.g. blood pressure, cholesterol, HbA1c)
- Presence of various patient health conditions.

Prior to the initial set of reports, PHNs were consulted on their design. In the round 4 surveys, both practices and PHNs were asked for feedback on the reports. This is summarised in Volume 2.

In the round 4 delivery of benchmark reports, trends in practice recording of patient blood pressure, pulse, cholesterol, kidney function and HbA1c from December 2018 to June 2020 were included. Practice data were analysed for all patients who remained in the HCH in the practice, irrespective of patient health conditions (except HbA1c in those with diabetes) and irrespective of whether patients visited the practice. Numbers of practices and patients included in the analysis were as follows: 59 practices and 3,903 patients in December 2018; 76 practices and 7,461 patients in June 2019; 92 practices and 8,381 patients in Dec 2019; and 101 practices and 9,119 patients in June 2020.

Delivery

Practice and PHN benchmark reports have been distributed to practices and PHNs four times, in March 2019 (Round 1), September 2019 (Round 2), April 2020 (Round 3) and October 2020 (Round 4) (Table 14). The first round of the benchmark reports was for the period February 2018 to December 2018, provided to 94 HCH practices and nine PHNs. Where practices or PHNs did not receive the reports, it was because they did not supply the practice extracts or had too few enrolments for the report to be meaningful.

The second round of the reports was for the period February 2018 to June 2019, provided to 132 HCH practices (including 12 ACCHSs) participating in HCH as at 31 July 2019 and the 10 PHNs.

The third round of the reports was for the period June to December 2019. They were provided to 125 HCH practices participating in the HCH as at 31 December 2019, and the 10 PHNs.

The fourth round of the reports was for the period January to June 2020. A total of 113 reports were generated for 120 practices participating in the HCH as at 30 June 2020. Three groups of 10 ACCHSs combined their practice extracts. For each group, a single report was generated presenting combined HPOS and practice data. There were 10 PHN reports delivered in round 4.

Table 14 – Dissemination of practice and PHN benchmark reports

	For practices	For PHNs
Round 1, March 2019 ¹	94	9
Round 2, September 2019 ²	132	10
Round 3, April 2020 ³	125	10
Round 4, October 2020 ⁴	113 ⁵	10

¹Practices participating in HCH as at 31 December 2018. Reports were not generated for practices or PHN because practice extracts were not available or there were too few enrolments for the report to be meaningful. ²Practices participating in HCH as at 31 July 2019. ³Practices participating in HCH as at 31 December 2019. ⁴Practices participating in HCH as at 30 June 2020. ⁵ Three groups of 10 practices combined their practice extracts, for each group, a single report was generated presenting combined data.

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Appendix 1 HCH evaluation team

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Appendix 2 Progress with evaluation questions

Key question 1

Key question 1: Detailed questions	Key question 1: Measures	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference (IER = Interim evaluation report)
Level: Program			
1.01 What program level activities were undertaken to assist implementation, including program governance, planning, risk management, stakeholder engagement, development of policies and procedures, and HCH model development?	1.01.01 Description of program implementation activities undertaken.	C	IER 2019 Chapter 2, Appendix 1
	1.01.02 Opportunities for improving program-level activities in subsequent rollouts of the program most frequently identified by stakeholders.	P	IER 2019 Chapters 2 & 8
1.02 How were practices recruited to participate in the HCH program? What were the characteristics of practices that were accepted to participate in the HCH program? Did this yield an appropriate mix of practice types and settings for testing the first stage of the program's rollout? Did the practices recruited enrol a sufficient number and mix of patients to demonstrate HCH program viability?	1.02.01 Description of practice recruitment activities undertaken.	C	IER 2019 Chapter 3
	1.02.02 Number of practices applying and recruited by the study strata, including Modified Monash (remoteness) categories, practice type (i.e. corporate, independently owned, ACCHS), practice size and staff categories (GP only, GP + practice nurse, GP + practice nurse + other clinical staff).	C	IER 2019 Chapter 3
	1.02.03 Number of practices recruited is at least 10 for each of the study strata.	C	IER 2019 Chapter 3
	1.02.04 Number of patients enrolled from HCH practices is at least 100 for each of the study strata.	C	IER 2019 Chapter 3
	1.02.05 Frequency of categories of factors influencing the practice to participate in the HCH program.	C	IER 2019 Chapter 3
	1.02.06 Proportion of HCH practice populations by Modified Monash (remoteness) categories.	C	IER 2019 Chapter 3

Key question 1: Detailed questions	Key question 1: Measures	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference (IER = Interim evaluation report)
	1.02.07 Opportunities to encourage wide recruitment of practices in subsequent rollouts of the program most frequently identified by stakeholders.	P	IER 2019 Chapter 3
1.03 How was HCH training strategy implemented at the national level? What training was provided to HCH practices? What was the level of participation by practice staff in training? How effective was HCH training in enhancing practice staff knowledge and understanding of the HCH program, the patient centred medical home, and the approach for implementing change within the practice? Which approaches to training were most successful?	1.03.01 Description of activities undertaken and arrangements put in place for HCH training.	C	IER 2019 Chapter 6, Appendix 1
	1.03.02 Number of HCH practice staff who participated in PHN-delivered training, by staff category.	C	IER 2019 Chapter 6
	1.03.03 Proportion of HCH practice staff (based on head count) who participated in PHN-delivered training, by staff category.	C	IER 2019 Chapter 6
	1.03.04 Number of HCH practice staff who completed the online HCH training program modules, by staff category (by module and overall).	C	IER 2019 Chapter 6
	1.03.05 Proportion of HCH practices from which practice staff participated in PHN-delivered training.	C	IER 2019 Chapter 6
	1.03.06 Tools most frequently identified by practice staff as being the most helpful in the HCH implementation.	C	IER 2019 Chapter 3
	1.03.07 Training modules most frequently identified by practice staff as being the most helpful in the HCH implementation.	C	IER 2019 Chapter 6
	1.03.08 Improvements in HCH training most frequently identified by practices and PHNs.	C	IER 2019 Chapter 6, Appendix 1
1.04 What infrastructure and processes were commissioned to support processes for risk stratification and patient enrolment? In what ways could processes and infrastructure for risk stratification and enrolment of patients be improved? How well did the risk stratification model and processes predict	1.04.01 Description of activities undertaken and arrangements for risk stratification and patient enrolment.	C	IER 2019 Chapters 4 & 7
	1.04.02 Performance of risk stratification model in predicting fact of hospitalisation (AUC), number of hospitalisations/bed days (RMSE) and	P	IER 2019 Chapter 7

