Evaluation Report of the Diabetes Care Project

Contents

THE HON SUSSAN LEY MP
MINISTER FOR HEALTH
MINISTER FOR SPORT

Foreword to the Evaluation Report of the Diabetes Care Project

Improvements to primary care are an integral part of building a responsive, efficient and sustainable health system. Primary health care is the part of the health system we all use the most, it's the frontline, providing holistic care encompassing both preventive and treatment services.

Australia's primary health care system, with general practice at its centre, on the whole delivers high quality and locally relevant primary health care services – more than 25,000 general practitioners working in around 7,000 practices and more than 120,000 registered allied health practitioners, often working with GPs in multi-disciplinary care teams.

The burden of disease in Australia has shifted from episodic care to chronic illnesses, placing increasing demands on the Australian health care system, particularly in terms of usage and costs, and increases the potential for a person to experience poorly integrated care delivery. Care needs are more complex and require multiple professional interactions across the health system. Primary health care is best positioned to manage chronic disease and support preventive health to ease pressure on the hospital system.

The Diabetes Care Project was the largest randomised controlled trial conducted in Australia. It piloted new models of healthcare delivery designed to improve care for adults with either type 1 or type 2 diabetes.

We need new ways of dealing with chronic illness and the results and recommendations of the Evaluation Report of the Diabetes Care Project will inform future policy development regarding arrangements for the management of chronic disease. It will also provide the primary health care research community with valuable data.

I would like to thank all the general practices, patients and health care sector workers who took part in the Project, which has led to the delivery of this Evaluation Report. I would also like to thank the Victorian Government for contributing funding to the Project.

There is a genuine need for primary health care reform that enables services to integrate and support seamless patient care. The Primary Health Care Advisory Group I have created will advise on opportunities for reform and this piece of research will provide a better evidence base for improving the management of chronic and complex conditions.

The Hon Sussan Ley MP

Parliament House Canberra ACT 2600 Telephone: (02) 6277 7220 Facsimile: (02) 6273 4146

Executive Summary

The Diabetes Care Project (DCP) was a pilot of coordinated models of primary care for diabetes conducted between 2011 and 2014. The DCP was established by the Commonwealth in response to recommendations made by the National Health and Hospital Reform Commission (NHHRC) in 2009 regarding the management of chronic disease in primary care. Five new care components were tested alongside current models of care:

1. An integrated information platform for general practitioners, allied health professionals and patients.
2. Continuous quality improvement processes informed by data-driven feedback.
3. Flexible funding, allocated based on patient risk stratification.
4. Quality improvement support payments linked with a range of patient population outcomes.
5. Funding for care facilitation, provided by dedicated Care Facilitators.

The pilot was a cluster randomised control trial (RCT) with two intervention groups (Group 1 and Group 2) and a Control Group. Group 1 received only the first two of these five care components (i.e. no funding changes), while Group 2 received all five components.

184 general practices and 7,781 people with diabetes enrolled in the DCP over six months —the fastest enrolment rate of similarly large programs internationally.

Over the 18 months of the trial, participants in Group 2 showed a statistically significant improvement in HbA1c (blood sugar) levels—the primary clinical endpoint of the trial—of 0.2 percentage points compared to the Control Group. The difference was larger for those who started the trial with HbA1c levels above the target range. For example, people with starting HbA1c levels greater than or equal to 9.0 percent at baseline showed a change in mean HbA1c of -0.6 percentage points compared to the Control Group. Significant improvements were also seen in Group 2 for blood pressure, blood lipids, waist circumference, depression, diabetes-related stress, care-plan take-up, completion of recommended 'annual cycles of care,' and allied health visits. In contrast, participants in Group 1 did not improve on any of these metrics (with the exception of care plan take-up).

The DCP also provided an opportunity to examine the impact of current care planning and annual cycle of care activities on clinical outcomes. Little relationship was seen between the complexity of a person's health care needs and the amount of chronic disease funding they receive. A prospective analysis of the Control Group during the trial period showed that having a care plan or completing an annual cycle of care at the start of the project did not have any influence on HbA1c, cholesterol, quality of life, depression, or diabetes-related stress, and it had only a small positive influence on blood pressure.

While Group 2 delivered positive outcomes, it cost $203 more per person per year compared to the Control Group. While this overall difference was not statistically significant, chronic disease payments to GPs and AHPs did increase significantly. These and other increases were offset by a reduction in the cost of hospitalisations—particularly potentially-preventable hospitalisations—of $461 per patient in Group 2,

although this was not statistically significant. While there is uncertainty around the pilot's cost-effectiveness, it is unlikely that the particular funding model implemented in the DCP would be cost-effective if rolled out more broadly.

The DCP demonstrated that improved information technology and continuous quality improvement processes were not, on their own, sufficient to improve health outcomes. However, combining these changes with a new funding model did make a significant difference. While a long-term extrapolation of the benefits and costs of the Group 2 funding model suggests that, on balance, it is unlikely to be cost-effective as implemented in the pilot, the DCP's findings can be used to inform future programs. There are therefore three recommendations arising from the DCP:

1. Change the current chronic disease care funding model to incorporate flexible funding for registration with a health care home, payment for quality and funding for care facilitation, targeting resources where they can realise the greatest benefit.
2. Continue to develop both eHealth and continuous quality improvement processes.
3. Better integrate primary and secondary care and reduce avoidable hospital costs.

Acronyms and Glossary of Terms

Term	Definition
ACCORD	Action to Control Cardiovascular Risk in Diabetes (lipid trial)
ADVANCE	Action in Diabetes and Vascular Disease: Preterax and Diamicron MR Controlled Evaluation (trial)
AHP	Allied health professional
AQoL-4d	Assessment of Quality of Life (instrument) – 4 dimensions
Baseline period	The 18-month period preceding a patient's enrolment in the DCP
BEACH	Bettering the Evaluation and Care of Health (report)
BMI	Body mass index
COPD	Chronic obstructive pulmonary disease
DALY	Disability-adjusted life year
DAG	Diabetes Advisory Group
DCP	Diabetes Care Project
GDP	Gross domestic product
GFR	Glomerular filtration rate (a measure of kidney function)
GP	General practitioner
GPMP	General Practice Management Plan
HbA1c	Glycated haemoglobin (a component of the blood that indicates the level of exposure to high blood sugar)
IT	Information technology
LDL / HDL	Low density lipoprotein / high density lipoprotein (structures that allow fats to be transported in the blood)
MBS	Medicare Benefits Schedule
NDSS	National Diabetes Services Scheme
NHHRC	National Health and Hospital Reform Commission
OR	Odds ratio (a measure of the strength of an association between two properties in a population)
p	p-value (reflects the likelihood of a hypothesis being true)
PBS	Pharmaceutical Benefits Scheme
PHQ-9	Patient Health Questionnaire-9 (standardised questionnaire)
PN	Practice Nurse
PoCT	Point of Care Testing in General Practice Trial

Term	Definition
Primary Care Organisations	Independent entities responsible for coordinating local primary health care services, such as Divisions of General Practice and Medicare Locals
QALY	Quality-adjusted life year
QISP	Quality Improvement Support Payment
QoF	Quality and Outcomes Framework (UK)
RACGP	Royal Australian College of General Practitioners
RECORD	Regulation of Coagulation in Orthopedic Surgery to Prevent Deep Venous Thrombosis and Pulmonary Embolism (clinical trial)
Risk stratification	The process of allocating individuals to two or more groups based on measures of the likelihood of future adverse events
TCA	Team Care Arrangements
UKPDS	United Kingdom Prospective Diabetes Study
95% CI	95 percent confidence interval (the range of values for a measure within which one can be 95 percent confident that the true value lies)

Chapter 1—Diabetes in Australia

This chapter describes the current state of diabetes in Australia and outlines a number of opportunities to improve how the disease is managed. The chapter is divided into two sections:

- Section 1.1 The burden of diabetes in Australia
- Section 1.2 Opportunities to improve diabetes care in Australia

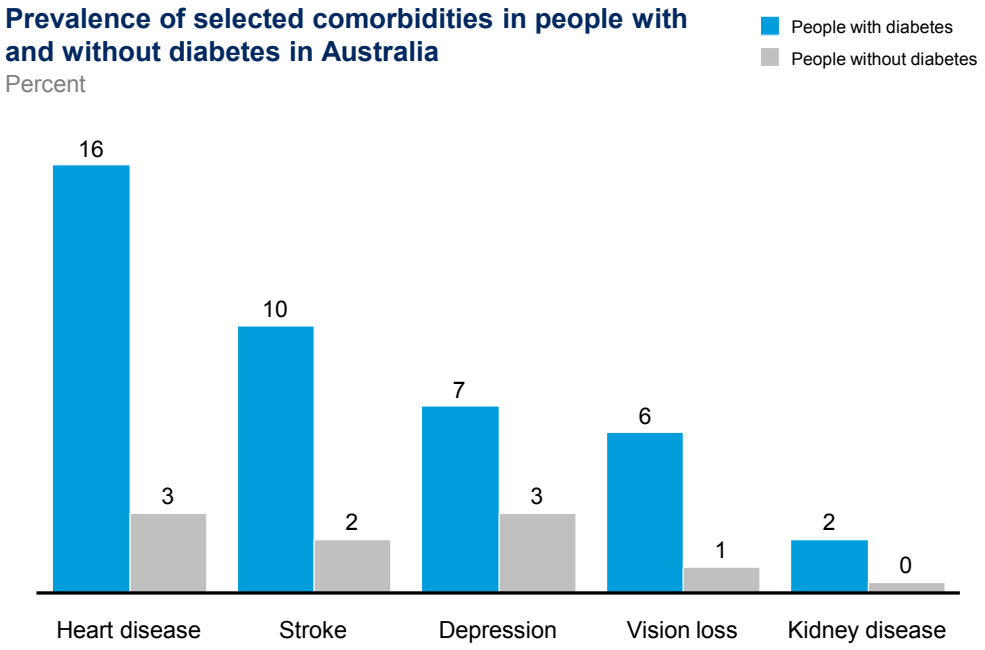
1.1 THE BURDEN OF DIABETES IN AUSTRALIA

Diabetes mellitus is a significant problem in Australia. In 2011-12, an estimated one million Australians over the age of two years had diabetes, 85 percent of whom had type 2 diabetes.[1] While these figures are already substantial, it is likely that they underestimate the actual prevalence of the disease. Indeed, recent biomedical surveys suggest that there is one case of undiagnosed diabetes for every four people diagnosed with the disease (among Australians aged 18 years or more).[2]

The number of people with diabetes is expected to increase rapidly over the coming years. According to National Health Survey reports, the prevalence of diabetes has more than tripled in Australia over the last twenty years, increasing from 1.3 percent of the population in 1989–90 to 4.5 percent of persons aged 18 years and over in 2011–12.[1] The major drivers of this increased prevalence include an ageing population (the prevalence of diabetes increases with age), rising levels of obesity (which increases the incidence of diabetes), and greater life expectancy among people with diabetes.[3] Projections made in 2010 suggested that the prevalence may rise to 8.5 percent of the population aged between 20 and 79 by 2030, however the latest National Health Survey indicates that prevalence may have stabilised between 2007–08 and 2011–12.[1,4]

The prevalence of diabetes is a significant concern for the Australian health system because the disease is a major cause of morbidity and mortality. People with diabetes can experience a range of health complications as the disease progresses, including heart disease, stroke, kidney disease, vision loss, peripheral neuropathy and depression (Figure 1). As such, five percent of lost disability-adjusted life years (DALYs) were attributable to diabetes in Australia in 2003.[5] In 2011, diabetes contributed to (i.e. was the underlying or associated cause of) ten percent of all deaths in the country, making it the sixth leading cause of death in Australia.[2]

FIGURE 1 [6]



The mortality and morbidity rates associated with diabetes mean that the cost of the disease, both for the individual and for the health system, is considerable. The DiabCo$t Australia Study[7] (conducted in 2001) and the AusDiab study[8] (conducted in 2004–05) estimated that direct healthcare costs for a person with diabetes range from approximately $3,800 to $6,100 per person per year (in 2014 dollars),[a] although the costs are substantially higher for people with complications. Based on these estimates and 2011–12 prevalence estimates, the total direct healthcare cost of caring for people with diabetes in Australia would equate to between $4 billion and $6 billion per year. The Australian Institute of Health and Welfare estimated this figure to be $1.6 billion in 2008–09, with around 43 percent of these costs coming from hospitalisations for the disease.[3]

The largest categories of direct healthcare diabetes costs are hospitalisations (35 percent) and pharmaceuticals (32 percent).[9] In 2010–11, diabetes-related hospitalisations accounted for 2.5 percent (220,000) of all the hospitalisations that occurred during that period. Furthermore, diabetes is the largest contributor to potentially-preventable hospitalisations, accounting for 26 percent of all such hospitalisations in Australia.[10] In terms of drug therapy, around 8.2 million prescriptions were dispensed in 2012 for blood glucose-lowering medications such as insulin (11 percent) and metformin (approximately half of the remaining medications).[2]

[a] Based on CPI escalation (Australian Bureau of Statistics).

1.2 OPPORTUNITIES TO IMPROVE DIABETES CARE IN AUSTRALIA

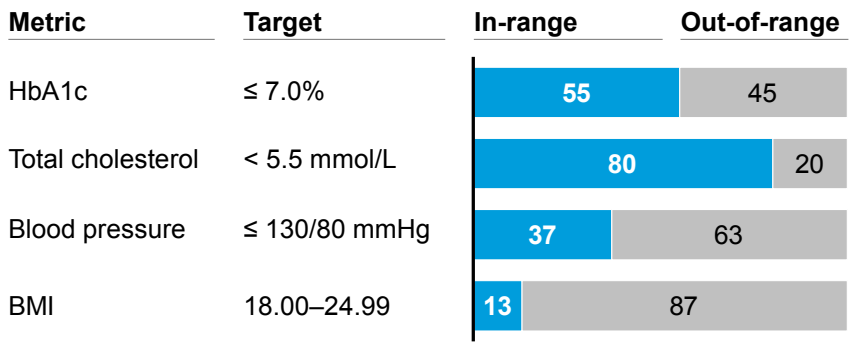
There are opportunities to improve outcomes and the quality of care for people with diabetes in Australia.

First, there is an opportunity to increase the number of people with diabetes who receive care in accordance with the recommended clinical guidelines. In 2009–10, only 18 percent of Australians with diabetes had a claim made by their GP for an annual cycle of care.[11] It has also been estimated that the relevant clinical guidelines are not followed in 37 percent of diabetes-related clinical encounters.[12] Improving care processes in diabetes care should lead to improved clinical outcomes for people with diabetes. Published Australian data suggests that there is a significant shortfall in meeting the clinical targets for diabetes management (Figure 2). For example, the Australian Bureau of Statistics' Australian Health Survey found that 45 percent of Australian adults with known diabetes did not achieve the recommended glycaemic targets, and that almost two-thirds of people had high blood pressure. Weight control is also a major priority for people with diabetes, 87 percent of whom are outside the ideal body mass index (BMI) range.[1]

FIGURE 2 [1]

Australians with known diabetes who are within range for clinical targets

Percent; Australians over age 18 years with known diabetes (estimate)



Secondly, it is important to monitor and maintain high standards of patient experience in the primary care of diabetes. As the National Health and Hospitals Reform Commission (NHHRC) explained, 'how consumers experience the health system and how they value the outcomes is essential to promoting an agile and self-improving health system'[13]. Up to 41 percent of Australians with diabetes have indicated that they experience anxiety, stress, depression or feel 'burned out' from coping with their diabetes.[14] Improving patient experience through the provision of high-quality care can contribute significantly to the

psychological well-being of people with diabetes, and research suggests that it may also be associated with achieving better glycaemic control.[15]

Thirdly, it is important that new models of care are developed that can improve outcomes in a financially sustainable way for the Australian health system. A 'top down' analysis of allocated healthcare expenditure for diabetes suggests that healthcare costs associated with the disease increased by 86 percent between 2000–01 and 2008–09 (an increase of around seven percent per annum), while expenditure for all diseases increased by 60 percent in total over the same period (an increase of around five percent per annum).[3] As an example, pharmaceutical expenditure on diabetes medication grew by 12 percent per annum from FY06 to FY13, driven both by the growing prevalence of diabetes and the increased availability and use of more expensive, newer anti-diabetic drugs (such as long-acting insulins, oral DPP4-inhibitors, and injectable GLP1-agonists) (Figure 3).[16] Similarly, expenditure on Commonwealth-funded chronic disease management services (relating to all chronic diseases, including diabetes) has grown at a rate of 25 percent per annum from FY06 to FY14 (Figure 4). In addition to increased care plan uptake, this growth has been driven by an increased number of services per care plan (such as team care arrangements [TCAs], reviews, and AHP visits). In addition to the cost burden of chronic disease management items, 79 percent of GPs surveyed by the Australian Medical Association (AMA) as part of the AMA Red Tape Survey 2011 agreed that there was too much red tape involved in complying with the requirements associated with these items.[17]

FIGURE 3 [16]

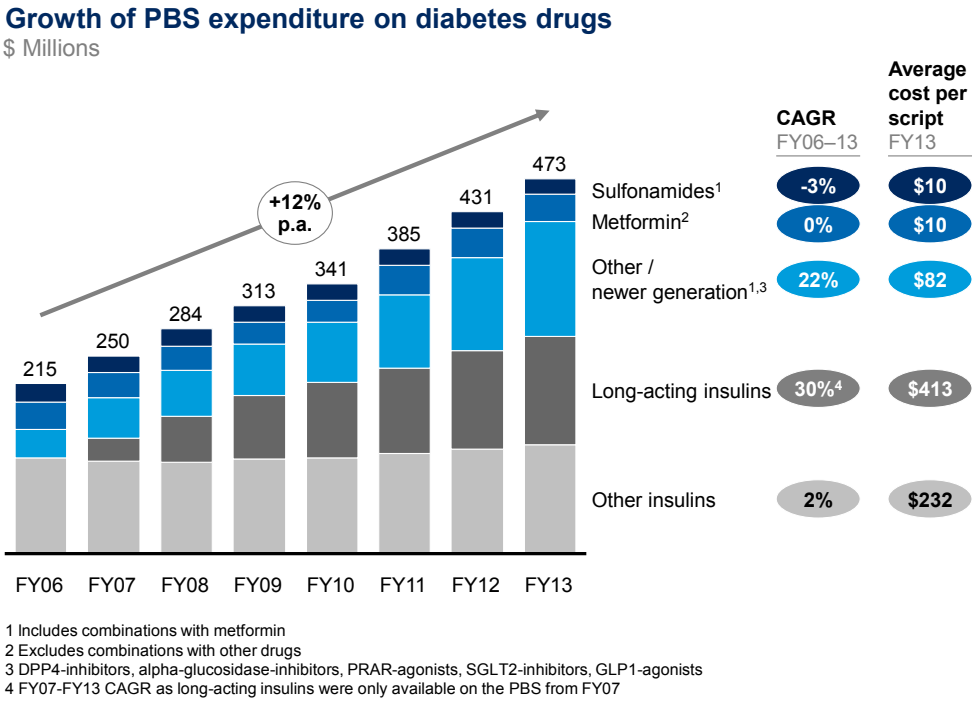
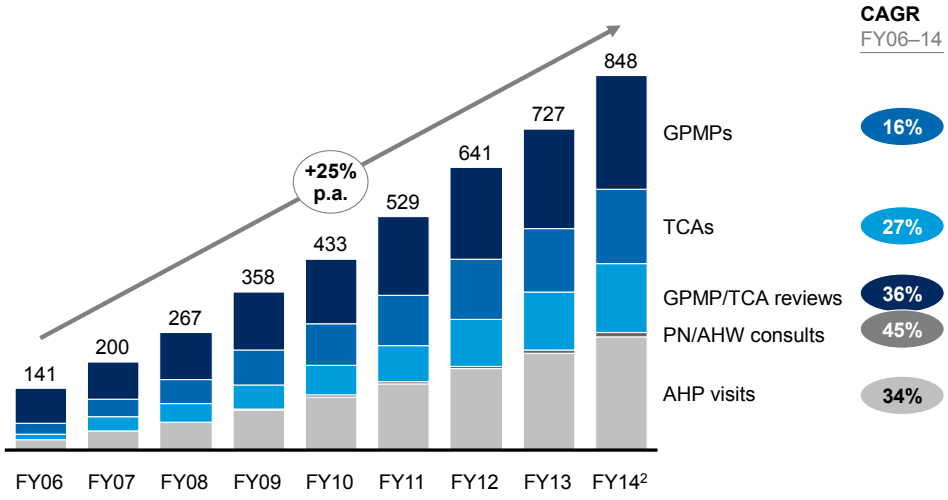


FIGURE 4 [18]

Growth of Medicare chronic disease funding

MBS expenditure on chronic-disease-specific items[1]; $ Millions p.a.



1 Includes MBS item numbers: 721, 723, 732, 2517, 2518, 2521, 2522, 2525, 2526, 2620, 2622, 2624, 2631, 2633, 2635, 10950, 10951, 10952, 10953, 10954, 10956, 10958, 10960, 10962, 10964, 10966, 10968, 10970, 81100, 81110, 81120, 81105, 81115, 81125, 10997
2 July to May, annualised
Note: Excludes practice incentive payments (PIPs) and service incentive payments (SIPs)

Chapter 2—Design of the Diabetes Care Project (DCP)

This chapter describes the Diabetes Care Project and is divided into three sections:

- 2.1 Background and objectives of the DCP
- 2.2 DCP interventions
- 2.3 DCP trial design

2.1 BACKGROUND AND OBJECTIVES OF THE DCP

The Diabetes Care Project (DCP) was established in response to two of the recommendations published by the National Health and Hospital Reform Commission (NHHRC) in 2009.

First, the NHHRC recommended that chronic disease should be managed in primary care settings through voluntary patient registration in 'health care homes.'[13] The Australian Medical Association (AMA) defines a health care home or 'patient-centred medical home' (as it is referred to in some jurisdictions) as a 'simple extension of the family doctor, where the GP leads a multi-disciplinary team and is recognised and remunerated appropriately for coordinating comprehensive and quality longitudinal care.'[19] Medical homes have been adopted in various forms in the United States, Canada, France, the UK, Germany, the Netherlands, Sweden and New Zealand, where they have been shown to provide cost and utilisation benefits (such as improved clinical outcomes and a reduced number of hospitalisations); enhance population health and preventative services; reduce disparities in access to care across a population; and improve patient and clinician experiences.[20]

Second, the NHHRC recommended that the Commonwealth consider innovative funding models that include quality-based funding to manage population health. It was suggested that the 'Commonwealth Government [would] need to consider … a next generation Medicare [with] a broader range of services … involving, for example, a mix of salary, fee-for-service, grants, payments for performance and quality, and payments for episodes of care.'[13] Innovative funding models that extend beyond a purely fee-for-service model have been considered or implemented in Australia and other countries for some time. In Australia, for example, the Practice Incentive Program (PIP) was introduced in 1999 to improve the quality of care provided in asthma, diabetes, mental health and cervical screening.[21] In 2008, a paper commissioned for the National Preventative Health Taskforce suggested that 'the needs of specific groups may be better achieved by funding performance rather than fee for service—for example the proportion of disadvantaged or recently unemployed patients who have a health check.'[22] Beyond Australia, the numerous patient-centred medical home schemes in the United States typically involve elements of population-based flexible funding and payments for quality in addition to fees for service.[23] In the UK, the Quality and Outcomes Framework (QoF) for GPs represents a large-scale system-wide reform that incentivises GPs to meet population clinical targets. These Australian and international models in primary care funding are used where health care funders want to encourage efficient and equitable health care for a population.[24]

Australia's Coordinated Care for Diabetes Health Reform measure was originally announced in March 2010, with funding of $449.2 million over four years allocated in the 2010–11 Budget. It was intended to fund the flexible delivery of primary health care services through general practice for the treatment and ongoing management of people with diabetes who voluntarily enrolled with their general practice.

Following this announcement, a range of concerns were raised by stakeholder groups such as the Australian Medical Association (AMA) and the Royal Australian College of General Practitioners (RACGP), in both media commentary and informal stakeholder discussions. Key areas of concern included the 'fundholding' arrangements (over- and under- expenditure), 'capitation' concerns, 'cherry-picking' by practices only enrolling the 'least sick' patients with diabetes, and the pay-for-performance targets for general practice.

On 12 November 2010, the then Minister for Health and Ageing announced—in response to these stakeholder concerns—that a pilot of the Coordinated Care for Diabetes reform would commence in July 2011. (This pilot would subsequently be renamed the Diabetes Care Project.)

An open competitive Request for Tender was undertaken by the Commonwealth on 2 May 2011 to select an organisation to oversee the development, implementation and evaluation of the pilot. International consulting firm McKinsey & Company (McKinsey) was announced as the successful tenderer on 29 June 2011. McKinsey formed a consortium with a range of organisations listed below:

- Australian Institute of Health and Welfare
- Baker IDI Heart and Diabetes Institute
- CheckUp
- Darling Downs - South West Queensland Medicare Local Ltd (formerly Queensland Toowoomba & District Division of General Practice)
- Department of Health (Victoria)
- Diabetes Australia Queensland
- General Practice Queensland (GPQ)
- Gold Coast Medicare Local (formerly General Practice Gold Coast; also took over contract with Ipswich and West Moreton Division of General Practice).
- Healthfirst Network (trading name for Adelaide Western General Practice Network Inc)
- Infiniti Health Solutions Ltd
- Networking Health Victoria (formerly General Practice Victoria)
- Precedence Health Care Pty Ltd
- Queensland Department of Health
- SA Health

- The University of Melbourne
- The University of New South Wales
- The University of South Australia
- Wide Bay Medicare Local Ltd (formerly GP Links Wide Bay Ltd)
- Workstar Pty Ltd

During 2011–12, a broad set of stakeholders from across the health system designed the DCP to test the NHHRC recommendations, as well as other potential changes in the provision of integrated care. A Diabetes Advisory Group (DAG) was appointed by the Commonwealth to inform the design, implementation and evaluation of the project. The group included government, clinician, patient and academic stakeholders and focused on improving integrated care for Australians living with diabetes. The DAG was chaired by the Department of Health's Chief Medical Officer and consisted of members from a broad range of stakeholder groups (outlined in Appendix 6).

In addition to the DAG, local reference groups—which included both clinicians and people with diabetes—were consulted on the detailed design of the DCP's models of care, including evaluation of different IT care planning tools. (An IT reference group, for example, involved around 20 clinicians and other practice staff.) During August and September 2011, six local reference group workshops were held across Queensland and South Australia with health providers and consumers, including (but not limited to) GPs, dietitians, pharmacists, practice nurses, endocrinologists, mental health workers, podiatrists, exercise physiologists, and people with diabetes. The local reference groups provided perspectives from the 'front line' of primary care to assist in defining the new care pathways that would be tested as part of the DCP.

Eight areas of evaluation were defined by the Department of Health for the pilot:

1. The quality of diabetes care provided to enrolled patients;
2. The level of flexibility offered by the new funding arrangements in supporting the delivery of diabetes services and development of new ways to provide innovative, patient-centred care that is appropriately tailored to the needs of individual patients;
3. The impact of flexible funding arrangements on the affordability of care for patients (i.e. out-of-pocket expenses);
4. The impact of flexible funding arrangements on the quality of care coordination, and the level of collaboration and interactions across the multidisciplinary team;
5. The impact of pay-for-performance incentives on the quality of diabetes care, as measured against key process and intermediate clinical indicators;
6. The impact of pay-for-performance incentives on the recording of information on diabetes care provided for enrolled patients;

7. The impact of voluntary patient enrolment on continuity and coordination of care, and client satisfaction with their care;
8. The sustainability of the payment types and levels under any future wider rollout of the Pilot.

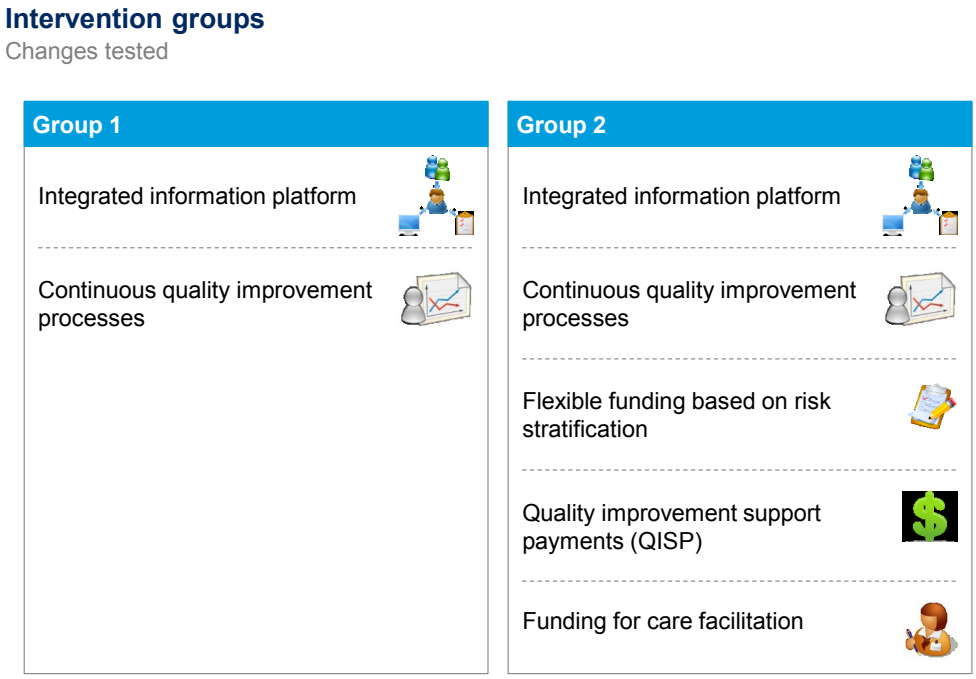
2.2 DCP INTERVENTIONS

The DCP was designed to test the impact of two different models of care (in comparison with usual care) on clinical quality and patient and provider experience (Figure 5). These models of care were designed to evaluate changes that the NHHRC and the DAG identified as having the potential to improve the way care is organised and delivered. Group 1 tested improvements that could be made within the current funding model—specifically adopting an integrated information platform and continuous quality improvement processes. Group 2 tested the same components as Group 1, as well as flexible funding based on risk stratification, payments for quality and funding for care facilitation.

In total, five major changes were tested across the two groups, the details of which are described in the following sections:

- 2.2.1. Integrated information platform
- 2.2.2. Continuous quality improvement processes
- 2.2.3. Flexible funding based on risk stratification
- 2.2.4. Quality improvement support payments (QISP)
- 2.2.5. Funding for care facilitation

FIGURE 5



2.2.1. Integrated Information Platform

This intervention provided practices with a new IT tool—a modified version of a commercially available product called cdmNet—with nine functionalities to support better integrated care:

1. **Patient registration**. The IT system maintained a list of all patients registered with a given general practice, along with information about their clinical status and gaps in their clinical care.
2. **Risk scoring**. When a person registered with the DCP, the IT system would ask the person's GP to confirm their medical history and ensure their clinical results were up to date. This information was then used to automatically assign people to a risk stratification category (the risk stratification system is described below). In Group 1, this information was used for research purposes only—specifically, to ensure up-to-date clinical parameters at the start and end of the trial period. In Group 2, risk stratification was the basis for flexible funding allocations, and it allowed the system to provide recommendations for an optimal care plan based on a person's needs.
3. **Care planning and clinical protocols**. An individual, automatically generated care plan was created for each participant. In Group 1, there was a single standardised care plan template. In Group 2, templates differed based on people's individual risk stratification level. In all cases, care plans could be completely customised by participants' care teams.

4. **Provider bookings**. The system enabled eReferrals to efficiently engage AHPs in patient care, and to encourage those AHPs to access and contribute to participants' electronic health records. This functionality also facilitated allocation of AHP funding provided by the DCP.
5. **Care tracking**. The live tracking function monitored primary health practitioners' interactions with participants, allowing the system to display a complete picture of integrated care for each individual participant (detailing all of the participant's interactions with the health system, including hospitalisation).
6. **Common patient record**. This shared electronic health record spanned the full health system, allowing live data access and providing the option of adding new data. Upon accessing the registry, primary care practitioners were presented with an overview of their patient's details, status, and risk. Information contained in the electronic health record included the following: patient demographics (name, date of birth, smoking status); the name of the referring GP; clinical metrics (HbA1c level, blood pressure, cholesterol level, and BMI); comorbidities (such as depression); and the patient's 'risk stratification' group (explained in more detail below).
7. **Patient portal**. A patient portal provided participants with read/write access to their shared electronic health record, including the ability to track completion of self-care items in the care plan (such as physical exercise sessions) and record relevant data (weight, blood pressure, glucose levels, attendance at care appointments).
8. **Performance management and analytics**. A data collection and analytics mechanism (with a specific focus on practice-level data relative to peers) allowed practices and primary care organisations to view how given practices were performing for the purpose of continuous quality improvement processes.
9. **Appointments, billing, and fund management**. In Group 2, GP and AHP activity was tracked at the per-patient level in order to facilitate the allocation of DCP funding to those providers.

2.2.2. Continuous Quality Improvement Processes

This intervention introduced systematic quality improvement processes into primary care. These processes occurred between the National Project Management Office and primary care organisations, and between primary care organisations and general practices. Continuous quality improvement processes involved the following six steps (Figure 6):

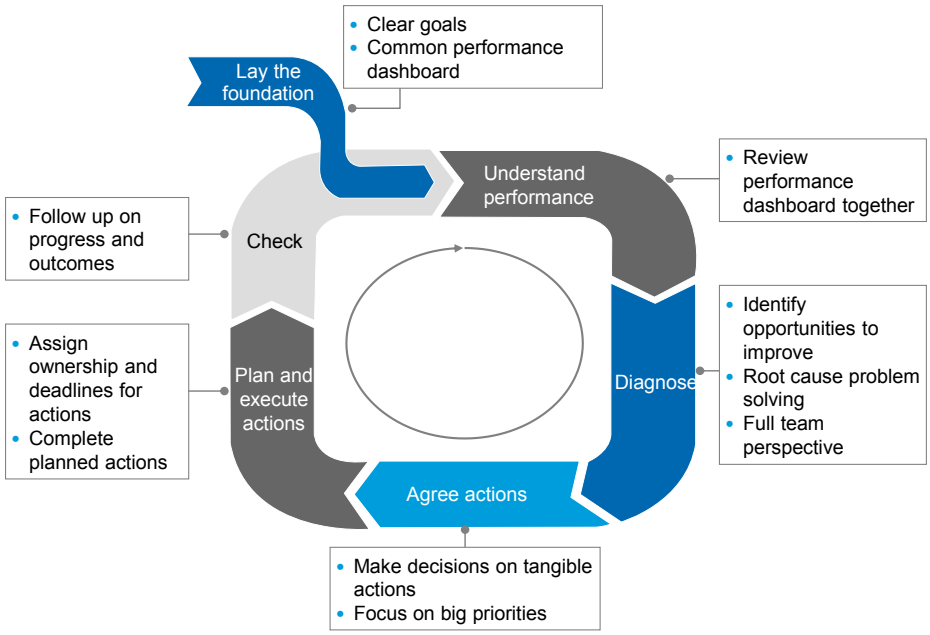
- **Lay the foundation**—Setting clear performance goals and defining a common performance dashboard. The goals included metrics such as improving metabolic indicators (HbA1c, cholesterol, blood pressure) and delivering good quality care (such as completing an annual cycle of care and care planning). These metrics, along with approximately 20 others, were tracked weekly on a standard reporting dashboard used across all sites.
- **Understand performance**—Understanding performance through joint reviews. Information on the performance dashboard was reviewed periodically. The National Project Management Office and

primary care organisations met weekly at first, and then monthly. Primary care organisations and general practices met every three to six months during the project, diagnosing opportunities to improve performance by problem solving at the root-cause level and gathering a full-team perspective. This was generally done at team meetings. In general practices, this often involved doctors, nurses and practice managers.

- **Diagnose**—Identifying opportunities to improve and diagnosing root causes of problems. This step involved a full team perspective.
- **Agree actions**—Agreeing actions, with a focus on identifying priorities and tangible actions. The actions were recorded on a standard template and made available to all team members.
- **Plan and execute actions**—Planning and executing these actions by assigning ownership and deadlines.
- **Check**—Following up on processes and outcomes to ensure that the required actions had been completed.