Key question 1: Detailed questions	Key question 1: Measures	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference (IER = Interim evaluation report)
hospitalisation and use of other health care services? Was there sufficient information available in practice data and other sources to allocate to risk categories? What are the implications of applying the risk stratification and patient selection processes more broadly across Australian primary care practice populations? What improvement would be expected if the risk stratification process included additional data sources?	level of health expenditure (RMSE) (AUC-Area under the curve, RMSE-Root mean square error).		
	1.04.03 Variation in predictive performance of risk stratification models across practice types/categories (reflecting quality of practice information).	N	
	1.04.04 Improvement in predictive performance measures when adding additional data from linked source.	N	
1.05 How effective and efficient were the program's administrative processes, including for patient enrolment, claims management, monitoring program processes, and managing program compliance and integrity?	1.05.01 Description of administrative arrangements.	C	IER 2019 Chapters 3 & 4
	1.05.02 Proportion of HCH claims processed within specified time frames.	N	
	1.05.03 Proportion of practices agreeing that the HCH processes reduced administrative burden for the practice compared with usual MBS processes.	N	
	1.05.04 Program and administrative improvements most frequently identified by practices and other stakeholders.	P	IER 2019 Chapters 3 & 4
	1.05.05 Description of compliance issues that emerged during the trial and how these were addressed.	N	
Level: Primary Health Network/Regional			
1.06 What roles did PHNs play in the HCH implementation? What existing PHN/ state/territory/ Local Hospital Network (LHN) quality improvement/ chronic disease management initiatives were leveraged to assist the HCH implementation?	1.06.01 Support activities most frequently identified by practices, PHNs and other stakeholders.	C	IER 2019 Chapter 6, IER 2020 Chapters 3 & 7
	1.06.02 Description of quality improvement/ chronic disease management initiatives by PHNs, LHNs, and state and territory health authorities leveraged during HCH implementation.	P	IER 2019 Chapter 6, IER 2020 Chapters 3 & 7

Key question 1: Detailed questions	Key question 1: Measures	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference (IER = Interim evaluation report)
	1.06.03 Quality improvement/ chronic disease management initiatives most frequently identified by practices, PHNs and other stakeholders.	P	IER 2019 Chapters 3 & 6, IER 2020 Chapter 3
	1.06.04 Opportunities for improvement in support provided to practices by PHNs, LHNs, and state and territory health authorities most frequently identified by practices and PHNs.	P	IER 2019 Chapter 6, IER 2020 Chapters 3 & 7

Key question 2

Key question 2: Detailed questions	Key question 2: Measures	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference in Vol 2
Level: Practice			
2.01 What did practices do to implement HCH, and how did this differ between practices, including changes to policies, procedures, systems, administrative processes, changes to manage payment for HCH patients, processes for risk stratification, and patient enrolment?	2.01.01 Most frequent changes to policies, procedures and systems as a result of HCH implementation (together with descriptions).	C	IER 2019 Chapter 3, IER 2020 Chapter 3
	2.01.02 Proportion of practices that reported changes to administrative processes (grouped to categories) to manage payments as a result of HCH implementation (together with descriptions of processes).	C	IER 2019 Chapter 3, IER 2020 Chapter 3
	2.01.03 Proportion of practices that reported undertaking activities (grouped to categories) for risk stratification and patient enrolment processes (together with descriptions of processes).	C	IER 2019 Chapters 3 & 7, IER 2020 Chapter 3
2.02 How did practices approach provision of chronic disease care prior to the implementation of HCH? What chronic disease management and quality improvement initiatives were in place within the practice at the commencement of the HCH program? Which of these were used and/or enhanced for the HCH implementation?	2.02.01 Most frequent chronic disease management/quality improvement initiatives and processes that were a focus during the trial. Initiatives will be assigned to categories based on coding of textual descriptions.	C	IER 2019 Chapter 3, IER 2020 Chapter 3
	2.02.02 Proportion of practices that reported focussing on specific categories of chronic disease management/quality improvement initiatives.	C	IER 2019 Chapter 3, IER 2020 Chapter 3
2.03 How did the mix, roles and activities of primary health care staff change following the HCH program implementation?	2.03.01 Mean number of staff (head count and FTE) by staff type (GP, practice nurse/other nurse, nurse practitioner, allied health staff, Aboriginal Health Worker, administrative staff) at commencement and at the end of the trial.	P	IER 2019 Chapter 3
	2.03.02 Proportion of practices that reported undertaking changes in staff roles (grouped to categories) following HCH commencement (together with descriptions of changes).	P	IER 2019 Chapter 3,

Key question 2: Detailed questions	Key question 2: Measures	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference in Vol 2
	2.03.03 Proportion of practices that reported undertaking changes in staff activities (grouped to categories) following HCH commencement (together with descriptions of changes).	P	IER 2020 Chapter 3 IER 2019 Chapter 3, IER 2020 Chapter 3
2.04 How did the relationship between the practice and other health care and service providers change during the HCH implementation? Did the HCH program provide opportunities for better coordination of care, information sharing and communication with other health care and service providers?	2.04.01 Most frequent changes in care coordination reported by external health service providers with which HCH practices interact (together with descriptions).	P	IER 2020 Chapter 3
	2.04.02 Proportion of practices that reported changes in relationship between the practice and other health care and service providers (grouped to categories) following HCH commencement (together with descriptions of changes).	P	IER 2020 Chapter 3
2.05 How did the additional flexibility associated with the bundled payment facilitate practice change? Was the value of the bundled payment sufficient to change the way practices provide chronic disease care?	2.05.01 Proportion of practices that reported undertaking specific changes (grouped to categories) due to the additional flexibility that the bundled payment provided for the practice (together with descriptions of processes).	P	IER 2019 Chapter 3, IER 2020 Chapter 3
2.06 How did practices change from prior to the HCH program implementation to the end of the trial in implementing the dimensions of the patient centred medical home?	2.06.01 Proportion of practices with improved overall score, scores on each dimension, and scores for individual items, on the HCH-A tool, from between HCH commencement and at the end of the trial. (Change in mean scores will also be analysed.) The following dimensions will be highlighted in the analysis: organised/evidence based care, continuous and team based healing relationships, patient centred interactions, and care coordination.	N	
	2.06.02 Change between HCH program commencement and at the end of the trial in the proportion of practices by after-hours arrangement categories.	N	
	2.06.03 Change between HCH program commencement and at the end of the trial, in practice operating hours by day of week and public holidays.	N	

Key question 2: Detailed questions	Key question 2: Measures	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference in Vol 2
2.07 Which practice level approaches to implementation worked well, and in what contexts?	2.07.01 Rating of effectiveness of implementation strategies by practices (together with descriptions).	N	
2.08 How did the impact of HCH vary across practices with different characteristics (e.g. across different remoteness areas and ownership arrangements)? How did these characteristics affect the success of the model? What does this tell us about the potential of the HCH program to improve access to primary health care, particularly for vulnerable and disadvantaged populations, and improve equity in health outcomes?	2.08.01 Proportion of patients enrolled in HCH by risk tier and other selected characteristics, compared across HCH practice strata.	C	IER 2019 Chapter 5
	2.08.02 Patients enrolled in HCH as a proportion of the total practice population, compared across HCH practice strata.	N	
	2.08.03 Multiple: Comparison of patient level outcomes, including access (see key question 3) compared across HCH practice strata and assessment of implications for equity in access and outcomes.	N	
2.09 How did the HCH implementation change provider experiences of delivering primary care services?	2.09.01 Proportion of practice staff who report that following the HCH implementation they experienced improvements in selected aspects of their job, including: (a) having clear planned goals and objectives; (b) having an interesting job; (c) developing their role; (d) working to the full scope of their practice; (e) having adequate resources to do their job.	N	
	2.09.02 Change in proportion of staff who left the service in the year prior to HCH vs. the final year of HCH.	N	

Key question 3

Key question 3: Detailed questions	Key question 3: Measures	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference in Vol 2
Level: Patient			
3.01 What changes occurred in the quality of chronic illness care provided for patients enrolled in the HCH program, and how did these compare with patients receiving care from practices not enrolled in HCH? Was there an improvement in the provision of preventive services (e.g. influenza vaccination). Was there an improvement in the level of medications review and quality use of medicines?	3.01.01 Change in the proportion of HCH patients with a diagnosis of Type 2 diabetes recorded in the practice system/inferred from other practice system data, for whom the results of a HbA1c test were recorded at least once in the previous six and in the previous 12 months compared with the change for comparator patients. (See Note 1) (See Note 2)	P	IER 2020 Chapter 4
	3.01.02 Change in the proportion of HCH patients for whom a diagnosis of diabetes can be inferred from MBS/PBS claims, for whom a claim for a HbA1c test was made at least once in the previous six and in the previous 12 months compared with the change for comparator patients. (See Note 2)	P	IER 2020 Chapter 4
	3.01.03 Change in the proportion of HCH patients for whom the results of a blood pressure assessment were recorded at least once in the previous six and in the previous 12 months compared with the change for comparator patients. (See Note 2) Patients with a diagnosis of Type 2 diabetes will be analysed separately. (See Note 1)	P	IER 2020 Chapter 4
	3.01.04 Change in the proportion of HCH patients or whom the results of a lipid test were recorded in the practice system at least once in the previous six and in the previous 12 months compared with the change for comparator patients. (See Note 1) (See Note 2)	P	IER 2020 Chapter 4
	3.01.05 Change in the proportion of HCH patients with a diagnosis of Type 2 diabetes and patients who had a cardiovascular disease diagnosis recorded in the practice system/inferred from other practice system data, for whom the results of a kidney function test (estimated glomerular filtration rate (eGFR) and/ or an albumin/creatinine ratio (ACR) or other micro albumin test result) was recorded at least once in the previous 12 months compared with the change for comparator patients. (See Note 1) (See Note 2)	P	IER 2020 Chapter 4
	3.01.06 Change in the proportion of HCH patients for whom a claim for a lipid test was made at least once in the previous 12 months compared with the change for comparator patients. (See Note 1) (See Note 2)	P	IER 2020 Chapter 4

Key question 3: Detailed questions	Key question 3: Measures	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference in Vol 2
	3.01.06a Change in the proportion of HCH patients whose smoking status has been recorded. (See Note 1) (See Note 2)	P	IER 2020 Chapter 4
	3.01.06b Change in the proportion of HCH patients for whom information has been recorded in the practice clinical management system to enable calculation of BMI. (See Note 1) (See Note 2)	P	IER 2020 Chapter 4
	3.01.06c Change in the proportion of HCH patients who are immunised against influenza. (See Note 1) (See Note 2)	N	
	3.01.06d Change in the proportion of HCH patients who have had the necessary risk factors assessed to enable cardiovascular disease assessment (including age, smoking status, cholesterol and blood pressure). (See Note 1) (See Note 2)	P	IER 2020 Chapter 4
	<p>3.01.07 Change in the proportion of patients for whom a claim for a GP management plan or review (MBS items 721) was made in the previous 24 months (with additional analysis conducted on previous 12 months), compared with the change for comparator patients. Note: HCH patients will not be eligible to claim item 721. However, the development of a GP management care plan is a requirement for enrolment in HCH. Therefore, it can be assumed that 100% of HCH patients have a GP management plan prepared. (See also Note 1 and Note 2)</p> <p>Additional analysis will be conducted to assess trends for Reviews of a GP Management Plan (Item 732) and contribution to a Multidisciplinary Care Plan, or to a Review of a Multidisciplinary Care Plan (item 729), and Health Assessment for Aboriginal and Torres Strait Islander People (MBS item 715).</p>	N	
	3.01.08 Change in the proportion of patients for whom a claim for the development of Team Care Arrangement (TCA) service (MBS item 723) was made in the previous 24 months (with additional analysis conducted on previous 12 months), compared with the change for comparator patients. Note: HCH patients' eligibility for item 721 for services delivered by the HCH practice will change, therefore assessment of these changes will require analysis and modelling based on practice data extracts. (See also Note 1 and Note 2).	N	

Key question 3: Detailed questions	Key question 3: Measures	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference in Vol 2
	3.01.09 Change in the proportion of patients who can be classified as meeting the criteria for psychotropic polypharmacy, polypharmacy or hyperpolypharmacy compared with the change for comparator patients. (See Note 2) Psychotropic polypharmacy is defined as two or more psychotropic medicines 'taken' at the same time. Polypharmacy is defined to five to 10 medicines 'taken' at the same time. Hyperpolypharmacy is defined as 10 or more medicines 'taken' at the same time.	N	
	3.01.10 Change in the proportion of patients who can be classified as meeting the criteria for psychotropic polypharmacy, polypharmacy or hyperpolypharmacy for whom a medication review claim was made in the previous 12 months compared with the change for comparator patients. (See Note 2) See definitions above.	N	
	3.01.11 Change in the proportion of patients who exceed thresholds for potential inappropriate drug use (based on Beers criteria ((American Geriatrics Society Beers Criteria Update Expert Panel, 2015)) and/or Drug Burden Index ((Hilmer et al., 2007))) compared with the change for comparator patients. (See Note 2)	N	
3.02 Did patients enrolled in the HCH program have improved access to primary care services, including through alternate ways of accessing the service? How did the use of primary care services change for HCH patients compared with similar patients receiving care from practices not enrolled in HCH? How did use of services from within the HCH practice change? Did the HCH model result in increased continuity in the provision of primary care?	3.02.01 Proportion of patients who increased their assessment of access to care items on the patient survey (aggregated across dimensions and individual item scores) between baseline and final patient survey. (Change in mean scores will also be analysed.)	N	
	3.02.02 Most frequent improvements in access to care reported by consumers, families and carers (together with descriptions).	P	IER 2020 Chapter 5
	3.02.03 Change in the mean number of services for which unreferral MBS claims have been made in the previous 12 months compared with the change for comparator patients. (See Note 2) (Note: for HCH patients, levels of service will be estimated by using practice data extracts to identify equivalent services claimable under MBS.)	N	
	3.02.04 Change in the proportion of primary care services delivered across modalities (face-to-face, telemedicine, email) and staff type (GP, practice nurse, nurse practitioner, allied health, Aboriginal Health Worker) in the previous 12 months between: (a) entry to the HCH program; and (b) the anniversary of entry to the program.	N	
	3.02.05 Change in non-referred services delivered by HCH practices as a proportion of all primary care providers. (An additional formulation of this measure will include emergency department presentations in the numerator of total non-referred services.)	N	