FIGURE 6

Continuous quality improvement (CQI) process



2.2.3. Flexible Funding Based on Risk Stratification

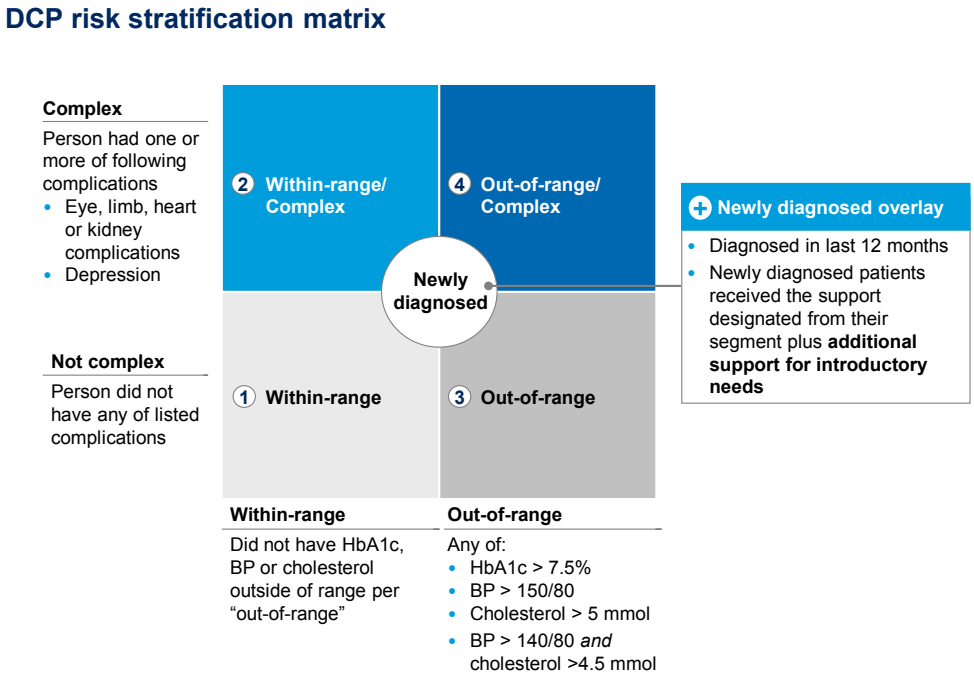
This intervention changed how GPs and AHPs received funding related to diabetes care for people enrolled in a 'health care home.' Funding levels were tiered according to risk to ensure that resources were directed where they could realise the greatest benefits. Enrolled participants were risk stratified based on metabolic

predictors of long-term complications (i.e. their HbA1c levels, blood pressure and cholesterol levels) and the presence of complications associated with diabetes (i.e. the presence of microvascular or macrovascular complications). Using these criteria, five risk stratification groups were identified among the enrolled participants (Figure 7).

- Within range and not complex
- Within range and complex
- Out of range and not complex
- Out of range and complex (this included people with type 1 diabetes)
- Newly diagnosed participants (i.e. those diagnosed with diabetes less than 12 months before enrolment)

An important design choice when constructing the risk strata was setting the thresholds for what constituted 'within range / out of range' and 'not complex / complex.' In terms of the threshold for HbA1c in particular, the Diabetes Advisory Group and local reference groups advised that although the RACGP guidelines on the treatment of diabetes recommended HbA1c at 7.0 percent as the clinical target,[25] it was important for care teams involved in the trial to not aggressively treat people who were marginally above this (i.e. between 7.0 and 7.5 percent). For this reason, the DCP was designed so that people with an HbA1c level greater than 7.5 percent were considered out of range for the purposes of the project. The same principle was applied to blood pressure and total cholesterol thresholds.

FIGURE 7



Under the flexible funding arrangements, general practices received annual payments quarterly (and in advance) for the cohort of people they enrolled in their care. These payments ranged from $130 to $350 per person per year, depending on the risk level of the participant. In exchange, GPs could not claim MBS items for care plans, team care arrangements and related items for those people (Figure 8 and Figure 9). Unlike the MBS items these payments replaced, this funding was paid on a population basis and was not tied to activity. The system did not fully replace fee-for-service payments, however, and practices continued to claim for standard consultations and other items. The result was a hybrid system with a component of population-based funding and a component of activity-based funding. Practices were free to decide how to allocate this funding, including how much was passed on to GPs themselves.

Setting the funding levels for flexible funding was challenging because of uncertainty about how much practices were receiving for participants on GP management plans and other chronic disease items. Given that the DCP was a voluntary opt-in trial running parallel with the MBS, it was important to ensure that practices receiving flexible funding payments were no worse off on a per-patient basis than under the usual MBS chronic disease items.

Funding for allied health remained tied to activity but differed from current allied health funding in two ways. First, the amount of funding was tiered based on risk so that a high-risk person could receive up to $666 of funding per year—enough to pay for about ten standard visits (compared to the five individual visits permitted under a current team care arrangement). Second, the range of allied health consultations that could be accessed using this funding was broadened. In addition to the allied health consultations usually funded through the MBS—which includes 'typical consults' (20–40 minutes, $53 payment) and

'group assessments' (30 minutes, $17 payment), the DCP also offered the following consultation types to provide GPs with additional flexibility in tailoring a package to a patient's needs:

- **Extended consults** (40-60 minutes, $85 payment) to be used as an initial consult or assessment visit.
- **Phone consults** (0-20 minutes, $17 payment) to check on patient progress, or phone calls from the patient to AHPs to clarify information.
- **Short consults** (10-20 minutes, $26.50 payment) for podiatrists to cut toenails.
- **Mental health worker group consults** (60 minutes, $17 payment) for group education/demonstration-based classes.

Payments were made directly to AHPs, but GPs decided how it was allocated.

FIGURE 8

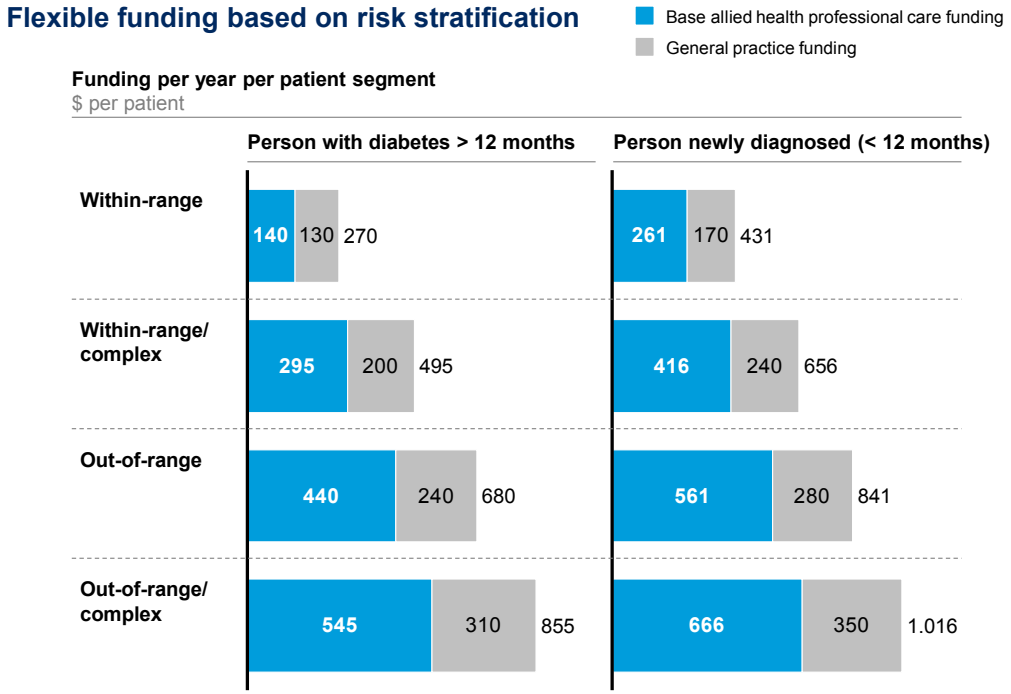
Medicare item numbers replaced by flexible funding and QISP in Group 2

Medicare items that could not be claimed when on the DCP

Category	Item number	Description
General practice	721	GP Management Plan (GPMP)
	723	Team Care Arrangements (TCAS)
	732	GPMP or TCA reviews
	10997	Practice nurse/Aboriginal health worker consultation
	2517 to 2526 and 2620 to 2635	Diabetes Cycle of Care consultations
Allied health	10950-10970	Individual allied health services
	81100,81110 and 81120	Assessment of suitability for group allied health services
	81105, 81115 and 81125	Group allied health services

FIGURE 9

Flexible funding based on risk stratification



2.2.4. Quality Improvement Support Payments

In addition to flexible funding, practices were also eligible for quality improvement support payments (QISP). These payments were up to $150 per person per year and were paid in arrears at the end of each period on the basis of improved clinical outcomes (HbA1c), clinical processes (i.e. having good-quality care plans and recording the observations required for an annual cycle of care), and patient experience (Figure 10). As with flexible funding, payments were made to practices, which were able to pass these on to GPs to the extent that they saw fit. Designing quality-based payment models is challenging and the DCP stakeholder consultation process highlighted several principles that should underpin funding design (detailed below), all of which are consistent with experience elsewhere.[26]

- **Ensure payments are balanced across clinical processes, clinical outcomes and patient experience**. This is important for two reasons. First, it reduces the potential for causing unintended consequences by incentivising one outcome at the expense of others. For instance, a system aimed exclusively at reducing HbA1c could result in clinicians over-treating some participants at the expense of their overall wellbeing. This risk is mitigated by including measures of patient experience. Secondly, where clinical outcomes are not improved due to factors beyond the clinicians' control, they can still be rewarded for employing the correct clinical processes.

- **Pay for improvement from any starting point.** Some pay-for-quality systems around the world reward clinicians for reaching particular thresholds. Under the UK's QoF, for example, GPs are paid primarily on the basis of reducing the percentage of a population to certain clinical thresholds. In the case of HbA1c, the current cut-offs are less than 7.5 percent (thresholds of 35–75 percent of participants), less than 8.0 percent (thresholds of 43–83 percent) and less than 9.0 percent (thresholds of 52–92 percent).[27] However, this style of system may disadvantage clinicians who live in areas with higher numbers of out-of-range participants, incentivise clinicians to exclude sicker participants from the program, or discourage action if participants are so far from meeting the targets that intervention appears futile. Rewarding clinicians for improvement from any starting point reduces perverse incentives such as these, although it does make the program more difficult administratively (primarily because it requires a baseline to be established at the start of each period, against which performance can be measured).

- **Ensure payments are significant enough to matter**. There is evidence to suggest that larger incentive sizes improve program take-up,[28] although the relationship between incentive size and quality is less well established. While research has been conducted on this topic, a considerable amount of the literature comes from the United States, where there is the problem of incentive dilution (i.e. providers are incentivised by multiple payers with different schemes).[29] Australia's current primary care funding system largely rewards activity rather than quality. Under the current system, the elements closest to payment for quality are the Practice Incentive Payments (PIPs) and the Service Incentive Payments (SIPs). However, in 2003, these accounted for only nine percent of GP income from Medicare (not including private sources of income).[30] In contrast, the UK's QoF represents 17 percent of total practice income.[31] For the DCP, the maximum annual QISP payment per patient was set at $150. Based on DCP baseline cost data, this payment would represent

approximately 25 percent of total GP payments per participant (although given that only a subset of a practice's patients would be enrolled in the program, it would be a considerably smaller percentage of a practice's total income).

- **Keep the system as simple as possible**. Incentive systems need to have enough metrics to drive multidimensional change and balance out competing factors. However, the number of metrics should also be small enough to allow clinicians to readily recall them. For this reason, the DCP included only one clinical metric (HbA1c) and four other metrics.

FIGURE 10

Quality Improvement Support Payments (QISP)

	Indicator	Description	Weighting Percent	Payments to practices Maximum A$ per patient, per annum
Patients	1 Patient experience	• Level of patient's empowerment, satisfaction and care coordination based on surveys	25	37.50
Process	2 Patient adherence with care plan	• Proportion of planned care plan activities that are completed	20	30.00
	3 Care plan completeness	• Proportion of total non-general practice flexible funding allocated to care plan activities	10	15.00
	4 Accurate and timely data entry	• Proportion of specific metrics for all patients that were entered on time (e.g. inputting HbA1c, blood pressure, BMI measurements etc to patient database)	20	30.00
Clinical	5 HbA1c	• Reduction in HbA1c levels for patients whose HbA1c level is out of range • Maintenance of HbA1c levels for patients whose HbA1c is within range	25	37.50
			Total maximum payment	150.00

2.2.5. Funding for Care Facilitation

In Group 2, funding was provided to engage Care Facilitators, whose role was to facilitate communication within multidisciplinary care teams. Care Facilitators were responsible for the holistic care of participants, acting as a central point of contact between patient, practice and the relevant AHPs. They were independently funded by the DCP Project Management Office via primary care organisations and contracted to cover several practices within a local area. Their role involved reviewing patient data (having received the appropriate consent) in order to identify risks and coordinate care. This included booking case calls, scheduling Home Medicines Reviews (HMR) or Mental Health Reviews, or finding alternative AHPs for participants in the event of availability issues. It was intended that a care facilitator would have a case load of approximately 300 to 400 patients across all risk strata.

Care Facilitators were also responsible for enabling participants and health providers to take full advantage of the other DCP interventions. This involved supporting and educating practices and participants to use the innovative features of the DCP's model of care. For example, Care Facilitators were expected to train—and provide ongoing support to—GPs and Practice Nurses in enrolled practices who would need to use the project's IT tool for (among other things) patient registration, risk stratification, and care planning. Care Facilitators were also intended to drive the continuous quality improvement processes at the practice and patient level using system-wide data.

2.3 DCP TRIAL DESIGN

The DCP was designed as a randomised cluster-controlled trial involving people with diabetes in Queensland, South Australia and Victoria who voluntarily registered to participate in the project. Clustering was at the practice level because the interventions changed the way practices worked and practice-level clustering minimised contamination between the intervention groups (Group 1 and Group 2) and the Control Group. Enrolled practices were randomised to either the Control Group or one of the two models of care (Group 1 or Group 2). This section describes:

- 2.3.1 Recruitment and enrolment processes
- 2.3.2 Randomisation
- 2.3.3 Outcome measures
- 2.3.4 Ethical considerations

2.3.1. Recruitment and Enrolment Processes

Seven primary care organisations (independent entities responsible for coordinating local primary health care services, such as Divisions of General Practice and Medicare Locals) across the states of Queensland (n = 4), South Australia (n = 1), and Victoria (n = 2) took part in the project. Prior to the commencement of the project, each primary care organisation distributed DCP information sheets to all general practices within their network and adjacent areas and sought expressions of interest to participate in the project. Practices were eligible to participate in the project if they met the following criteria:

- The practice's software (GPs' desktop application) was compatible with project software for data extraction purposes.
- The practice met the Royal Australian College of General Practitioners' (RACGP) definition of 'general practice.'
- The practice was accredited (or registered for accreditation) against the current edition of the RACGP 'Standards for General Practices.'
- The practice had current public liability insurance.

- All health professionals at the practice who would be providing care to enrolled participants were appropriately qualified and registered and had current professional indemnity insurance.
- The practice had not indicated that they do not participate in trials.

Practices that expressed an interest in participating in the project were enrolled and randomly assigned to one of three trial arms: the Control Group, Group 1, or Group 2. Each enrolled practice underwent training to familiarise it with the assigned trial arm and DCP procedures. Primary care organisations assigned to Group 2 were supported by a 'project delivery and integration team' to recruit and train Care Facilitators.

Adult participants of participating general practices were eligible to participate in the project if they met the following criteria:

- Aged 18 years or older.
- Established (equal to or more than 12 months' duration) type 1 diabetes mellitus or newly diagnosed or established type 2 diabetes mellitus.
- Capacity to provide informed consent to participate.
- No terminal illness or life expectancy of less than two years.
- Did not have dementia.
- Not pregnant or planning to become pregnant in the next two years.
- Not participating in the Coordinated Veterans Care (CVC) program.

All eligible people with diabetes were identified by the enrolled practice and the project delivery and integration team and sent a GP-endorsed letter advertising the project and actively seeking enrolments. After receiving informed consent, participants were asked to complete the baseline surveys and meet with their GP to have their baseline metrics recorded.

2.3.2. Randomisation

In four of the primary care organisations, enrolled general practices were randomly allocated to the Control Group or Group 1 at a ratio of 1:2. In the other three primary care organisations, practices were randomly assigned to the Control Group or Group 2 at a ratio of 1:2. A single type of intervention was tested in each primary care organisation due to two practical constraints. First, primary care organisations would have found it difficult to enrol and support practices using two different interventions, given that Group 1 and Group 2 involved multiple different components. Secondly, Care Facilitators in Group 2 were required to work with approximately five practices within a single geographic area and mixing all three groups in one area would have made it difficult to travel between practices efficiently. Randomisation was applied after recruiting each group of three practices in a combined primary care organisation and region stratum (where 'region' refers to urban or rural area). This helped to mitigate any potential bias created by testing only one intervention in each primary care organisation. Randomisation was applied separately for urban

and rural practices within each primary care organisation because it was expected that service use and availability would differ by location. To approximate equal sample sizes in each group, block randomisation was used with computer-generated, randomly permuted blocks of three. A researcher not involved in the implementation of the project and blinded to the identity of the practices performed this task.

2.3.3 Outcome Measures

The primary clinical endpoint of the DCP was the difference in the change in HbA1c between treatment groups at the end of the project. The project was designed to have 150 practices (or 50 practices per trial arm) and 3,750 participants (or 1,250 participants per trial arm). At this scale, the project would have sufficient power to detect a difference of at least 0.25 percentage points in mean HbA1c between any two treatment groups. This difference is considered clinically significant on an intention-to-treat basis.[32]

Secondary outcomes included changes in other biochemical and clinical metrics (specifically serum total cholesterol, serum triglycerides, serum low-density lipoprotein cholesterol, serum high-density lipoprotein cholesterol, estimated glomerular filtration rate and albumin:creatinine ratio, blood pressure, and body mass index and waist circumference, as recorded in the GP patient record or patient's local pathology laboratory); incidence of diabetes-related complications (specifically autonomic and peripheral neuropathy, peripheral arterial disease, diabetic foot ulceration, lower limb amputation, microalbuminuria, chronic kidney disease, proliferative and non-proliferative diabetic retinopathy, glaucoma, serious vision loss, acute state of severe uncontrolled diabetes requiring hospitalisation, myocardial infarction, stable and unstable angina, transient ischaemic attack, cerebrovascular accident and sexual dysfunction); health-related quality of life (measured by the Assessment of Quality of Life – 4 Dimension [AQoL–4D] instrument); clinical depression (measured by the Patient Health Questionnaire); success of tailored care (assessed by the practitioner satisfaction survey, Patient Evaluation of the Quality of Diabetes Care survey, patient semi-structured interviews and practitioner focus groups); and economic sustainability (such as cost utility analysis). All outcomes were measured at baseline and at the end of the trial period.