Key question 3: Detailed questions	Key question 3: Measures	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference in Vol 2
	3.02.06 Change in indices of care continuity and care density for the previous 12 months compared with the change for comparator patients. (Note for HCH patients, levels of service will be estimated by using practice data extracts to identify equivalent services claimable under MBS.) Indices include: usual provider of care (UPC) index ((Saultz, 2003)), Bice Boxerman Continuity of Care (COC) index ((Bice & Boxerman, 1977)), and Care Density Index ((Pollack et al., 2013)). (See Note 2)	N	
3.03 How did the use of secondary care and other community-based services change for HCH patients compared with similar patients in practices not enrolled in HCH? Was there improved coordination of services between primary care and other service providers?	3.03.01 Change in the mean number of claims for allied health services available under MBS for people with chronic diseases (MBS Items 10950-10970;81 100-81 125) in the previous 12 months compared with the change for comparator patients. (See Note 2)	N	
	3.03.02 Change in the mean number of specialist, pathology and imaging services for which MBS claims have been made in in the previous 12 months compared with the change for comparator patients. (See Note 2) (Note for HCH patients, levels of service will be estimated by using practice data extracts to identify equivalent services claimable under MBS.)	N	
	3.03.03 Most frequent changes in referral pathways and improvements in integration of care reported by practices, PHNs and other stakeholders (together with descriptions).	N	
3.04 Were the patients enrolled in the HCH program and their families/ carers more engaged in managing patients' health needs? What strategies resulted in the greatest impact on patient activation?	3.04.01 Proportion of patients with improved assessment of engagement, including increased involvement in care planning (aggregated across dimension and individual item scores) and activation between baseline and final survey. (Change in mean scores will also be assessed).	N	
	3.04.02 Most frequent changes in patient engagement and activation reported by patients (together with descriptions).	P	IER 2020 Chapter 5
3.05 Did patients enrolled in the HCH program report an improved experience of primary care, including coordination of their care and communication with their primary care providers? What were the experiences of	3.05.01 Proportion of patients with an improved rating of their primary care provider between the baseline and final patient survey. (Change in mean scores will also be assessed.)	N	
	3.05.02 Proportion of patients with an improved assessment of the communication items (aggregated across dimension and individual item scores) between the baseline and final patient survey. (Change in mean scores will also be assessed.)	N	

Key question 3: Detailed questions	Key question 3: Measures	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference in Vol 2
patients, carers and families in care planning?	3.05.03 Proportion of patients with an improved assessment of the coordination of care items (aggregated across dimension and individual item scores) between the baseline and final patient survey. (Change in mean scores will also be assessed.)	N	
	3.05.04 Most frequent improvements in communication and coordination of care reported by consumers, families and carers (together with descriptions).	P	IER 2020 Chapter 5
3.06 How did the utilisation of hospital services (including emergency care), and entry into aged care change for HCH patients compared with similar patients receiving care in practices not enrolled in HCH?	3.06.01 Change in the mean number of emergency department presentations (total and by episode end status) per patient in the previous 12 months compared with the change for comparator patients. (See Note 2)	N	
	3.06.02 Change in the mean number of emergency admitted patient care episodes per patient in the previous 12 months compared with the change for comparator patients. (See Note 2)	N	
	3.06.03 Change in the mean number of total admitted patient care episodes per patient and bed days per patient in the previous 12 months compared with the change for comparator patients. (See Note 2)	N	
	3.06.04 Change in the mean number of total admitted patient care readmissions per patient in the previous 12 months compared with the change for comparator patients. (See Note 2)	N	
	3.06.05 Change in the proportion of acute bed days occurring in a hospital that is located close to the patient's residence.	N	
	3.06.06 Change in the mean number of potentially preventable admitted patient care episodes (overall and by type) per patient in the previous 12 months compared with the change for comparator patients. (See Note 2)	N	
	3.06.07 Change in the mean number of potentially preventable admitted patient care bed days (overall and by type) per patient in the previous 12 months compared with the change for comparator patients. (See Note 2)	N	

Key question 3: Detailed questions	Key question 3: Measures	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference in Vol 2
	3.06.08 Change in the mean National Weighted Activity Units (NWAU) (admitted and emergency care) per patient in the previous 12 months compared with the change for comparator patients. (See Note 2)	N	
	3.06.09 Proportion of patients admitted to a residential aged care facility compared with proportion for comparator patients.	N	
	3.06.10 Mean/ median time for HCH patients admitted to a residential aged care facility compared with the mean/ median time for comparator patients (using time-to-event analysis).	N	
3.07 Which patients benefited from the HCH program? Are the benefits of the HCH program similar for patients across categories of disadvantage? Was patient participation in the program maintained through the trial? Were movements of patients between risk tiers appropriate? What does this tell us about the potential of the HCH program to improve access to primary health care, particularly for vulnerable and disadvantaged populations, and improved equity in health outcomes?	3.07.01 Multiple: Comparison of patient level outcomes (each of the indicators) compared across selected patient characteristics including: remoteness area of residence, Indigenous status, selected cultural and linguistic diversity (CALD) categories, categories of risk, including assessment of implications for equity in access and outcomes.	N	
	3.07.02 Proportion of patients who leave the program categorised by reason for leaving.	N	
3.08 What preliminary evidence is there of the impact of the HCH program on health outcomes?	3.08.01 Change in the proportion of HCH patients with a diagnosis of Type 2 diabetes recorded in the practice system/inferred from other practice system data, whose last HbA1c measurement result was within specified levels (less than or equal to 7%; greater than 7% but less than or equal to 8%; greater than 8% but less than 10%; greater than or equal to 10%), compared with the change for comparator patients. (See Note 1) (See Note 2)	N	
	3.08.02 Change in the proportion of HCH patients with a diagnosis of Type 2 diabetes or cardiovascular disease recorded in the practice system/inferred from other practice system data, who had a kidney function test within the last 12 months and an eGFR result recorded, with results within specified levels (greater than or equal to 90; greater than or equal to 60 but less than 90; greater than or equal to 45 but less than 60; greater than or equal to 30 but less than 45; greater than or equal to 15 but less than 30; less	N	

Key question 3: Detailed questions	Key question 3: Measures	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference in Vol 2
	than 15), compared with the change for comparator patients. (See Note 1) (See Note 2)		
	3.08.03 Change in the proportion of HCH patients with a diagnosis of Type 2 diabetes recorded in the practice system/inferred from other practice system data, whose last blood pressure measurement result was less than or equal to 130/80 mmHg, compared with the change for comparator patients. (See Note 1) (See Note 2)	N	
	3.08.04 Median time to event reflecting onset of serious acute cardiovascular event or death. Composite index of hospital admission for selected serious conditions (e.g. acute coronary syndrome, stroke) and death. Median time to event for HCH patients compared with comparator patients (using survival analysis).	N	
	3.08.05 Median survival (time to death). HCH patients compared with comparator patients (using survival analysis).	N	

Key question 4

Key question 4: Detailed questions	Key question 4: Measures	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference in Vol 2
Level: Program			
4.01 What is the cost to governments of care for HCH enrolled patients?	4.01.01 Difference in mean government payments in the previous 12 months between (a) entry to the HCH program; and (b) the anniversary of entry to the program, HCH patients vs. comparator patients.	N	
4.02 What is the cost to governments of care for HCH enrolled patients taking into consideration the net of savings due to reduced hospitalisation and other health services?	4.02.01 Difference in mean per patient total of government MBS/HCH payments and cost to government of hospital services in the previous 12 months between: (a) entry to the HCH program; and (b) the anniversary of entry to the program, HCH patients vs. comparator patients. Cost to government of hospital services will be based on the total NWAUs related to use of public hospitals, multiplied by the National Efficient Price.	N	
4.03 Is the current HCH model financially sustainable?	4.03.01 Mean government cost (including of hospital services) per patient is less for HCH patients vs. comparator patients.	N	
4.04 What resources are required to make HCH succeed, and how can these be efficiently used?	4.04.01 Estimated cost of improvements to the design and payment arrangements for the HCH model and the impacts these will have on program outcomes.	N	
4.05 What will be the financial impact of extending the model to practices across Australia?	4.05.01 Estimated cost to government of extending the HCH to all other practices across Australia.	N	
4.06 Does the HCH program deliver value for money?	4.06.01 Cost consequence analysis: Mean government cost per patient is less for HCH patients vs. comparator patients and there is evidence that HCH delivers equivalent or superior outcomes for patients. Alternatively, mean government cost per patient is greater for HCH patients vs. comparator patients and there is evidence that HCH delivers superior outcomes for patients.	N	
Level: Practice			
4.07 What are the costs to practices of delivering HCH programs? Is this matched by HCH payments? Is the current HCH model financially sustainable for practices?	4.07.01 Per patient practice revenue for HCH patients compared with continuation of usual MBS payments.	N	
	4.07.02 Change in net cost to practices per patient resulting from changes in the mix of services delivered to HCH patients.	N	
Level: Patient			
4.08 What is the impact of HCH enrolment on patient, carer and family out-of-pocket costs?	4.08.01 Difference in the mean out-of-pocket payments for HCH patients in the previous 12 months between: (a) entry to the HCH program; and (b) the anniversary of entry to the program, HCH patients vs. comparator patients. Out-of-pocket costs will be	N	