Outcome data was sourced from patient and practitioner surveys, participant diaries, participant interviews, practitioner focus groups, selected sections of GP patient records imported into cdmNet, the Medicare Australia database (for Pharmaceutical Benefits Scheme and Medicare Benefits Scheme data), the National Diabetes Supply Scheme (NDSS) database, and hospital separation databases of the Queensland, Victorian and South Australian Departments of Health.

Baseline comparisons were undertaken by Chi-squared test for categorical variables and one-way analysis of variance for continuous variables, with non-parametric equivalent tests used where appropriate. Linear mixed effects models were used to test for intervention effects, with fixed factors of group, period, group/period interaction, and location (metro, urban, rural) as independent variables. In all cases, the level of statistical significance was taken as $p<0.05$.

2.3.4 Ethical Considerations

The project protocol was approved by the human research ethics committees of the Department of Health and Ageing (Commonwealth Government), Department of Human Services (Commonwealth Government), Australian Institute of Health and Welfare (Commonwealth Government), SA Department of Health (South Australian Government), Queensland Department of Health (Queensland Government), Department of Health Victoria (Victorian Government), and the Aboriginal Health Research Ethics Committee (Aboriginal Health Council of South Australia).

Chapter 3—Implementation and Results of the DCP

This chapter documents the results of the DCP. It is divided into two sections:

- 3.1 Participation by practices and people with diabetes
- 3.2 Results

3.1 PARTICIPATION BY PRACTICES AND PEOPLE WITH DIABETES

This section provides an overview of the practices and people with diabetes who participated in the trial:

- 3.1.1 Participation by practices
- 3.1.2 Participation by people with diabetes

3.1.1. Participation by Practices

In total, 184 practices enrolled in the DCP and were randomised to one of three trial arms (outlined in Figure 11):

- Control Group; or
- Group 1; or
- Group 2.

Practices were located in:

- Queensland (Wide Bay, Toowoomba, Gold Coast and Ipswich); and
- South Australia (Adelaide); and
- Victoria (Melbourne and Barwon).

Together, the participating practices represented 37 percent of the accredited practices (as defined in Chapter 2) that reviewed initial communications about the project. This is a reasonable response rate when compared to the 2011–2012 Bettering the Evolution and Care of Health (BEACH) program, which had a response rate of 23 percent.

Over the course of the DCP, 30 practices withdrew (16 percent of the originally enrolled practices), meaning that a total of 154 practices (84 percent) completed the project (Figure 12). Eighty-seven percent of practice withdrawals occurred during or shortly after enrolment. Across the three trial arms, the rate of practice withdrawal ranged from 14 to 18 percent. Practice withdrawal rates are outlined in Figure 12. The two main reasons for practice withdrawal were unhappiness with the randomisation result and changes in practice circumstances (Table 1).

FIGURE 11

Participant flow diagram

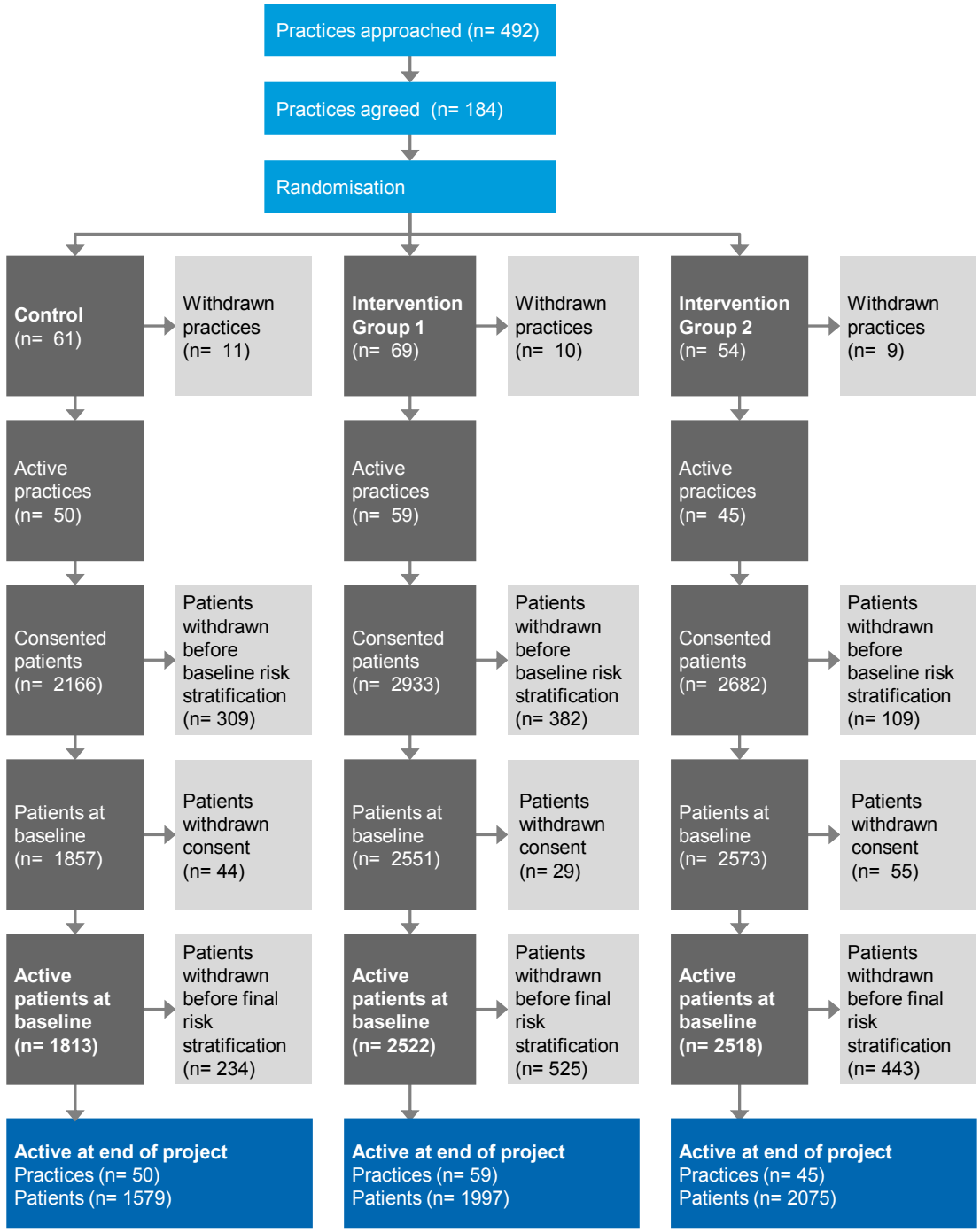


FIGURE 12

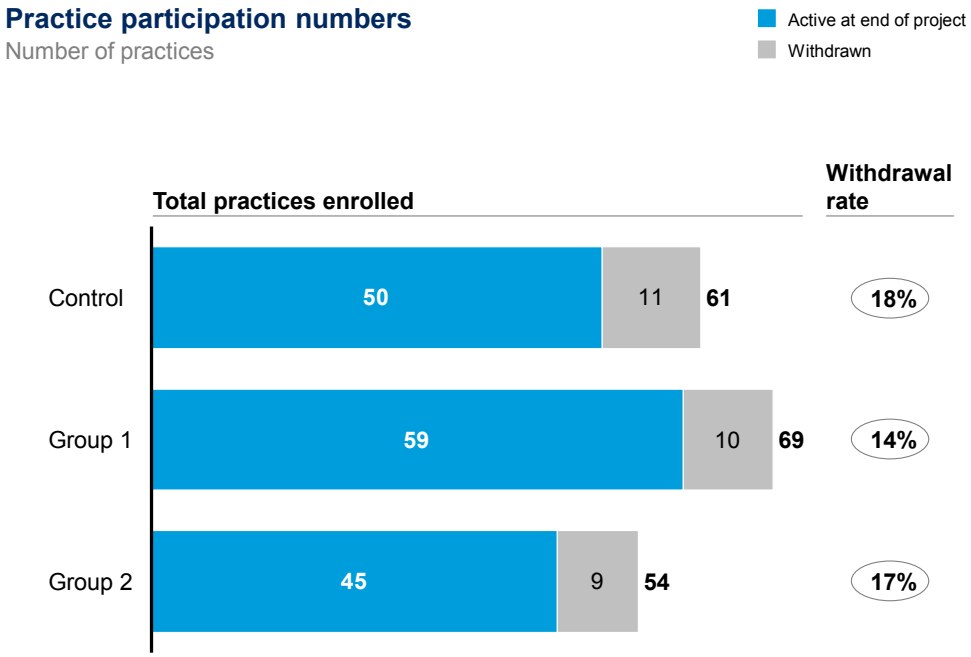


TABLE 1. REASONS PRACTICES WITHDREW FROM THE DCP, PERCENT OF GROUP (N=30)

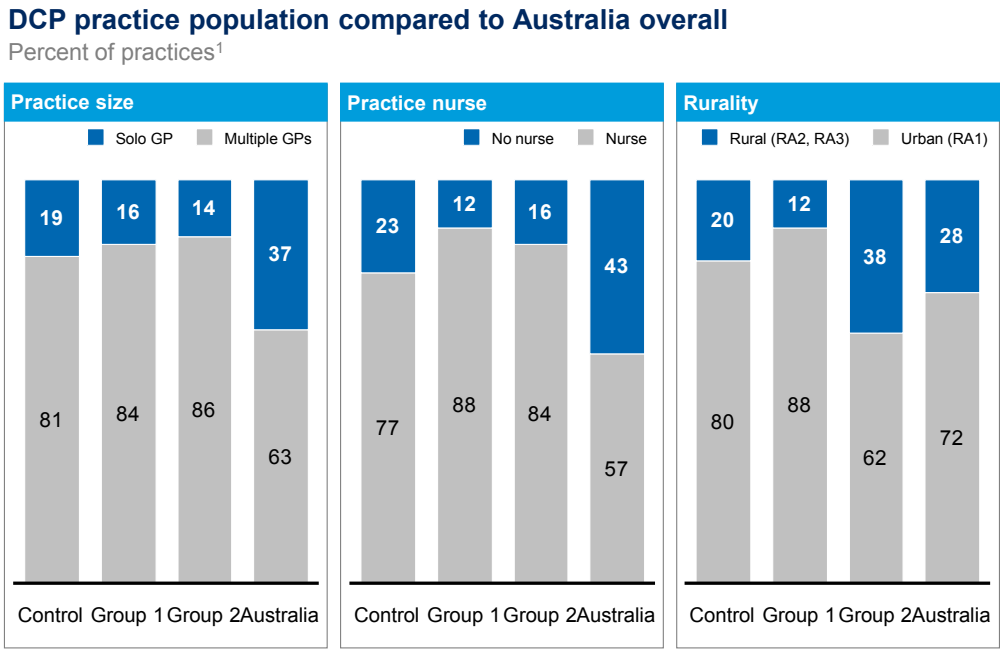
Reason for patient withdrawal	Control	Group 1	Group 2
Disagreement with the changes being piloted	0	10	22
Changes to practice circumstances	9	50	44
Unhappy with randomisation result	55	0	12
No participants enrolled	27	40	0
Primary care organisation withdrew	9	0	22
Total	**100**	**100**	**100**

There were some differences in practice characteristics, both between the three trial arms and in comparison with the Australian general practice landscape. Compared to the national average for GP practices, DCP practices had fewer solo GPs and more Practice Nurses, and they were slightly more likely to be located in an urban area (Figure 13).[b] There were only minor differences between practices in the

[b] Defined as 'RA1' according to Australian Bureau of Statistics.

Control Group, Group 1 and Group 2: Practices in Group 1 had more Practice Nurses and were more urban than practices in the Control Group and Group 2.

FIGURE 13[33,34]



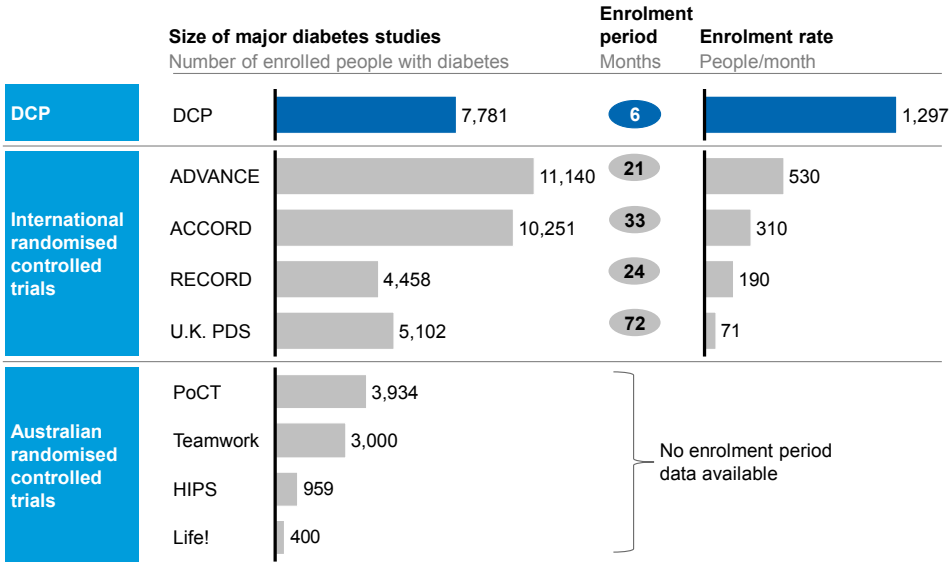
DCP: N=148 (practice size), N=147 (practice nurse), N=154 (rurality).
Australia: N=4,244 (practice size and practice nurse), N=21,119 GPs (rurality).

Interviews and focus groups were conducted in the latter half of the trial period with 36 GPs across the three groups and 71 AHPs and practice nurses in Groups 1 and 2.

3.1.2. Participation by People With Diabetes

In total, 7,781 people consented to participate in the DCP. This occurred over an enrolment period of approximately six months, meaning that the enrolment rate was around 1,300 people per month. Compared to other Australian and international randomised control trials, this is both a large number of participants and a rapid enrolment rate (Figure 14). The number of 'active participants' (after taking into account a subset of withdrawals) was 6,853 at the beginning of the implementation of the pilot (baseline risk stratification) and 5,651 at the end of the implementation (final risk stratification).

FIGURE 14 [35–38]



Prior to baseline risk stratification (when participants' clinical indicators were measured and participants were registered in the IT tool and placed into the risk stratification groups described in Chapter 2), 800 participants withdrew (approximately 10 percent of those who consented to participate). This left a total of 6,981 participants, all of whom completed the baseline risk stratification thereby beginning treatment. Between the baseline and final risk stratification 1,330 participants (17 percent of those who originally consented to participate) were lost to follow up, 128 of whom requested that their data collection be discontinued. The majority of these participants made this request because they moved out of the DCP area (Table 2).

Participants were enrolled in the DCP for an average of 17.6 months (the mean number of months between their baseline risk stratification and their final risk stratification or the end date of the trial).

In Group 2, nine care facilitators were employed, meaning that on average there were 280 patients per care facilitator (based on the 2,518 active Group 2 patients at baseline).

TABLE 2. REASONS PARTICIPANTS WITHDREW FROM THE DCP AFTER BASELINE RISK STRATIFICATION, PERCENT OF GROUP (N=1,330)

Reason for patient withdrawal	Control	Group 1	Group 2
Dissatisfaction with funding	0	0	1
Ill health	1	1	2
Other	4	2	8
Deceased	9	7	6
Moved out of project area	52	32	20
Did not complete final risk stratification	31	45	22
Practice withdrew from project	3	14	41
Total	**100**	**100**	**100**

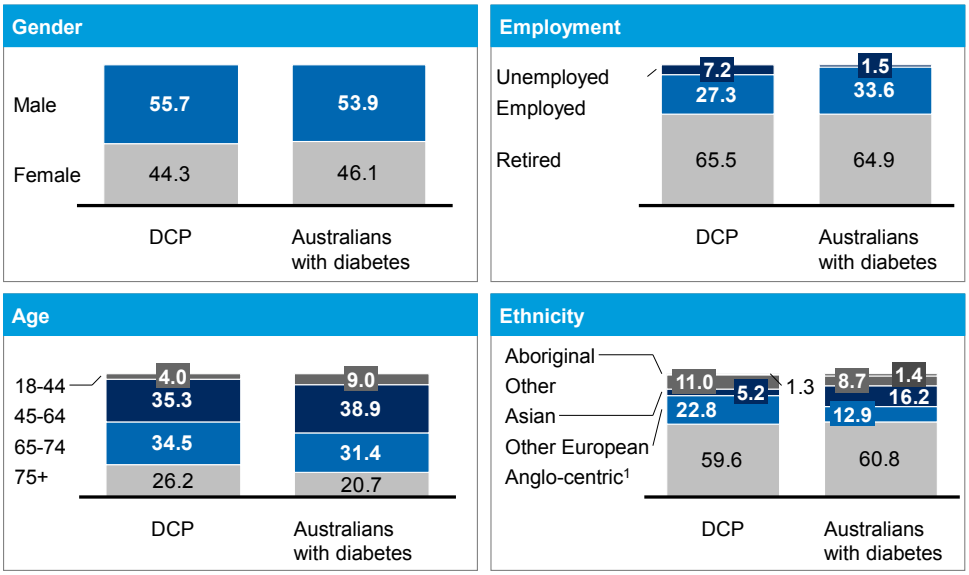
The DCP cohort was broadly consistent with the national population of people with diabetes in terms of gender and employment status, although they were slightly older and there were fewer people of Asian descent (Figure 15). The DCP also attracted a higher-risk population according to the trial's risk stratification framework (Figure 16). There were minimal differences in measured clinical characteristics at baseline between participants across the trial arms (see Appendix 1), although participants in the Control Group had lower reported diabetes-related stress than participants in Groups 1 and 2. Other substantial differences in baseline characteristics that were statistically significant are outlined below (full list in Appendix 1):

- **Co-morbidities**. Group 2 self-reported higher rates of asthma, arthritis, mental health issues, and coronary heart disease than the Control Group and Group 1.
- **Patient experience**. The Control Group and Group 1 had higher self-management scores than Group 2.
- **English language and ethnicity**. The Control Group had more people who spoke English very well (80 percent) than Group 1 (75 percent) and Group 2 (76 percent), and more people who identified as Anglo-Celtic (63 percent) than Group 1 (57 percent).
- **Private health insurance**. Group 2 had more people with private health insurance (52 percent) than the Control Group (48 percent) and Group 1 (44 percent).
- **Risk stratification**. The Control Group had more people in the 'out-of-range and complex' risk stratification group (37 percent) than Group 1 (31 percent) and Group 2 (33 percent).
- **Type of diabetes**. More Control Group participants had type 1 diabetes (seven percent), compared to Groups 1 and 2 (six percent).