Key question 4: Detailed questions	Key question 4: Measures	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference in Vol 2
	estimated from MBS and PBS data, analysis of hospital data and analysis and modelling of practice policies relating to co-payments for HCH patients.		

Key questions – Community pharmacy trial

Measures	Level PR=Program PH/C= Pharmacist/ practice PT=Patient	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference in Vol 2
5.01 Description of program activities undertaken.	PR	P	IER 2019 Chapter 11, IER 2020 Chapter 8
5.02 How did pharmacists prepare for delivering medication management services to patients?	PH/C	P	IER 2020 Chapter 8
5.03 Number of pharmacists completing the online training and attending the training workshops.	PR	P	IER 2020 Chapter 8
5.04 Pharmacists' satisfaction with online training and training workshops.	PR	P	IER 2020 Chapter 8
5.05 Nature of pharmacy integration initiatives, including related to medication reconciliation/ review, that HCH practices and community pharmacists had in place prior to the commencement of the community pharmacy component of the HCH trial.	PH/C	P	IER 2020 Chapter 8
5.06 What features of the program worked and what features need to be improved?	PR	P	IER 2020 Chapter 8
5.07 Number and proportion of HCH patients (by tier) receiving Trial Program services and comparison with HCH population.	PR	P	IER 2019 Chapter 11
5.08 Distribution of patients across self-reported chronic conditions, and comparison with HCH population.	PH/C	P	IER 2019 Chapter 11, IER 2020 Chapter 8

Measures	Level PR=Program PH/C= Pharmacist/ practice PT=Patient	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference in Vol 2
5.09 Distribution of patients across practice types and geographic regions, and comparison with HCH population.	PR	P	IER 2019 Chapter 11
5.10 Number and proportion of patients that completed follow-up reviews.	PT	P	IER 2020 Chapter 8
5.11 How adequate was the number of sessions for patients' needs?	PT	N	
5.12 Number and proportion of Tier 2 and Tier 3 patients receiving supporting services.	PT	P	IER 2019 Chapter 11
5.13 Types of supporting services provided by pharmacists to Tier 2 and 3 patients and changes at follow-up review.	PH/C	P	IER 2020 Chapter 8
5.14 Under what circumstances do Tier 1 patients benefit from supporting services?	PT	N	
5.15 Was patient participation in the program maintained throughout the trial?	PT	N	
5.16 What were the types of goals identified for patients during the development of the MMP? Which were the most common?	PH/C	P	IER 2019 Chapter 11, IER 2020 Chapter 8
5.17 What were the type of outcomes reported in patients' MMPs? Which were the most common?	PH/C	P	IER 2019 Chapter 11, IER 2020 Chapter 8
5.18 Which patients benefited from the Trial Program and how did they benefit?	PT	N	

Measures	Level PR=Program PH/C= Pharmacist/ practice PT=Patient	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference in Vol 2
5.19 Are the benefits of the program similar for patients across categories of disadvantage? What strategies are required to ensure disadvantaged groups benefit from the program?	PT	N	
5.20 How were medications reviewed for patients who did not receive services from community pharmacists?	PT	P	IER 2020 Chapter 8
5.21 Opportunities for improving program-level activities in subsequent rollouts of the program most frequently identified by stakeholders.	PR	P	IER 2020 Chapter 8
6.01 What criteria did practices use to select patients who could benefit from community pharmacist input?	PH/C	N	
6.02 Change in patients' self-reported (to the pharmacist) attendance at an emergency department and/ or hospitalisation in the last 6 months – initial assessment compared with follow-up review.	PT	N	
6.03 Change in MedsIndex score - initial assessment compared with follow-up review.	PT	N	
6.04 Change in patients' adherence to medication (pharmacists' assessment) - initial assessment compared with follow-up review.	PT	N	
6.05 Change in the proportion of patients who can be classified as meeting the criteria for psychotropic polypharmacy ¹ , polypharmacy ¹ or hyperpolypharmacy ¹ - initial assessment compared with follow-up review.	PT	N	
6.06 Change in pharmacist's observation of the patient's achievement of each of the agreed medication management goals at the follow up review.	PT	N	
6.07 Patients' assessment of community pharmacy service in gaining knowledge, improving confidence and competence with medications.	PT	N	
6.08 Themes identified in qualitative analysis of reports from patients, carers and families on their experiences in receiving the services of the community pharmacist.	PT	P	IER 2020 Chapter 8
6.09 Did patients referred to community pharmacists report an improved experience of care overall, including coordination of their care and communication with their HCH?	PT	N	

Measures	Level PR=Program PH/C= Pharmacist/ practice PT=Patient	Progress (C=completed; P=partially covered in this report; N=not yet covered)	Reference in Vol 2
7.01 Number of pharmacists verbally consulting HCH/ GP about the patient, participating in team care meetings/ case conferences with patients' HCH, or advising the HCH/ GP of issues through other communication.	PH/C	P	IER 2020 Chapter 8
7.02 What approaches were implemented to facilitate collaboration between pharmacists and HCH practices/ GPs?	PH/C	P	IER 2020 Chapter 8
7.03 How successful were these models from the perspective of pharmacists and HCH practices/GPs? What factors contributed to or detracted from successful collaboration? What needs to change to improve the level of interprofessional collaboration between pharmacists and HCH practices/GPs?	PH/C	P	IER 2020 Chapter 8
8.01 What is the cost of the community pharmacy component of the HCH trial?	PR	N	
8.02 Do the fees paid to pharmacists compensate for the time spent with HCH patients during the trial?	PH/C	N	
8.03 What is the evidence that the program will lead to cost savings through quality use of medicines?	PR	N	