FIGURE 15 [1]

Demographics of enrolled participants compared to Australia overall

Percent of people with diabetes

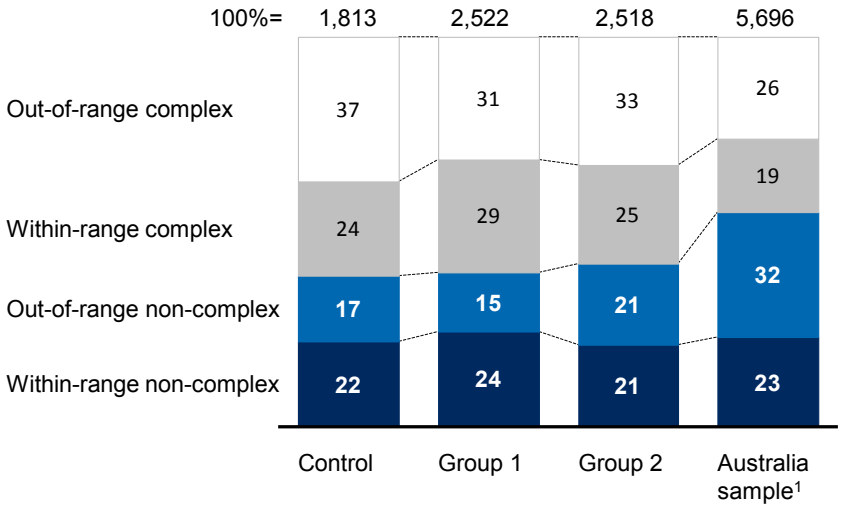


1 English-speaking countries

FIGURE 16

Risk distribution across cohort groups, and compared to Australian population

Percent of group



1 Sourced from a data extract from a sample of 20 Queensland general practices (no enrolment process) [Unpublished].

Interviews and focus groups were conducted in the latter half of the trial period with 39 patient participants in Groups 1 and 2.

3.2 RESULTS

This section describes the results of the DCP:

- 3.2.1. Clinical outcomes
- 3.2.2. Care processes
- 3.2.3. Patient experience
- 3.2.4. Cost of care

3.2.1. Clinical Outcomes

The primary clinical outcome of the DCP was that participants in Group 2 showed a statistically significant improvement in HbA1c levels compared to Control Group participants. There were also improvements in other secondary clinical outcomes in Group 2—including systolic blood pressure, cholesterol, triglycerides, waist circumference, incidence of depression, and diabetes-related stress—although these were clinically modest (Table 3). Group 1 did not experience a significant improvement in HbA1c levels or other clinical metrics, aside from a small improvement in renal function, compared to the Control Group (Table 3).

TABLE 3. CHANGE IN MEAN SCORES BETWEEN BASELINE AND END OF TRIAL

Characteristic	Mean Change	Mean Change	Significance*	Significance*	Control Group (N=1845)	Control Group (N=1845)	Control Group (N=1845)	Group 1 (N=2449)	Group 1 (N=2449)	Group 1 (N=2449)	Group 2 (N=2339)	Group 2 (N=2339)	Group 2 (N=2339)
	Group 1 minus Control	Group 2 minus Control	Group 1 vs Control	Group 2 vs Control	n	Mean	SD	n	Mean	SD	n	Mean	SD
HbA1c (%)	-0.02	-0.19	0.614	<0.001	1,803	0.01	1.01	2,505	-0.01	1.10	2,515	-0.19	1.03
Systolic blood pressure (mmHg)	0.68	-1.11	0.210	0.045	1,795	-1.69	17.17	2,500	-1.01	17.03	2,491	-2.80	18.19
Diastolic blood pressure (mmHg)	-0.21	-0.28	0.530	0.402	1,796	-1.02	10.99	2,500	-1.23	11.02	2,491	-1.30	11.21
Total cholesterol (mmol/L)	0.02	-0.07	0.358	0.012	1,802	-0.13	0.80	2,504	-0.11	0.88	2,517	-0.20	0.88
HDL (mmol/L)	0.01	0.01	0.546	0.325	1,744	-0.03	0.20	2,24	-0.02	0.25	2,399	-0.02	0.20
LDL (mmol/L)	0.02	-0.06	0.451	0.005	1,722	-0.09	0.61	2,195	-0.07	0.68	2,347	-0.15	0.70
HDL/LDL ratio	-0.02	0.03	0.638	0.627	1,750	0.65	0.44	2,252	0.63	0.32	2,469	0.68	0.37
Triglycerides (mmol/L)	-0.03	-0.07	0.321	0.007	1,746	0.03	0.75	2,485	0.00	0.79	2,451	-0.04	0.78
Serum creatinine (µmol/L)	-1.69	0.84	<0.001	0.063	1,771	1.47	13.97	2,478	-0.22	14.49	2,447	2.31	14.86
GFR (ml/min/1.73m2 body surface area)	1.44	-0.47	<0.001	0.134	1,766	-0.67	9.35	2,471	0.77	10.63	2,432	-1.14	9.61
ACR (mg/mmol)	0.88	0.21	0.129	0.750	1,155	0.24	17.44	1,853	1.12	17.42	1,773	0.45	18.76
Weight (Kg)	-0.16	-0.13	0.383	0.425	1,668	-0.29	5.95	2,324	-0.45	5.36	2,210	-0.42	6.19
BMI (kg/m^2)	-0.07	0.01	0.385	0.999	1,575	-0.08	2.28	2,232	-0.15	2.31	2,071	-0.07	1.98
Waist circumference (cm)	0.01	-0.41	0.963	0.031	905	0.10	4.01	1,341	0.11	4.17	1,216	-0.31	6.01
PHQ-9 Depression (score out of 27)	-0.12	-0.63	0.701	<0.001	1,395	-0.02	4.57	1,843	-0.14	4.54	1,831	-0.65	4.67
AQOL total (score out of 1)	-0.01	0.01	0.327	0.130	1,375	-0.01	0.18	1,810	-0.02	0.19	1,810	0.00	0.20
Diabetes-related stress (score out of 80)	0.04	-1.33	0.919	<0.001	1,374	-0.51	9.98	1,806	-0.47	10.82	1,789	-1.84	11.22

*Based on a linear mixed effects model, adjusting for ARIA score and clustering by GP practice and participant

The improvement in HbA1c levels in Group 2 was most pronounced among the most out-of-range people (Figure 17). Mean HbA1c levels in Group 2 changed by -0.19 percentage points overall compared to the Control Group, but the decrease was larger for those with higher starting levels of HbA1c. For example, people with HbA1c levels greater than or equal to 9.0 percent and 10.0 percent at baseline showed a change in mean HbA1c of -0.59 percentage points (p=0.001) and -0.61 percentage points (p=0.036), respectively, compared to the Control Group. The percentage of people with HbA1c greater than 7.5 percent decreased from 31 percent at baseline to 25 percent at the end of the trial period (an 18 percent decrease in the size of the out-of-range group, p<0.001) (Figure 18). In Group 2, improvement in HbA1c was seen in people with both type 1 diabetes (-0.39 percentage points relative to the Control Group, p=0.001) and type 2 diabetes (-0.18 percentage points relative to the Control Group, p<0.001), but the Group 1 intervention made no difference in either cohort (0.07 percentage points for type 1 diabetes, p=0.854; -0.02 percentage points for type 2 diabetes, p=0.590).

FIGURE 17

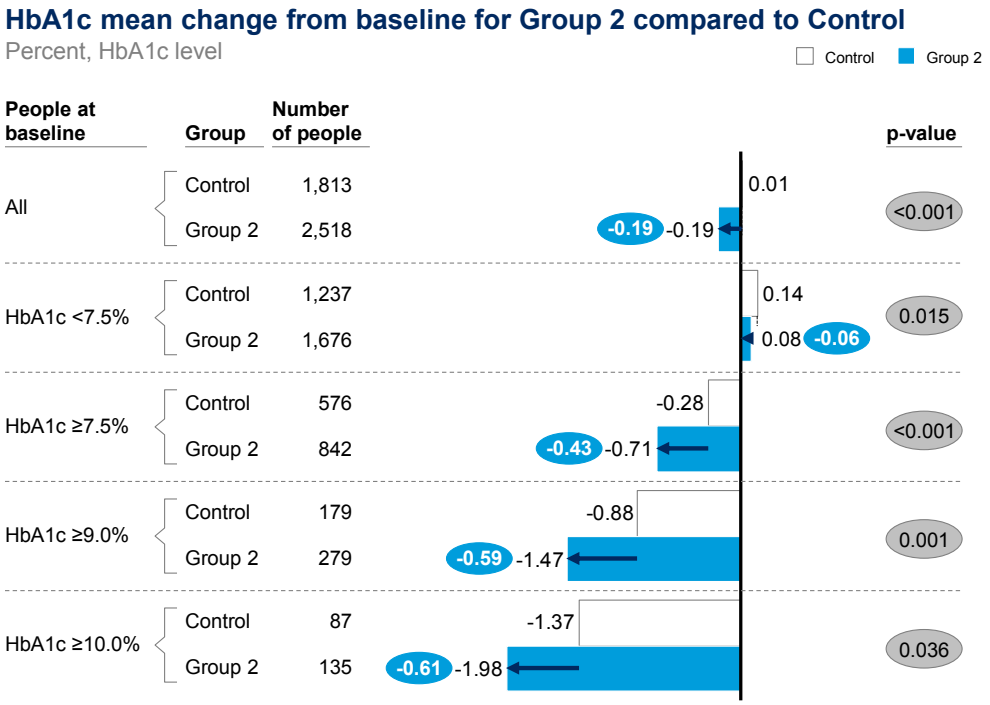
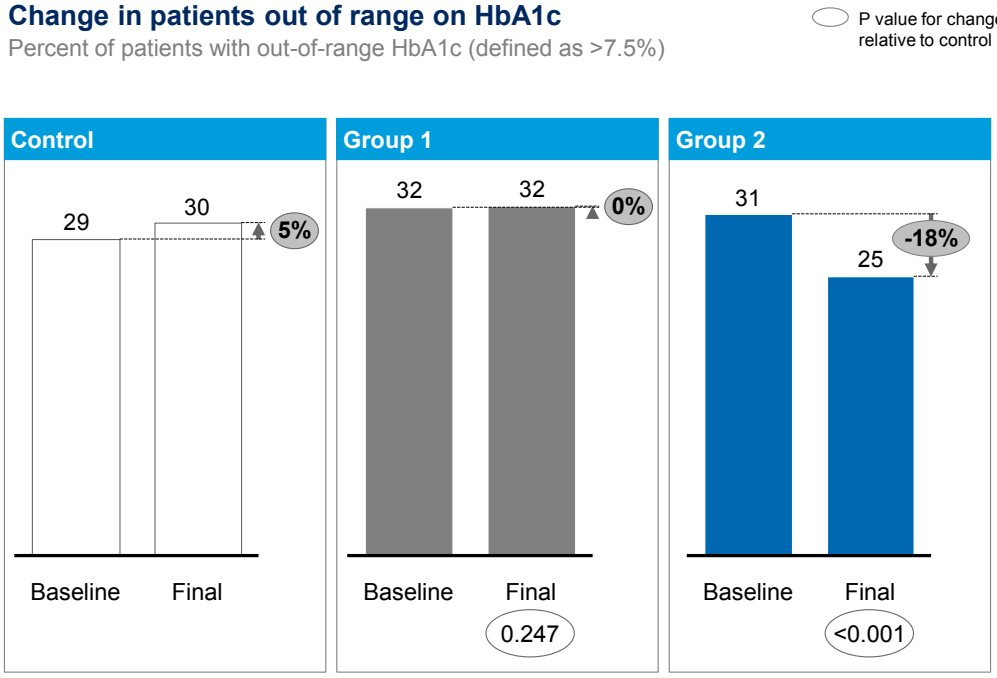


FIGURE 18

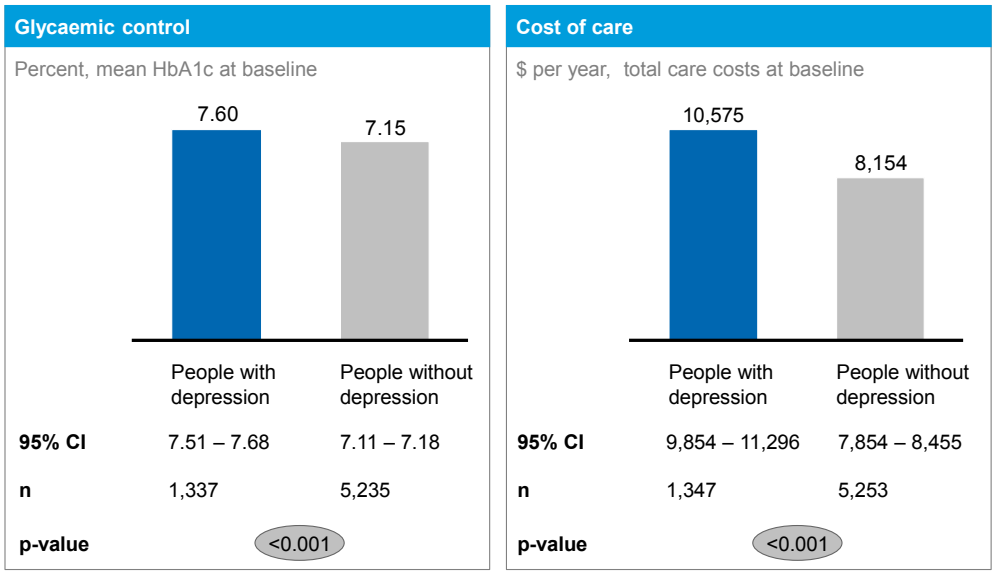


There were also small improvements in a number of metabolic indicators measured as secondary clinical outcomes in Group 2 (Table 3). The metrics that showed statistically significant improvements were systolic blood pressure (-1.11mmHg, p=0.045), total cholesterol (-0.07, p=0.012), LDL (-0.06mmol/L, p=0.005), triglycerides (-0.07mmol/L, p=0.007), waist circumference (-0.41cm, p=0.031), PHQ-9 depression score (-0.63 points, p<0.001), and diabetes-related stress (-1.33 points, p<0.001). In Group 1, the only secondary outcomes that showed improvement were renal function with reductions in serum creatinine (-1.69µmol/L, p<0.001) and improvement in glomerular filtration rate (GFR) (1.44 ml/min/1.73m2 body surface area , p<0.001).

People's psychological well-being also improved in Group 2. At the start of the trial, 20 percent of people across the study had moderate to severe depression (defined as a score of >9 out of 27 on the PHQ-9 scale). This cohort of people had higher HbA1c compared to other participants (7.59 percent versus 7.16 percent) and cost $2,421 (or 30 percent) more per year in healthcare costs (Figure 19). Participants in Group 2 experienced a reduction in depression during the trial period compared to the Control Group. The mean change in PHQ-9 scores in Group 2 was -0.63 points compared to the Control Group (p<0.001). Control Group participants experienced almost no change in PHQ-9 scores between baseline and the end of the trial period. There was a slight improvement among Group 1 participants (-0.12 points) but this was not statistically significant. In Group 2, there was a reduction in the percentage of people with moderate to severe depression (from 21 percent to 16 percent), which represented an incremental decrease of two percentage points compared to the Control Group (Figure 20). In Group 2, there was also a significant improvement in diabetes-related stress (improved by 1.33 points out of 80, p=0.001), but there was no change in Group 1.

FIGURE 19

Glycaemic control and care costs at baseline based on depression status

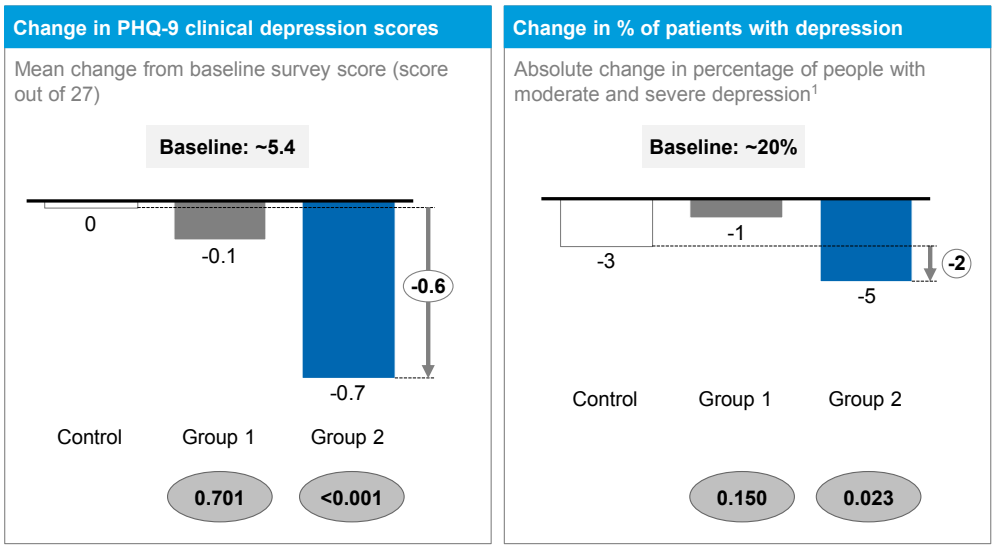


Note: "With depression" defined as having moderate to severe depression based on patient survey (PHQ-09 score of >9 out of 27); "No depression" defined as having no or mild depression