Appendix 3 Conditions derived from textual descriptions

Patient conditions	Textual descriptions
Asthma	Acute asthma, acute exacerbation of asthma, allergic asthma, asthma, asthma attack, asthmatic bronchitis, childhood asthma, chronic obstructive airway disease with asthma, cough variant asthma, eosinophilic asthma, exacerbation of asthma, exercise-induced asthma, hay fever with asthma, late onset asthma, occupational asthma, seasonal asthma, severe asthma, thunderstorm asthma, viral exacerbation of asthma.
COPD	Acute exacerbation of chronic obstructive airways disease, COPD, chronic lung disease, chronic obstructive airway disease with asthma, interstitial lung disease, pulmonary fibrosis, restrictive lung disease.
Atrial fibrillation	Atrial fibrillation, atrial fibrillation and flutter, chronic atrial fibrillation, controlled atrial fibrillation, non-rheumatic atrial fibrillation, paroxysmal atrial fibrillation, rapid atrial fibrillation.
Coronary heart disease	Acute ST segment elevation myocardial infarction, acute coronary syndrome, acute myocardial infarction, acute non-ST segment elevation myocardial infarction, angina, cardiac arrest, coronary angioplasty, coronary artery bypass graft, coronary artery bypass graft, myocardial infarction, percutaneous transluminal coronary angioplasty, Prinzmetal angina, silent myocardial infarction, stable angina.
Stroke	Brain stem infarction, brainstem stroke syndrome, cerebral embolism, cerebral haemorrhage, cerebral infarction, cerebrovascular accident, embolic stroke, haemorrhagic cerebral infarction, intracranial haemorrhage, left sided cerebral hemisphere cerebrovascular accident, subarachnoid haemorrhage, subdural haemorrhage, thalamic infarction, thrombotic stroke.
Congestive heart failure	Biventricular congestive heart failure, chronic heart failure, congestive heart failure, diastolic heart failure, heart failure, heart failure with reduced ejection fraction, hypertensive heart failure, left ventricular diastolic dysfunction, right heart failure.
Osteoarthritis	Patellofemoral osteoarthritis, osteoarthritis.
Osteoporosis	Osteoporosis, osteoporosis due to corticosteroids, osteoporotic fracture, posttraumatic osteoporosis, postmenopausal osteoporosis.
Anxiety	Adjustment disorder with anxious mood, anxiety, anxiety attack, anxiety disorder, anxiety neurosis, anxious personality disorder, chronic anxiety, generalised anxiety disorder, mixed anxiety and depressive disorder, separation anxiety disorder of childhood, social phobia.

Patient conditions	Textual descriptions
Depression	adjustment disorder with depressed mood, agitated depression, chronic depression, depressed mood, depression, endogenous depression, major depressive disorder, mixed anxiety and depressive disorder, recurrent depression, severe depression, severe major depression with psychotic features, symptoms of depression.
Bipolar disorder	Bipolar, bipolar i disorder, bipolar ii disorder, bipolar disorder, schizoaffective disorder, bipolar type.
Schizophrenia	Catatonic schizophrenia, chronic paranoid schizophrenia, chronic schizophrenia, paranoid schizophrenia, psychotic disorder, schizoaffective disorder, schizophrenia.
Dementia	Dementia, dementia associated with alcoholism, dementia of frontal lobe type, frontotemporal dementia, senile dementia of the Lewy body type, senile dementia with psychosis multi-infarct dementia, vascular dementia.
High blood pressure	Antihypertensive therapy, diastolic hypertension, essential hypertension, hypertensive, malignant hypertension, ocular hypertension, portal hypertension, pulmonary hypertension, renal hypertension, renovascular hypertension, systolic hypertension.
High cholesterol	Cholesterol, dyslipidaemia, familial combined hyperlipidaemia, familial hypercholesterolaemia, hypercholesterolaemia, hyperlipidaemia, mixed hyperlipidaemia.
Diabetes type 1	Diabetes mellitus type 1
Diabetes type 2	Diabetes mellitus type 2
Chronic kidney disease	Anaemia of chronic renal failure, chronic kidney disease, chronic renal impairment, end stage renal disease, hypertensive renal disease, IGA nephropathy, medullary sponge kidney, renal dialysis, transplant of kidney
Cancer	Cancer, malignant, metastatic, carcino, leukaemia, neoplasm, neoplastic, lymphoma, melanoma, blastoma, mesothelioma, sarcoma, seminoma

Appendix 4 Sample practice benchmark report



Health Care Homes Practice Benchmark Report

For: Sample Medical Centre

Reporting period: January - June 2020

This report provides information about patients enrolled in the Health Care Homes (HCH) program in your practice and other practices participating in the HCH. It also describes the completeness and timeliness of clinical assessments and measurements as recorded in the practice management systems for HCH patients. The information presented could be useful to inform areas for quality improvement. Results presented in this report are drawn from two data sources, including HCH registrations with the Department of Human Services' Health Professional Online Services (referred to as "HPOS registration") and patient records extracted from the practice clinical management systems by an extraction tool (referred to as "practice data"). The HPOS registration and practice data are provided for the HCH evaluation in a confidential and de-identified form. It is not possible to ascertain patient clinical information that is not included in the practice data extracts.

Information about your practice

Practice size*	Between 1.6 and 5 full-time equivalent GPs
Practice location	Metropolitan areas (Modified Monash category 1)
Practice ownership	Non-corporate

* Practice size is based on the number of full-time equivalent GPs in the practice which may change over time.

Key findings from this report

-
- * By the end of June 2020, your practice had 150 patients enrolled in the HCH program within the HPOS registration system.
 - * The number of enrolled patients identified in your practice data extracts over the same period was 155.
 - * In the last year, recording of clinical assessments and measurements in practice extracts for 159 patients ranged from 17% (waist), 18% (physical activity), 23% (alcohol consumption), 33% (smoking status) to 90% (pulse) and 91% (blood pressure). In patients with diabetes, 86% had a HbA1c test recorded in the last year.
 - * The top five health conditions flagged in practice extracts for 159 patients are high blood pressure (57%), high cholesterol (49%), osteoarthritis (30%), osteoporosis (27%) and depression (23%). It is likely that patient diagnoses may be under-ascertained.
-

Section 1: HCH enrolments and patient characteristics based on the HPOS registration

This section presents the number of HCH patients enrolled in the HPOS registration in your practice and other similar practices by the end of June 2020 as well as patient characteristics such as age, sex and risk tier.

Table 1: Number of HCH enrolments and risk tier in your practice, as at June 2020

	HPOS registration
Time of enrolment commencement	March 2018
Number of total enrolments*	150
HCH risk tier	
Tier 1	20
Tier 2	83
Tier 3	47

* Enrolled patients who subsequently withdrew are not included.

Table 2: Demographic characteristics and risk tier of patients in the HPOS registration: your practice versus other practices, as at June 2020

	Statistics from other HCH practices			
	Your practice	Similar location	Similar size	All others
Number of enrolments (persons)				
Total enrolments	150	6000	3400	8750
Mean (median)		74 (42)	57 (43)	74 (43)
Enrolments by age, sex and risk tier (% of all enrolments)				
Age group				
Under 45	12	16	23	15
45 to 64	34	31	36	32
65 to 74	34	25	21	25
75 and older	20	29	19	29
Sex				
Female	49	53	54	54
Male	51	47	46	46
HCH risk tier				
Tier 1	13	16	9	16
Tier 2	55	51	45	49
Tier 3	32	32	46	35

Notes: Results are drawn from HPOS registration data.

- Percentage is not shown when there are fewer than ten patients.

Section 2: HCH patient health profile based on practice data extracts

In Section 2, HCH patients are identified in practice data extracts and the number of patients identified is compared to the HPOS registration. This section also reports the completeness and timeliness of patient clinical assessments, measurements and patient health conditions. It is not possible to examine patient health profile when practice data extracts are not available or contain no flags for HCH patients.

Recording of HCH patient enrolments in practice data

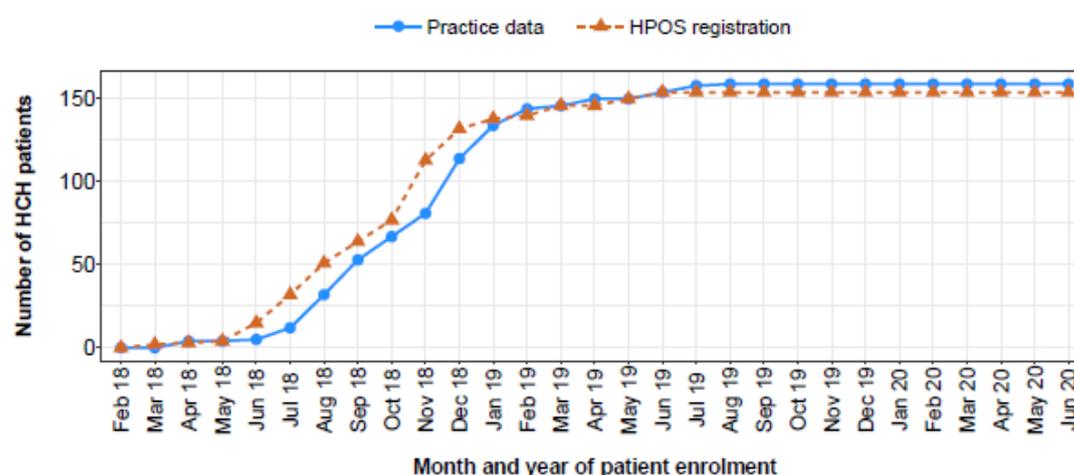
Table 3: Number of HCH patients and risk tier identified in your practice data, as at June 2020

	Practice data
When the first patient was recorded*	April 2018
Number of patients identified in practice data†	155
HCH risk tier	
Tier 1	25
Tier 2	85
Tier 3	45

* Based on date of patient enrolment recorded in practice data or derived from date of data extract.

† Enrolled patients who subsequently withdrew are not included.

Figure 1: Monthly cumulative patient enrolments in your practice: practice data versus HPOS registration



Note: Month and year of patient enrolment in 'Practice data' are derived from date of patient enrolment if available, otherwise date of practice extract.

Completion and timeliness of recorded clinical assessments and measurements

Table 4: Recording of clinical assessments and whether an assessment was recorded in the previous year: your practice versus other practices

	Your practice	Statistics for other HCH practices		
		Similar location	Similar size	All others
Number of enrolments recorded in practice data (persons)				
All patients	155	5980	2900	8100
Patients who have an assessment recorded (% of all patients*)				
Smoking status[†]				
Ever recorded	100	92	95	93
Reviewed in previous year	33	39	45	38
Alcohol consumption amount				
Ever recorded	55	84	82	83
Reviewed in previous year	23	38	41	36
Physical activity[‡]				
Ever recorded	21	6	20	11
Recorded in previous year	18	2	5	3
Body weight				
Ever recorded	98	94	94	95
Recorded in previous year	74	63	62	66
Body height				
Ever recorded	97	91	91	92
Waist				
Ever recorded	64	57	59	59
Recorded in previous year	17	20	23	21

Notes:

- Percentage is not shown when there are fewer than ten patients or data for an assessment are absent.

* Denominator includes only patients in practices that have data for an assessment.

[†] Smoking status is recorded as smoker, ex-smoker or never smoked.

[‡] Physical activity is recorded as sufficient, insufficient and sedentary.

Table 5: Recording of clinical measurements and whether a measurement was recorded in the previous year and previous six months: your practice versus other practices

	Statistics for other HCH practices			
	Your practice	Similar location	Similar size	All others
Number of enrolments recorded in practice data (persons)				
All patients	155	5980	2900	8100
Patients with diabetes	35	1670	760	2300
Patients with asthma or COPD*	45	1310	700	1740
Patients who have a measurement recorded (% of all patients†)				
Blood pressure[‡]				
Ever recorded	98	96	96	97
Recorded in previous year	91	76	74	79
Recorded in previous six months	70	59	56	62
Pulse				
Ever recorded	98	95	95	96
Recorded in previous year	90	71	70	75
Recorded in previous six months	70	53	52	56
Cholesterol[§]				
Ever recorded	97	93	91	94
Recorded in previous year	82	65	57	64
Recorded in previous six months	59	45	38	44
Kidney function[¶]				
Ever recorded	98	94	93	95
Recorded in previous year	86	71	65	73
Recorded in previous six months	61	52	46	54
Patients who have a HbA1c test recorded (% of patients with diabetes)				
HbA1c				
Ever recorded	100	99	99	99
Recorded in previous year	86	84	81	85
Recorded in previous six months	81	67	64	67
Patients who have a spirometry test recorded (% of patients with asthma or COPD[‡])				
Spirometry^{**}				
Ever recorded	63	25	19	26
Recorded in previous year	9	5	4	5
Recorded in previous six months	2	1	1	2

Notes:

- Percentage is not shown when there are fewer than ten patients or data for a measurement are absent.

* Patients with asthma or COPD in practices that had extracts of spirometry measurements.

† Denominator includes only patients in practices that have data for a measurement.

‡ Systolic or diastolic blood pressure.

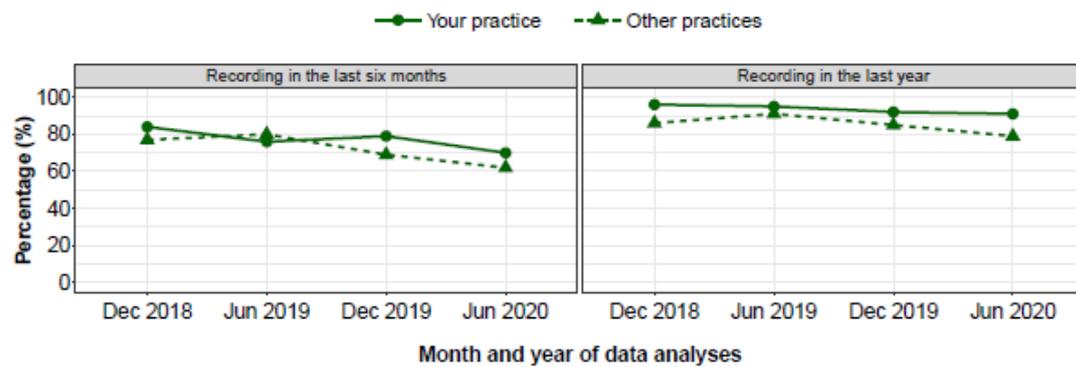
§ Total cholesterol, HDL, LDL or triglycerides.

¶ eGFR, serum creatinine, urinary creatinine or albumin-creatinine ratio.