FIGURE 20

Change in depression scores

Negative change represents improvement

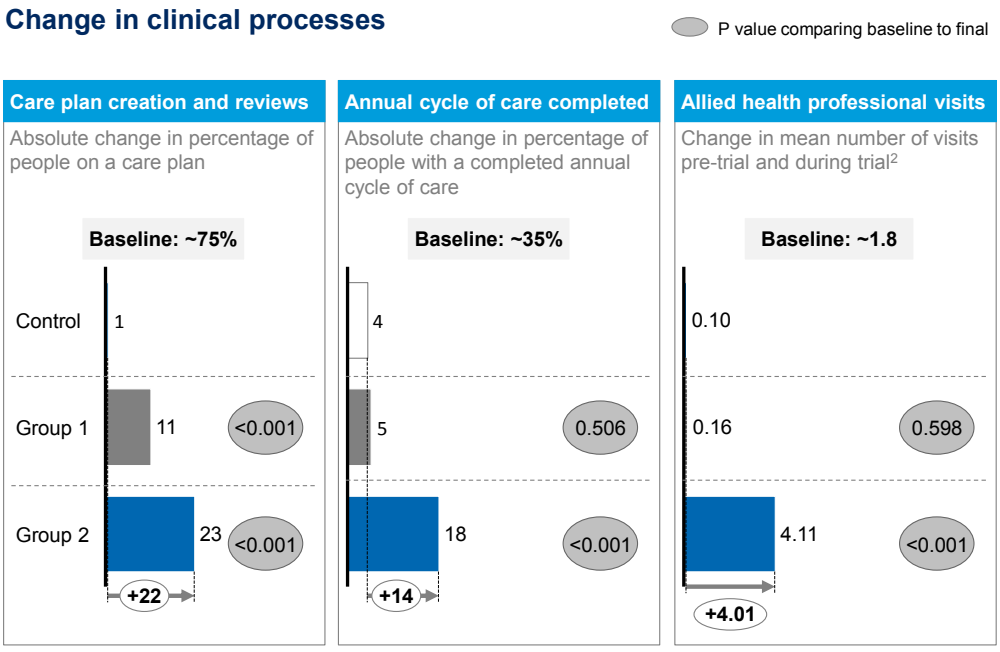


1 "With depression" defined as having moderate to severe depression based on patient survey; "No depression" defined as having no or mild depression
Note: The Patient Health Questionnaire (PHQ-9) is a 9-item screening questionnaire for depression; it is adapted from the PRIME MD TODAY instrument

3.2.2. Care Processes

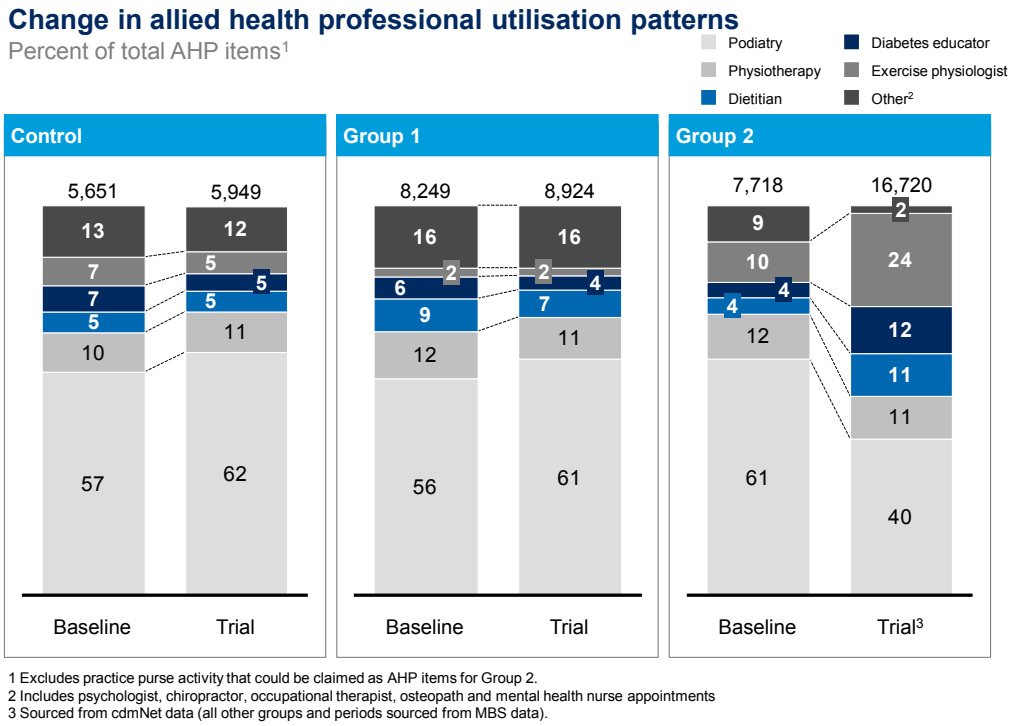
In Group 2, there was increased adherence to recommended clinical processes and more visits to AHPs (Figure 21). The percentage of participants on a care plan increased from 75 percent to 96 percent, the percentage of participants with a completed annual cycle of care increased from 35 percent to 53 percent, and the number of AHP visits increased from two to six per year. The mix of visits across AHP services in Group 2 also changed, with participants accessing a greater diversity of specialties compared to the Control Group (Figure 22). In Group 2, podiatry accounted for 61 percent of the visits in the baseline period but only 40 percent of visits in the trial period. Similarly, the mix of consultation types changed with the introduction of new consultation types. Standard or typical consultations accounted for 91 percent of Group 2 visits in the baseline period, but only 56 percent during the trial period. The remainder were nurse consults (20 percent), group assessments and consults (14 percent), extended consults (7 percent), phone consults (3 percent), and short consults with podiatrists (1 percent). Group 1 created more care plans but showed no changes in other processes or in the mixture of AHP visits.

FIGURE 21



1 "With GP care plans" means the patient had a GP management generated plan or GP management plan reviewed during the given period
2 Number of AHP visits has been annualised

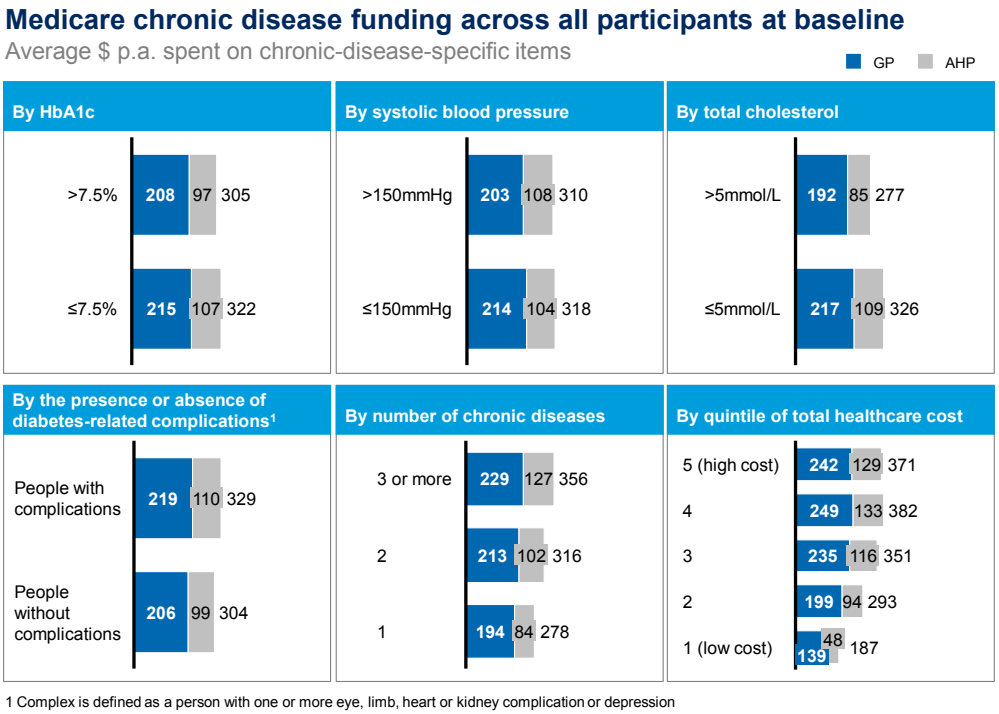
FIGURE 22



1 Excludes practice purse activity that could be claimed as AHP items for Group 2.
2 Includes psychologist, chiropractor, occupational therapist, osteopath and mental health nurse appointments
3 Sourced from cdmNet data (all other groups and periods sourced from MBS data).

The DCP also provided opportunities to study the impact of current care planning and annual cycles of care on clinical outcomes. A prospective analysis of current chronic disease funding shows that there is little to no relationship between the complexity of a person's health care needs (such as their clinical indicators and whether they have other chronic diseases, complications of diabetes, or are high-cost users of the health system) and the amount of chronic disease funding that they receive (Figure 23). Care plans and annual cycles of care did not of themselves translate into better health outcomes for patients with diabetes during the trial period. A prospective analysis of the Control Group during the trial period showed no statistically significant difference between people who had a care plan or had completed an annual cycle of care at the start of the project and those who had not and the subsequent changes in HbA1c, cholesterol, AQOL score, PHQ-9 depression score, and diabetes-related stress score (Appendix 4). (There was, however, a small and statistically significant improvement in blood pressure.) There was also no difference in changes in any of these metrics between participants in Group 1 who received an electronic care plan in the DCP's IT system (cdmNet) and the Control Group. Other recent reports detail associations between having a care plan and improved glycaemic control, but these reports are based on research conducted with lower sample sizes and greater potential for selection bias.[39–44]

FIGURE 23

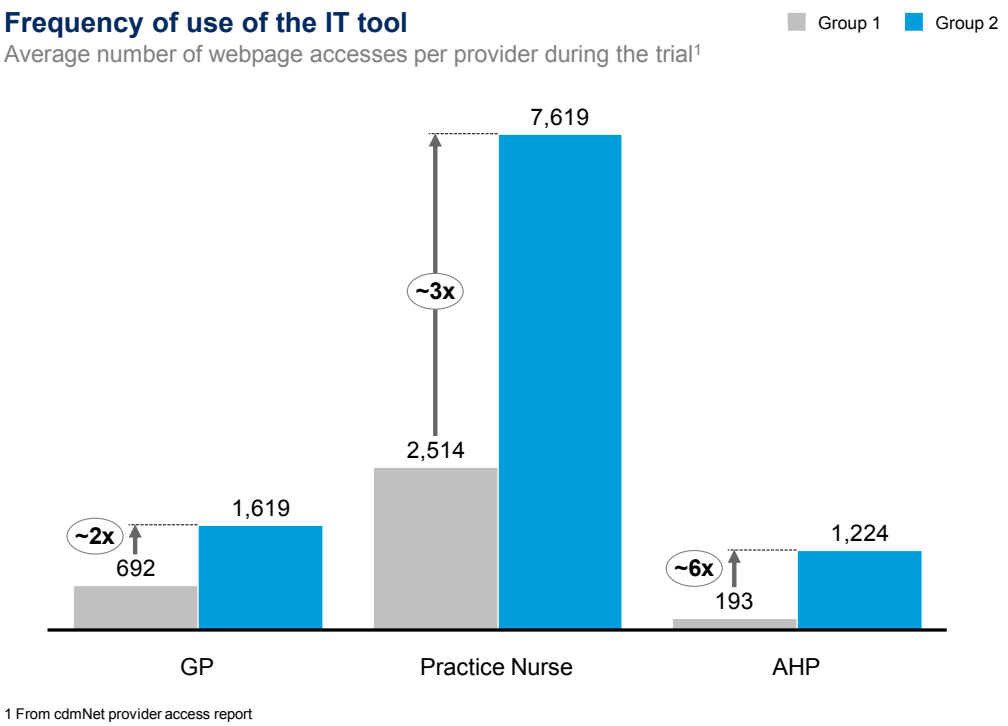


1 Complex is defined as a person with one or more eye, limb, heart or kidney complication or depression

In both Group 1 and Group 2, one of the significant changes to diabetes care processes was the introduction of a new IT system designed to enable most facets of the integrated care model. Practice Nurses were the main users of the tool, accessing webpages about five times as often as GPs. Uptake was between two and six times higher in Group 2 than in Group 1 across GPs, Practice Nurses and AHPs (Figure 24). There was also a difference in usage of the patient portal. In Group 1, 146 participants accessed the portal (about seven percent of active participants in that trial arm at baseline), and in Group 2, 381 people accessed the portal (about 18 percent of active people in that trial arm at baseline). There was a median of three accesses per person.

Introducing continuous quality improvement conversations was another significant change to diabetes care processes. These conversations were implemented in both Group 1 and Group 2. The continuous quality improvement conversations happened slightly more in Group 2 (an average of 3.5 times per practice during the trial period) than Group 1 (an average of 2.8 times per practice during the trial period).

FIGURE 24



Group 2 also included funding for care facilitation. Most GPs and Practice Nurses agreed that Care Facilitators were important in improving chronic disease care in their practices (Figure 25). For example, 87 percent of practices in Group 2 said that Care Facilitators implemented best practice guidelines well or completely. Time diary analysis shows that they spent the majority of their time (64 percent) working directly with Group 2 participants and practices (Figure 26). The remainder of their time was divided fairly evenly between travel (between the practices they were responsible for), meetings with supervisors, team meetings and training, practice planning, and conversations with AHPs. Care Facilitators focused their attention on the highest risk participants. For example, while out-of-range complex participants represented only 33 percent of Group 2 participants, 42 percent of Care Facilitator phone calls were made to this group.

FIGURE 25

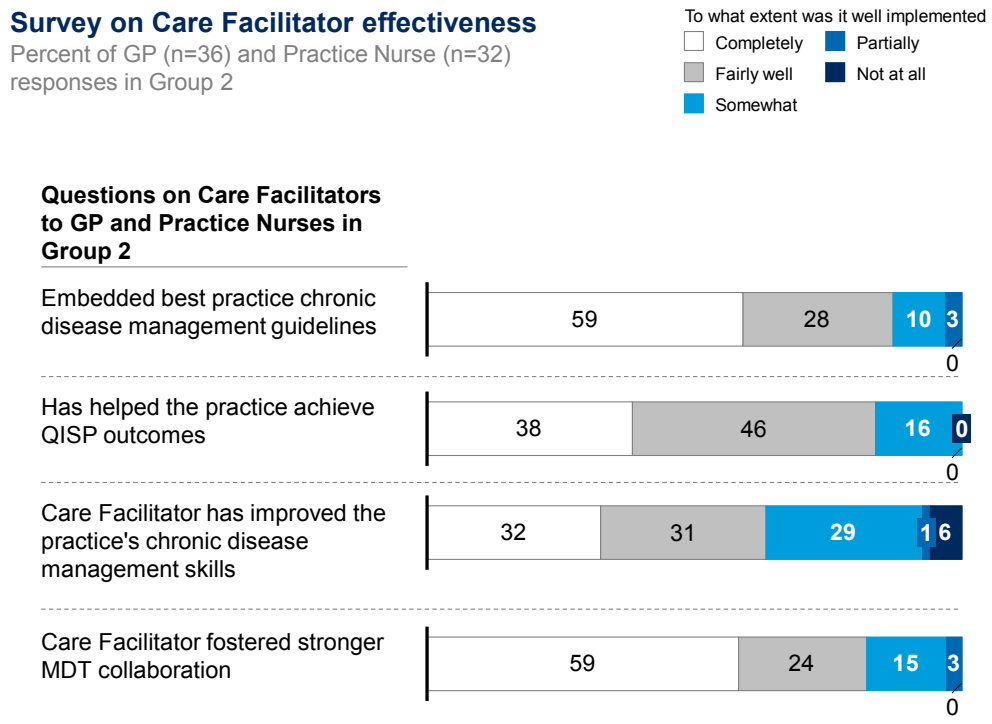
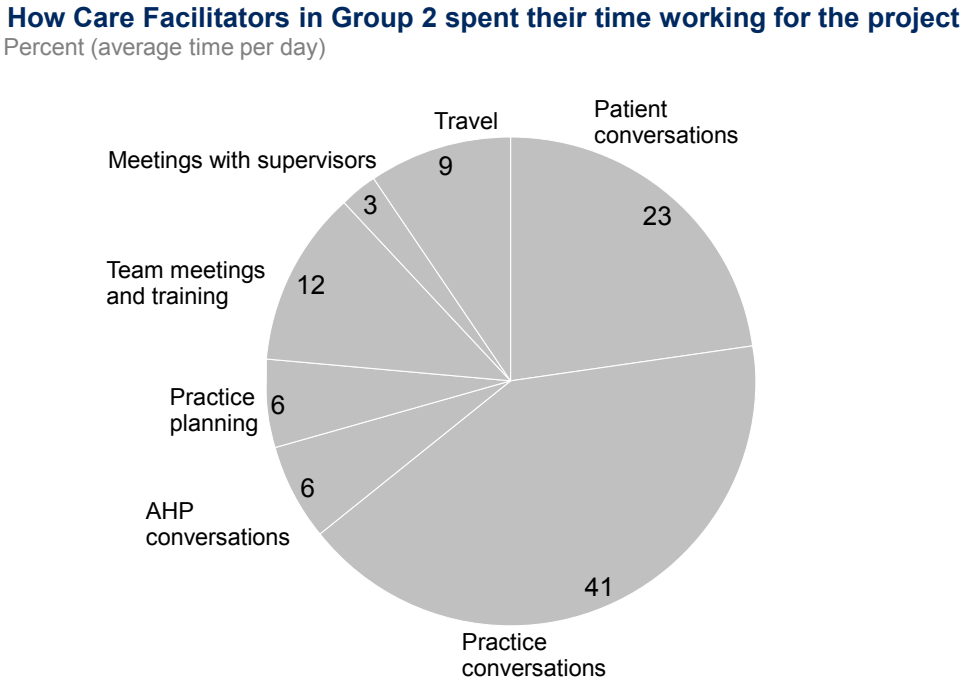


FIGURE 26



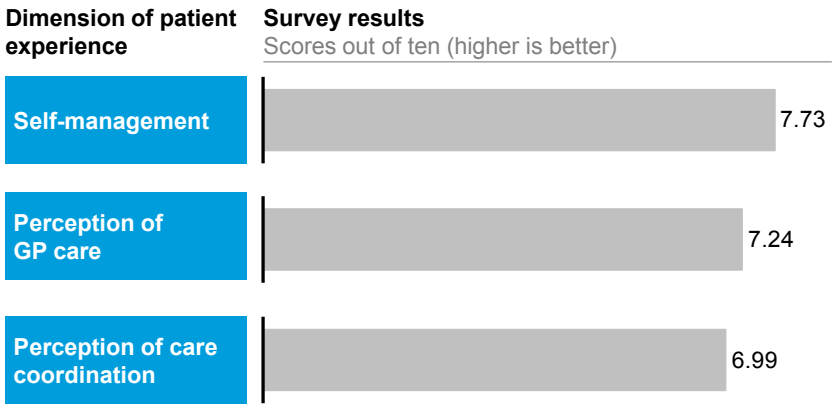
3.2.3. Patient Experience

Across the DCP cohort, people in all three trial arms were relatively happy with their experience at baseline (Figure 27). Almost all participants responded that their diabetes care was well coordinated, with 77 percent reporting that it was 'very well' or 'extremely well' coordinated. Along each of the dimensions of patient experience—self-management, perception of GP care and perception of care coordination—participants scored their care at around 70 percent of the maximum score across all groups.

In Group 2, there was a statistically significant improvement in continuity of care and self-management relative to the Control Group, although the extent of the improvement itself was relatively small (Table 4). Group 2 saw no significant change in perception of GP care. In Group 1, there were no statistically significant changes in any of the measures of patient experience.

FIGURE 27

Patient experience baselines scores



For Self-management, Group 1: N = 1680 , Group 2: N = 1769 . For Perception of GP care, Group 1: N = 1801, Group 2 N = 1858. For Perception of care coordination, Group 1: N = 1718, Group 2: N = 1737

TABLE 4. CHANGE IN MEAN PATIENT EXPERIENCE SCORES BETWEEN BASELINE AND END OF THE TRIAL PERIOD

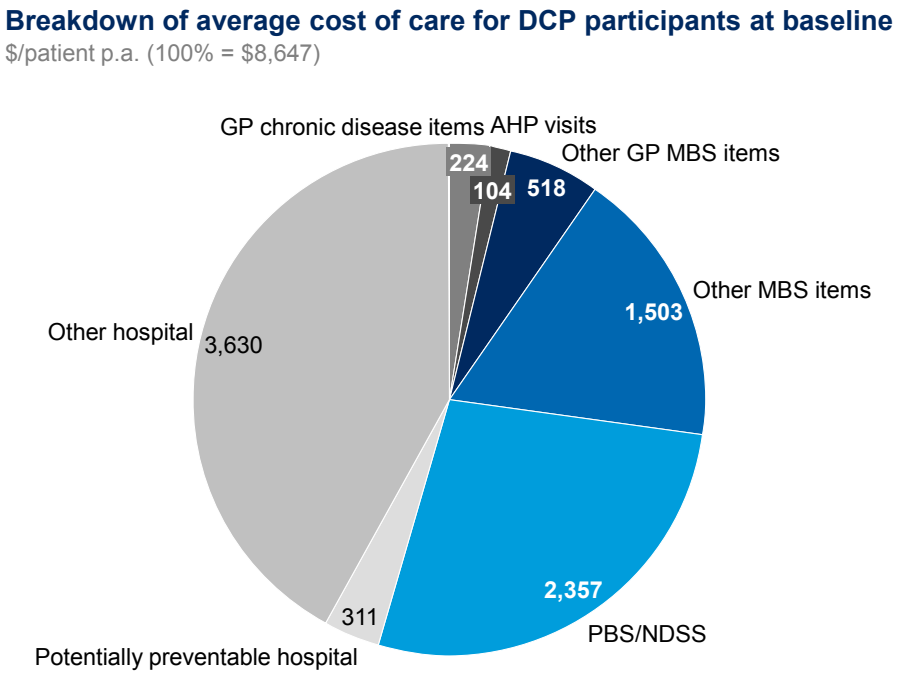
Characteristic	Mean Change	Mean Change	Significance*	Significance*	Control Group (N=1845)	Control Group (N=1845)	Control Group (N=1845)	Group 1 (N=2449)	Group 1 (N=2449)	Group 1 (N=2449)	Group 2 (N=2339)	Group 2 (N=2339)	Group 2 (N=2339)
	Group 1 minus Control	Group 2 minus Control	Group 1 vs Control	Group 2 vs Control	n	Mean	SD	n	Mean	SD	n	Mean	SD
Self-management (score out of 88)	-0.33	2.81	0.599	<0.001	1,276	1.70	13.56	1,689	1.37	15.31	1,705	4.51	15.61
Patient satisfaction with GP care (score from 14 to 70)	0.40	0.61	0.268	0.168	1,386	-0.75	9.89	1,847	-0.35	10.23	1,831	-0.14	10.26
Continuity of care (score from 4 to 24)	0.23	0.95	0.200	<0.001	1,258	0.23	3.87	1,679	0.46	3.96	1,621	1.18	3.86

*Based on a linear mixed effects model, adjusting for ARIA score and clustering by GP practice and participant

3.2.4. Cost of Care

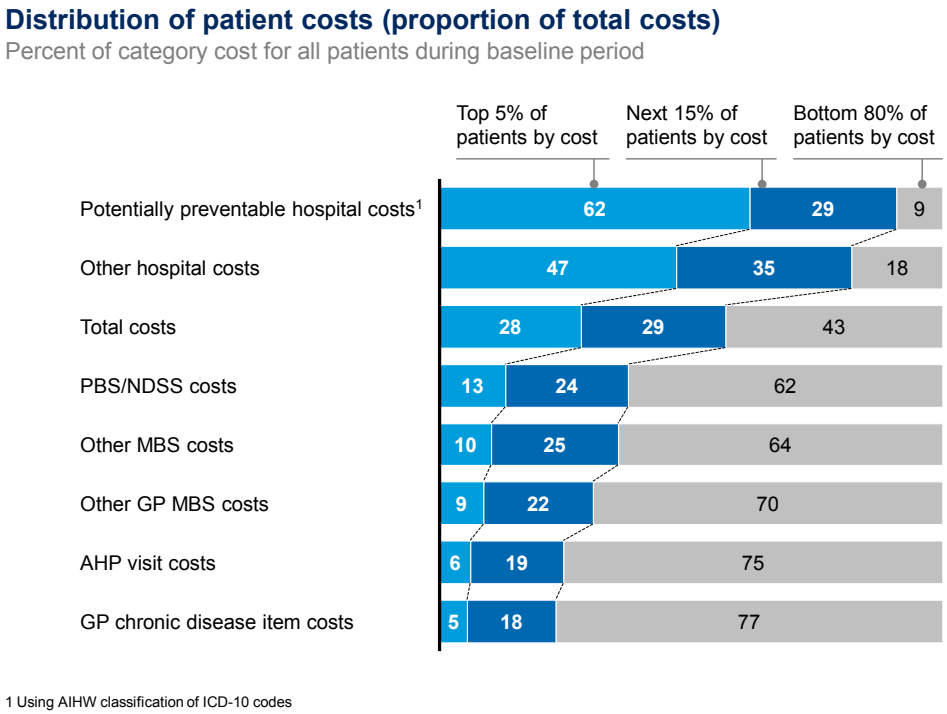
At baseline, the average total healthcare cost across all groups was $8,647 per person per annum (Figure 28). Hospital costs were the largest contributor to this ($3,941 per person per annum) and eight percent of these costs were associated with potentially-preventable hospitalisations.[c] Costs were unevenly distributed across the DCP cohort. The most costly five percent of participants accounted for 62 percent of potentially-preventable hospital costs, 47 percent of other hospital costs, and 13 percent of Pharmaceutical Benefits Scheme (PBS) and National Diabetes Services Scheme (NDSS) costs. In terms of chronic disease funding, the contribution of these participants was less skewed, accounting for six percent of AHP costs and five percent of GP chronic disease item costs (Figure 29). The most costly five percent of participants had an average total cost of $48,623 per person per annum, compared to $16,560 for next 15 percent of the DCP cohort, and $4,670 for the remaining 80 percent of the DCP cohort.

FIGURE 28



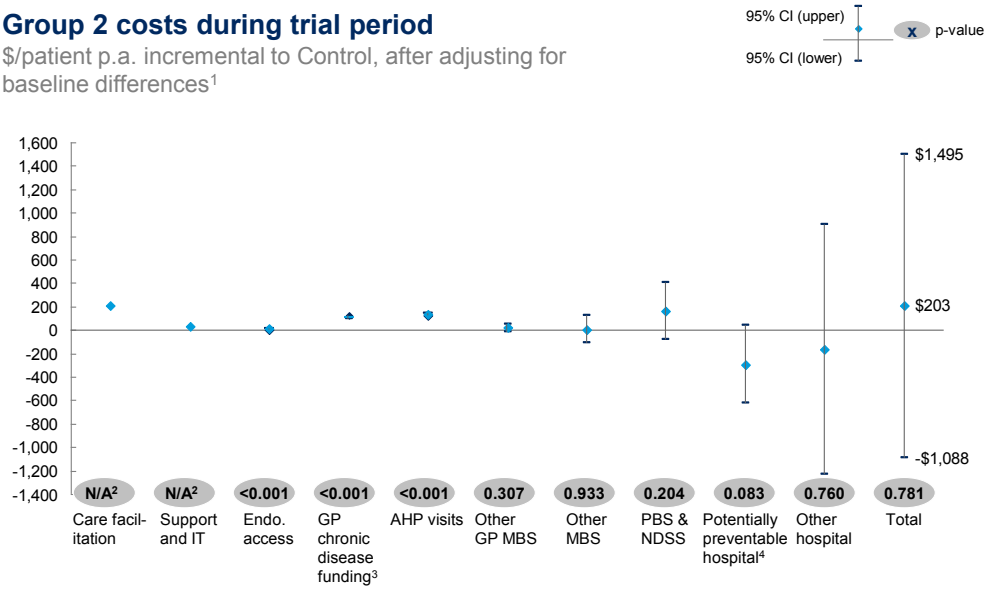
c Using AIHW definition based on classification of ICD-10 codes

FIGURE 29



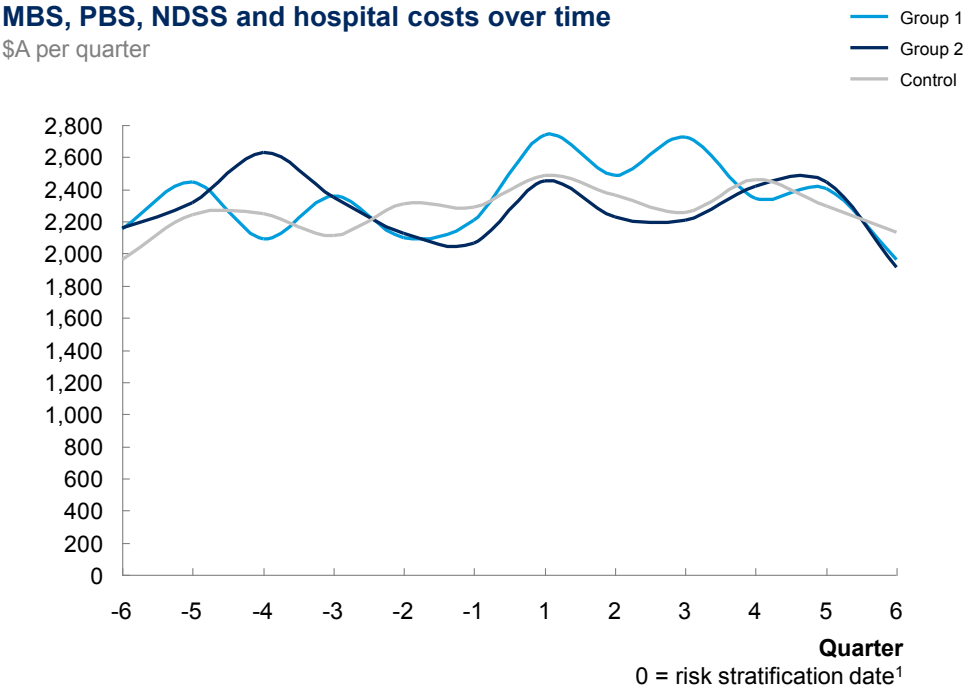
Costs in Group 1 and Group 2 increased by $718 and $203 per person per annum respectively, incremental to the Control Group, after adjusting for differences at baseline. Neither difference was statistically significant overall (p=0.275 and p=0.758 respectively), largely because of the wide variation in hospital costs (Figure 30). Furthermore, there was a high degree of fluctuation in MBS, PBS, NDSS and hospital costs over time, with no clear pattern across groups when broken down over time (Figure 31). However, a number of individual cost components within Group 2 did increase significantly. The funding received by general practices for chronic disease management rose by $107 per person per annum in Group 2, compared to the Control Group (p<0.001). AHP funding in Group 2 increased by $135 per person per annum due to the additional cost allocation to, and multi-disciplinary support for, AHP consultations (p<0.001). These increased costs were due in part to uncertainty in determining the true cost of the current system when the payments were designed, and in part because of the need to incentivise voluntary enrolment by practices that had a choice between the current system and the pilot payment model. The introduction of Care Facilitators added a new cost to diabetes care ($205 per person per annum), and PBS and NDSS costs rose by $158 per person per annum as a result of different prescribing habits (including the increased use of insulin and newer generation diabetes drugs during the trial) (Figure 32), although this was not statistically significant (p=0.204). This cost assessment also includes an allowance of $31 per person for administrative support and IT costs, based on an estimation of the costs required assuming the model was scaled up (see Appendix 5 for details).

FIGURE 30



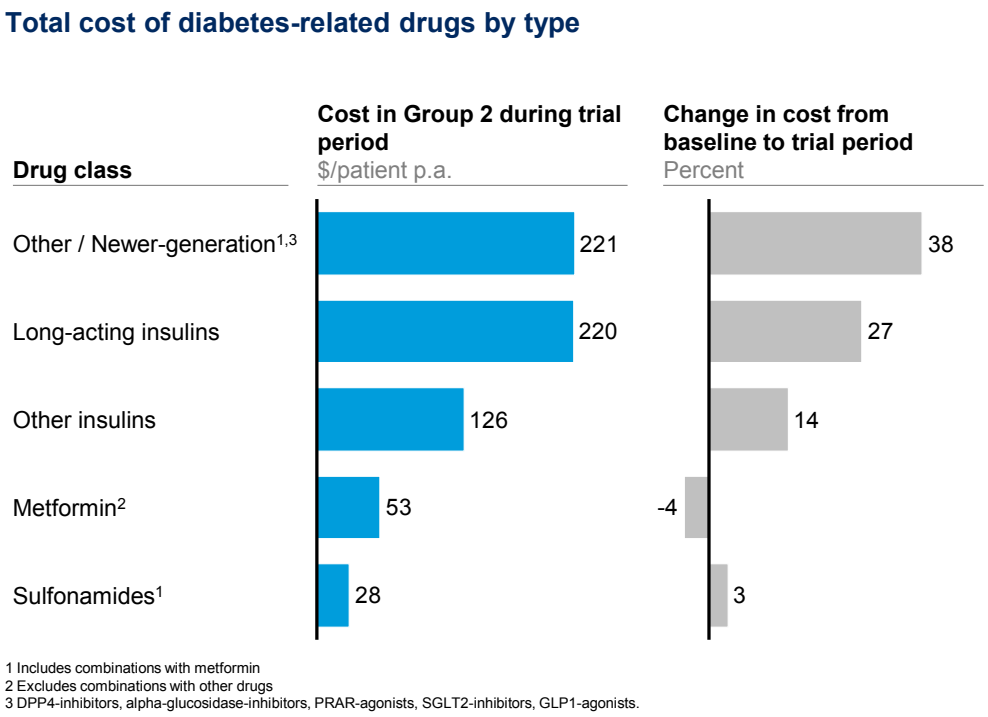
1 Using mixed effects model.
2 No patient-level data.
3 GP and AHP flexible funding and QISP in Group 2 during intervention period; equivalent MBS items (e.g. GPMPs, TCAs, AHP visits) for baseline and control (also includes PIPs and SIPs).
4 Using AIHW classification of ICD-10 codes.

FIGURE 31



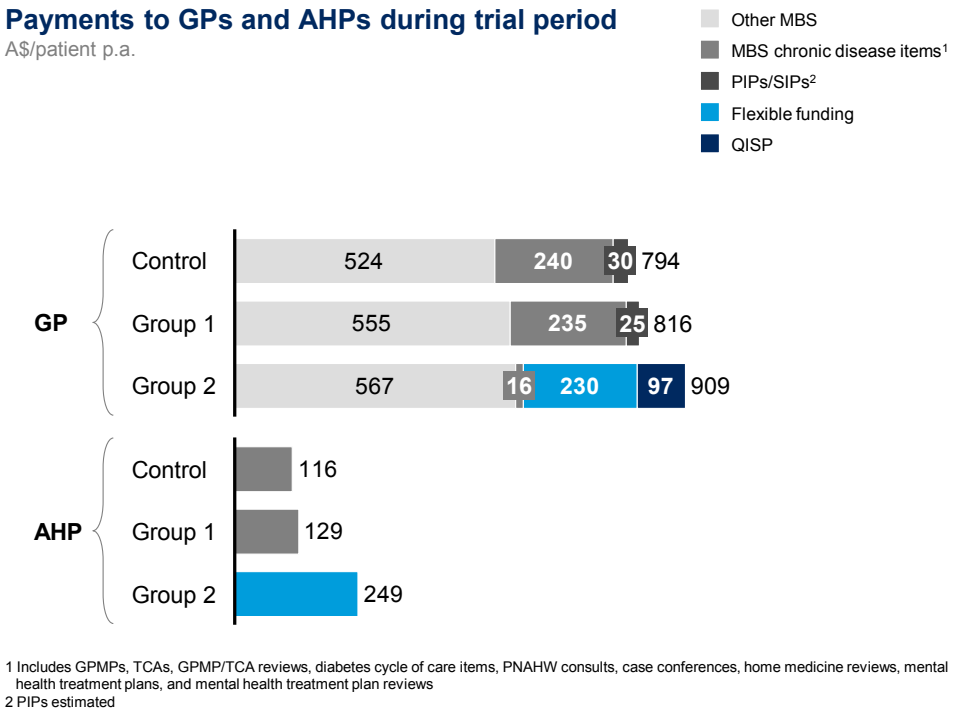
1 '-6' represents first quarter of baseline period; '6' represents final quarter of trial period.