** FEV or FVC.

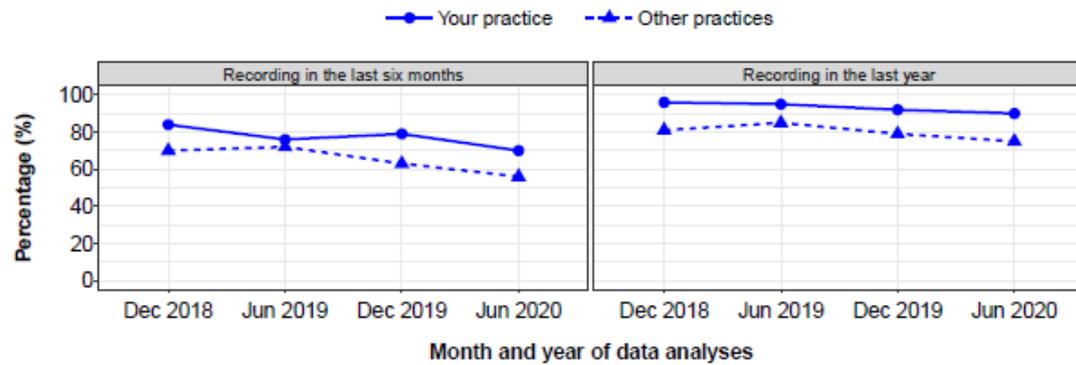
The following figures present the recording of patient assessments in your practices and other practices that remain in the HCH program by end of June 2020. The analyses are based on practice data that contain flags for HCH patients and conducted at the end of December 2018, June 2019, December 2019 and June 2020. Patients who withdrew are excluded from data analysis. The numbers of patients in the analyses (i.e. the numerators and denominators) may change because of new enrollments and/or withdrawals. Results for your practice are not shown if practice extracts were not available for the analysis period or the number of patients being fewer than ten.

Figure 2: Recording of blood pressure* in all patients: your practice vs other practices



* Recording of systolic or diastolic blood pressure in active HCH patients, irrespective of health conditions and whether patients visited the practice.

Figure 3: Recording of pulse* in all patients: your practice vs other practices



* Recording of pulse in active HCH patients, irrespective of health conditions and whether patients visited the practice.

Figure 4: Recording of cholesterol* in all patients: your practice vs other practices

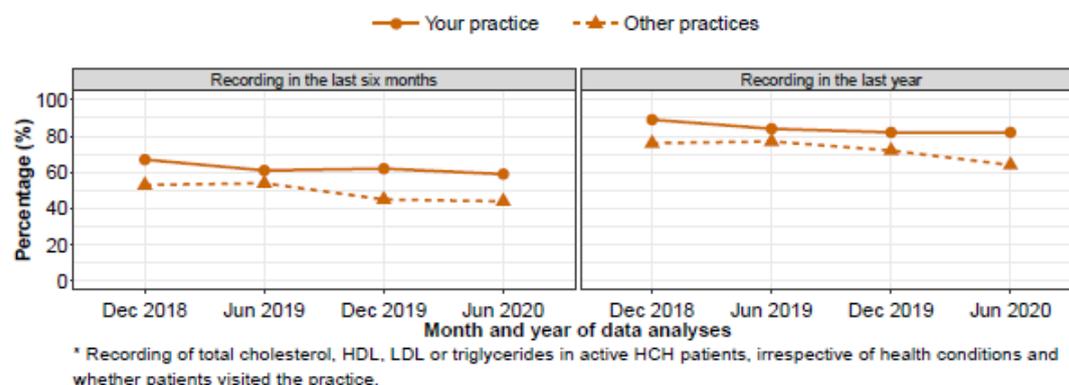


Figure 5: Recording of kidney function* in all patients: your practice vs other practices

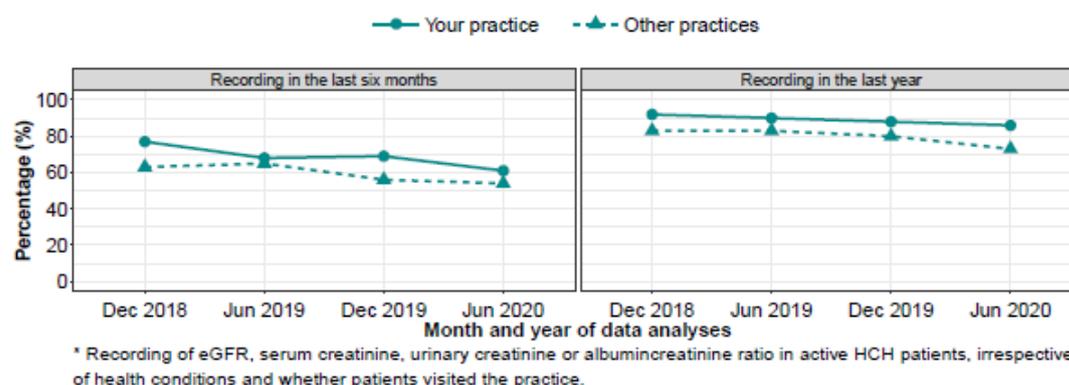
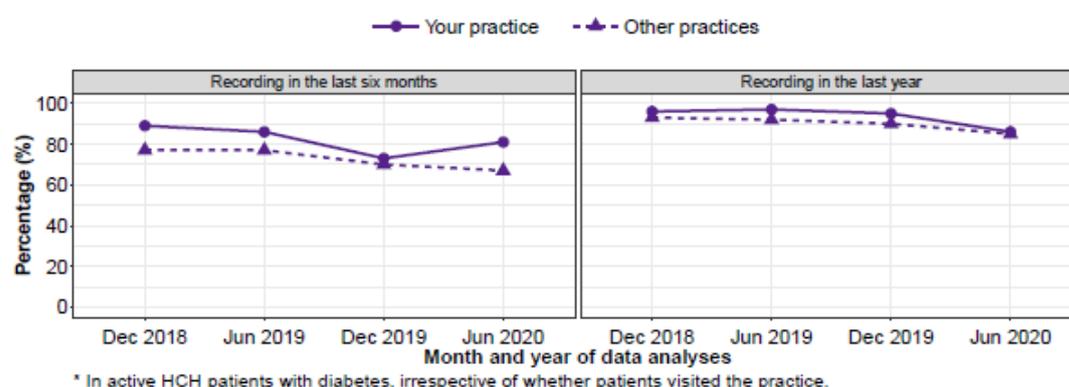


Figure 6: Recording of HbA1c* in patients with diabetes: your practice vs other practices



Health profile of HCH patients

This table presents health conditions that have ever been flagged or recorded in practice extract data. It is not possible to ascertain the conditions that have not been recorded in the practice systems or have not been included in the practice data extracts.

Table 6: Patients who have a health condition flagged in practice data extracts: your practice versus other practices

	Statistics for other HCH practices			
	Your practice	Similar location	Similar size	All others
Number of enrolments recorded in practice data (persons)				
All patients	155	5980	2900	8100
Patients who have a health condition flagged (% of all patients⁺)				
Patient health conditions				
Asthma	19	18	19	18
COPD	14	11	12	12
Atrial fibrillation	9	8	7	9
Coronary heart disease	18	15	13	16
Stroke	6	6	5	6
Congestive heart failure	3	4	4	5
Osteoarthritis	30	25	20	27
Osteoporosis	27	16	12	17
Anxiety	12	14	18	14
Depression	23	23	27	23
Bipolar disorder	1	2	3	2
Schizophrenia	1	2	3	2
Dementia	1	2	3	2
Cancer (any)	11	16	13	16
High blood pressure	57	44	41	46
High cholesterol	49	35	34	36
Diabetes type 1	4	2	2	2
Diabetes type 2	20	26	25	28
Chronic kidney disease	11	7	9	9
Number of above morbidities[†]				
Nil	4	12	11	11
One condition	18	16	18	15
2-4 conditions	54	53	55	54
5+ conditions	24	18	16	20

Notes:

- Percentage is not shown when there are fewer than ten patients or flags for a health condition are absent.

⁺ Denominator includes only patients in practices that have flags for a health condition.

[†] The number of above-listed health conditions, ranging from nil to 19.