FIGURE 32



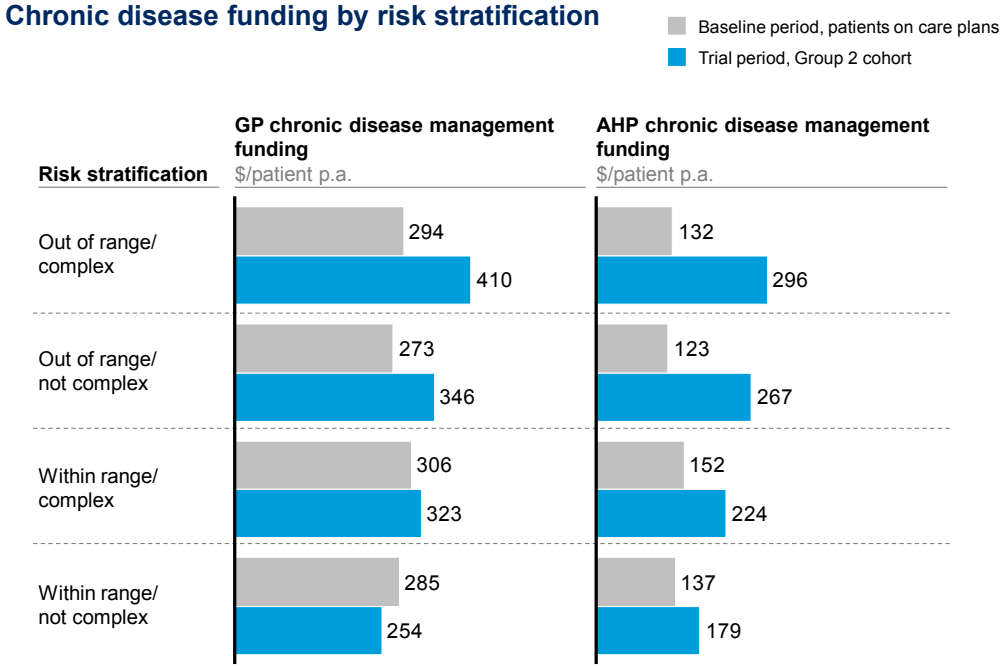
The DCP only affected the source and type of funding provided to general practices in Group 2 through the introduction of flexible funding and QISP (Figure 33). Flexible funding to general practices was tiered based on risk and was higher than the Medicare chronic disease funding received on a care plan at baseline (Figure 34). For the QISP, practices in Group 2 received on average about 70 percent of the maximum payment available for a full year period but the range was from $25 to $150 per person per year. There was no substantial change in QISP payments between the first year of the intervention and the second year of the intervention. There was some variation in the actual GP and AHP payments per patient (Figure 34) from the trial design (Figure 9), due to varying proportions of newly diagnosed patients in each risk stratification group, variable take-up of allied health top-up payments, and annualisation methods used to account for the 18-month trial length (see Appendix 5).

FIGURE 33



1 Includes GPMPs, TCAs, GPMP/TCA reviews, diabetes cycle of care items, PNAHW consults, case conferences, home medicine reviews, mental health treatment plans, and mental health treatment plan reviews
2 PIPs estimated

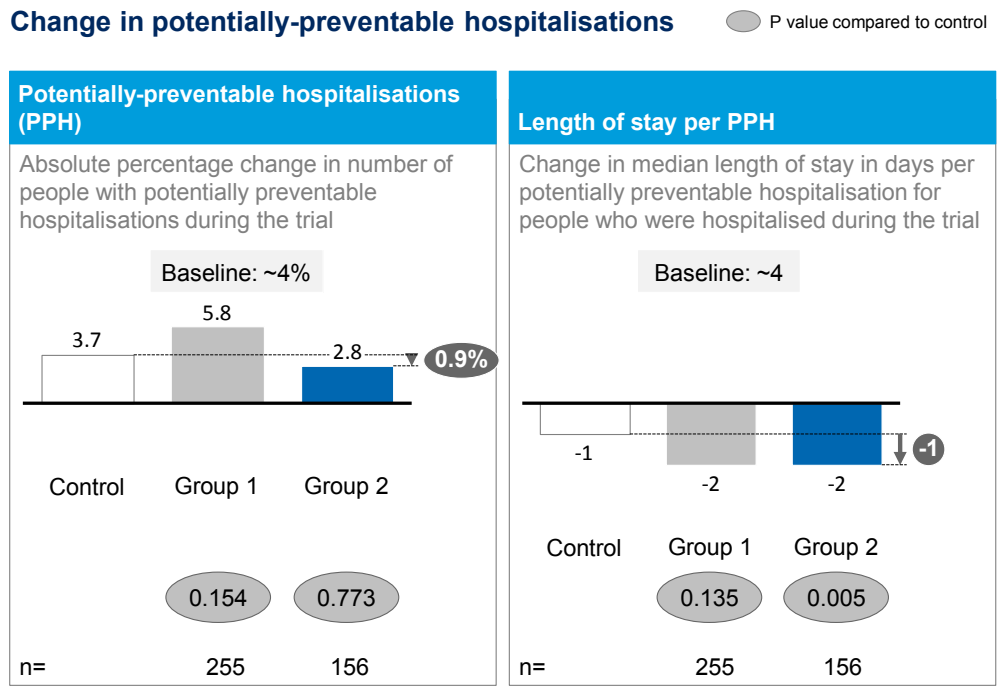
FIGURE 34



The cost increases associated with the Group 2 interventions were partially offset by a decrease in hospital costs of $461 compared to the Control Group, although this decrease was not statistically significant

(p=0.438, 95% CI $-1,628-$705). The decline in costs was primarily driven by a $294 decrease in the cost of potentially-preventable hospitalisations (p=0.083, 95% CI $-627 to $38). This was most likely due to a reduction in length of stay for potentially-preventable hospitalisations which decreased by a median of one day relative to the Control Group (Figure 35) (p=0.005). In contrast, hospital costs in Group 1 rose by $677 per patient per annum compared to the Control Group, although again this was not statistically significant.

FIGURE 35



Note: Potentially-preventable hospitalisations defined by the AIHW standard

Measuring the cost-effectiveness of the Group 2 model of care is challenging because the main benefits of improved blood glucose control would be expected downstream in the form of reduced complications (i.e. outside of the 18 month trial period).[45] These benefits were extrapolated (based on HbA1c and other clinical changes), along with costs, for an extended period. Two different population simulation models—the UKPDS model and the Archimedes model—predicted long-term benefits in Group 2 of 0.015 and 0.019 QALYs per person, respectively.

Overall, there is no evidence to suggest that the Group 2 model of care would be cost-effective if adopted for longer, with large uncertainties regarding both the net cost and benefits of the intervention. Projecting the incremental cost of Group 2 in primary care (i.e. assuming the hospital cost changes seen in the trial do not persist) and assuming a two percent reduction in hospital costs based on the predictable effect of changes in HbA1c,[46,47] the best estimate of cost per QALY would be around $250,000. This is not considered cost-effective. Alternatively, the best estimate of cost per QALY would be around $100,000 per QALY if the reductions in hospitalisation seen in the trial were to be included. However, these cost savings were not statistically significant and it is unclear whether they would persist. Based on these two scenarios, the probabilities of the intervention being cost-effective at a threshold of $50,000 per QALY are two percent and 45 percent respectively. On balance, therefore, it is unlikely the Group 2 model of care would be cost-effective as implemented.

Chapter 4—Conclusions and Recommendations

This chapter summarises the conclusions of the trial with respect to the original program evaluation areas and outlines the DCP consortium's recommendations. It is divided into two sections:

- 4.1 Conclusions by program evaluation areas
- 4.2 Recommendations

4.1 CONCLUSIONS BY PROGRAM EVALUATION AREAS

This section provides an overview of key findings by the eight program evaluation areas set by the Department in 2011:

- **4.1.1. Quality of diabetes care:** The quality of diabetes care provided to enrolled patients.
- **4.1.2. Funding flexibility and innovative patient-centred care:** The level of flexibility offered by the new funding arrangements in supporting the delivery of diabetes services and development of new ways to provide innovative, patient-centred care that is appropriately tailored to the needs of individual patients.
- **4.1.3. Patient affordability:** The impact of flexible funding arrangements on the affordability of care for patients (i.e. out of pocket expenses).
- **4.1.4. Flexible funding and coordination:** The impact of flexible funding arrangements on the quality of care coordination, and the level of collaboration and interactions across the multidisciplinary team.
- **4.1.5. Pay-for-performance and quality of care:** The impact of pay-for-performance incentives on the quality of diabetes care, as measured against key process and intermediate clinical indicators.
- **4.1.6. Pay-for-performance and information recording:** The impact of pay-for-performance incentives on the recording of information on diabetes care provided for enrolled patients.
- **4.1.7. Voluntary patient enrolment:** The impact of voluntary patient enrolment on continuity and coordination of care, and client satisfaction with their care.
- **4.1.8. Economic sustainability:** The sustainability of the payment types and levels under any future wider rollout of the Pilot.

4.1.1 Quality of Diabetes Care

The quality of diabetes care improved in Group 2 but not in Group 1. The DCP focused on three measures of care quality: intermediate clinical indicators, adherence to recommended clinical processes, and patient satisfaction. In all three domains, there were statistically significant improvements in key metrics for Group 2 (relative to the Control Group):

- **Intermediate clinical indicators:** Improvements in glycaemic control (HbA1c), blood pressure, blood lipids, waist circumference, and depression.
- **Adherence to recommended clinical processes:** Increased care-plan take-up, completion of recommended 'annual cycles of care,' and allied health visits.
- **Patient satisfaction:** improvement in patient perceptions of diabetes-related stress, self-management and quality of care (based on survey scores).

In contrast, the Group 1 cohort did not improve significantly on any of the above metrics with the exception of care-plan take-up.

4.1.2. Funding Flexibility and Innovative Patient-Centred Care

Funding flexibility in Group 2 allowed care to be more innovative and patient-centred. Participants in Group 2 saw AHPs from a broader range of specialties than the Control Group (Figure 22), reflecting the tailoring of care packages to their individual needs. Furthermore, a broader range of AHP consultation types were introduced and accessed in Group 2. During the trial period, only six percent of AHP consults were of the non-standard length or type in the Control Group, while in Group 2 this figure was 44 percent. GPs from Group 2 who were interviewed felt that the flexible AHP funding system was more patient-centred, as captured by this GP comment: "Traditional diabetic care using the care planning … is so incredibly inflexible … The beauty of [the DCP] was that you could tailor what you were providing to the patient's needs".

Funding for Care Facilitators was also a key enabler of care innovation, including meeting unmet needs. As an example, one Care Facilitator in a remote area was able to monitor and pool demand across multiple practices for a particular allied health specialty that was not previously available in the local area. A visiting AHP was arranged—an arrangement made possible by the levels of flexible funding.

4.1.3. Patient Affordability

No statistically significant changes in out-of-pocket expenses were observed for Group 2, although affordability would need to be closely monitored in any broader roll-out. The DCP monitored patient affordability in two ways: through a patient diary of all healthcare costs given to a small subset of patients; and through out-of-pocket components of MBS, PBS and NDSS claims. Neither of these revealed a statistically significant difference in patient costs between Groups 1 and 2 and the Control Group (see Appendix 5). However, there was a trend towards higher patient costs in Groups 1 and 2 (e.g. out-of-pocket MBS/PBS/NDSS costs in Group 2 were $72 per patient higher than in the Control Group over the 18-month trial period [p=0.142]). In the DCP, participants remained well protected by existing Commonwealth safety nets, but affordability would need to be monitored closely in any future rollouts of interventions similar to the DCP.

4.1.4 Flexible Funding and Coordination

There is some evidence that flexible funding improved care coordination and collaboration, but this is difficult to separate from the impact of other components of the Group 2 intervention, particularly pay-for-

performance. Patient perceptions of continuity of care improved significantly. Patient survey scores for continuity of care increased by five percentage-points (based on percentage of maximum score) in Group 2, incremental to the Control Group. The IT tool was a key enabler of greater collaboration across care teams, and the tool was used much more frequently in the presence of new funding arrangements (i.e. in Group 2 versus Group 1). In Group 2, GPs used the tool twice as often, Practice Nurses used it three times as often, and AHPs used it six times as often as their respective counterparts in Group 1. A large proportion of these encounters with the tool involved entering information that was shared across a patient's multidisciplinary team. Funding for care facilitation in Group 2 saw the addition of a new member to each patient's multidisciplinary team (MDT). In a survey on Care Facilitator effectiveness administered to GPs and Practice Nurses in Group 2, respondents were asked about the extent to which the task of fostering stronger MDT collaboration had been implemented (Figure 25). Fifty-nine percent of respondents replied 'completely' and a further 24 percent replied 'fairly well'. Care Facilitators worked across practices, allowing them to cross-pollinate ideas. The endocrinology access component of the Group 1 and Group 2 interventions also introduced a new mode of collaboration between GPs and specialists, enabling them to undertake reviews of patient cases together in a common location. One GP from Group 2 commented "having that sort of feedback with specialists … was fantastic."

4.1.5. Pay-for-Performance and Quality of Care

It is likely that pay-for-performance improved the quality of diabetes care, although it is difficult to separate its impact from other components of the Group 2 intervention. A range of key clinical and process indicators improved in Group 2, while these indicators did not improve in Group 1 (which did not experience any changes to funding arrangements). The clinical measure that saw the most substantial improvement was HbA1c, which was also the only clinical measure to be included in the pay-for-performance incentive scheme (QISP). While quality improvement processes and feedback focused on systolic blood pressure and cholesterol, they were not incentivised in the QISP, which may have been a factor in the smaller improvements seen in these metrics (relative to HbA1c).

4.1.6. Pay-for-Performance and Information Recording

Information recording improved in Group 2, and pay-for-performance likely played a role in this. In calculating QISP payments in Group 2, a 20 percent weighting was given to 'accurate and timely data entry.' This involved assessing whether key clinical metrics (e.g. HbA1c, weight, blood pressure, blood lipids) were entered correctly into GP IT systems. In the trial period, 49 percent of Group 2 patients met the criteria for accurate and timely data entry, compared to 24 percent in the Control Group ($p<0.001$) and 23 percent for Group 1. In Group 2, between the baseline period and the trial period, the average number of HbA1c measurements recorded per person per annum increased by 0.26, incremental to the Control Group ($p<0.001$). In Group 1, the average number of measurements decreased by 0.08 ($p=0.006$).These improvements in information recording reflect a combination of (a) increased activity and (b) better recording of existing activity; determining the split between the two was beyond the scope of the DCP design. Interviews with GPs, Practice Nurses and practice managers from Group 2 suggested that a large proportion of information recording for the DCP was left to Practice Nurses and/or practice managers. Payment of the QISP at the practice level may have assisted in facilitating this allocation of activity.

4.1.7. Voluntary Patient Enrolment

The enrolment process for all groups in the DCP was voluntary, and as such, there was no non-voluntary group with which to conduct a quantitative comparison. Group 2 involved a more restrictive form of registration, in so far as funding and care facilitation were tied to a particular practice. In Group 2, patient survey scores for continuity of care improved significantly relative to the Control Group, although there was no significant difference for patient satisfaction with GP care.

Evidence from interviews suggested that, for some participants, the act of formally signing up to a program fostered a sense of empowerment, structure and/or commitment to their management plans. Some health practitioners considered that many participants enrolled precisely because of the potential extra allied health options available, while one Practice Nurse commented: "Some people…didn't really fully comprehend what they were signing up for." Several GPs felt that the process of voluntary enrolment made it difficult to target certain high-risk groups. For example, the logistics of enrolment were difficult for people from non-English-speaking backgrounds and those with poor literacy, and very complex participants reportedly required much more encouragement to enrol.

4.1.8. Economic Sustainability

It is unlikely that the particular funding levels implemented in the DCP would be cost-effective in a broader rollout and they would need to be recalibrated to maximise the chances of cost-effectiveness. The total annual cost per patient of GP chronic disease funding (including flexible funding and pay-for-performance) in Group 2 was $107 more than the Control Group, while AHP funding was $135 more (after adjusting for differences at baseline). These differences were statistically significant. When taken together with all other costs, participants in Group 2 cost $203 more per patient than the Control Group, although this overall difference was not statistically significant. Taking into account the HbA1c benefits seen in the DCP, estimates of cost-effectiveness under two different future scenarios are approximately $100,000 or $250,000 per QALY. The typical upper threshold for cost-effectiveness is closer to $50,000 per QALY, meaning that it is unlikely that the particular funding model implemented in the DCP would be cost-effective in any future wider rollout. Were a scheme similar to the DCP to be rolled out more broadly, the funding model would need to be recalibrated to produce a greater likelihood of cost-effectiveness.

4.2 RECOMMENDATIONS

The DCP demonstrated a significant improvement in glycaemic control—the primary clinical endpoint of the trial—as well as secondary outcomes including adherence to recommended clinical guidelines, incidence of depression, and patient experience in Group 2 compared to the Control Group. Similar improvements did not occur in Group 1. Accordingly, the introduction of improved information technology and continuous quality improvement processes were not, on their own, sufficient to improve outcomes. However, combining these changes with a new funding model did make a significant difference. While the long-term extrapolation of the benefits and costs of the Group 2 funding model suggest that, on balance, it is unlikely that the model implemented would be cost-effective at a national level, these findings can be used to inform future programs. There are therefore three recommendations arising from the DCP:

- **4.2.1. Recommendation 1.** Change the current chronic disease care funding model to incorporate flexible funding for registration with a health care home, payment for quality and funding for care facilitation, targeting resources where they can realise the greatest benefit.
- **4.2.2. Recommendation 2**. Continue to develop both eHealth and continuous quality improvement processes.
- **4.2.3. Recommendation 3**. Better integrate primary and secondary care and reduce avoidable hospital costs.

4.2.1. Recommendation 1 : Change the current chronic disease care funding model to incorporate flexible funding for registration with a health care home, payment for quality and funding for care facilitation, targeting resources where they can realise the greatest benefit

The Commonwealth currently spends approximately $850 million on chronic disease management activity, and these costs grew at a rate of 25 percent per annum between FY06 and FY14 (Figure 4). Results from the DCP indicate that this money is not being targeted to benefit the most high-risk individuals, and it was difficult to demonstrate clinical benefits in the population receiving this money within the timeframes of the project and the metrics assessed. An important question for policymakers, therefore, is how to get the best value from funding for chronic disease management.

The main result from the DCP was that Group 2 practices showed superior outcomes compared to the Control Group, although the funding model implemented is not likely to be cost-effective at a national scale. In the future, there may be three ways to incorporate some of the ideas tested in Group 2 in a more cost-effective manner:

- **Target funding more precisely**. Funding could be tiered to focus more resources on those most likely to benefit from them. In the DCP, the people who benefited most from the interventions were those who started the project out of range on metabolic indicators such as HbA1c, but all participants in Group 2 received care facilitation and more generous general practice and AHP funding than people in the Control Group. (See Appendix 2 for analysis of predictors of improved clinical outcomes in the DCP.)
- **Optimise provider payments.** The funding levels under Group 2 were considerably higher for general practices and AHPs than in the Control Group. This was because of uncertainty at the start of

the project about how much activity was already underway for people who would enrol in the DCP, and because of the need to keep funding levels sufficiently high to attract practices away from the current Medicare model. It would be possible to implement lower funding levels and still leave healthcare providers better off than they are today or in the same position as they are today.

- **Expand outcomes included in payments for quality.** The QISP system could be expanded to include other indicators (such as cholesterol and blood pressure), which could potentially increase the clinical benefits of the program. In the DCP, the most significant clinical improvement was in glycaemic control—the only clinical outcome that was incentivised as part of the QISP. While other clinical outcomes (such as cholesterol and blood pressure) were emphasised in the quality improvement reporting and risk stratification models, they showed only small improvements compared to the Control Group.

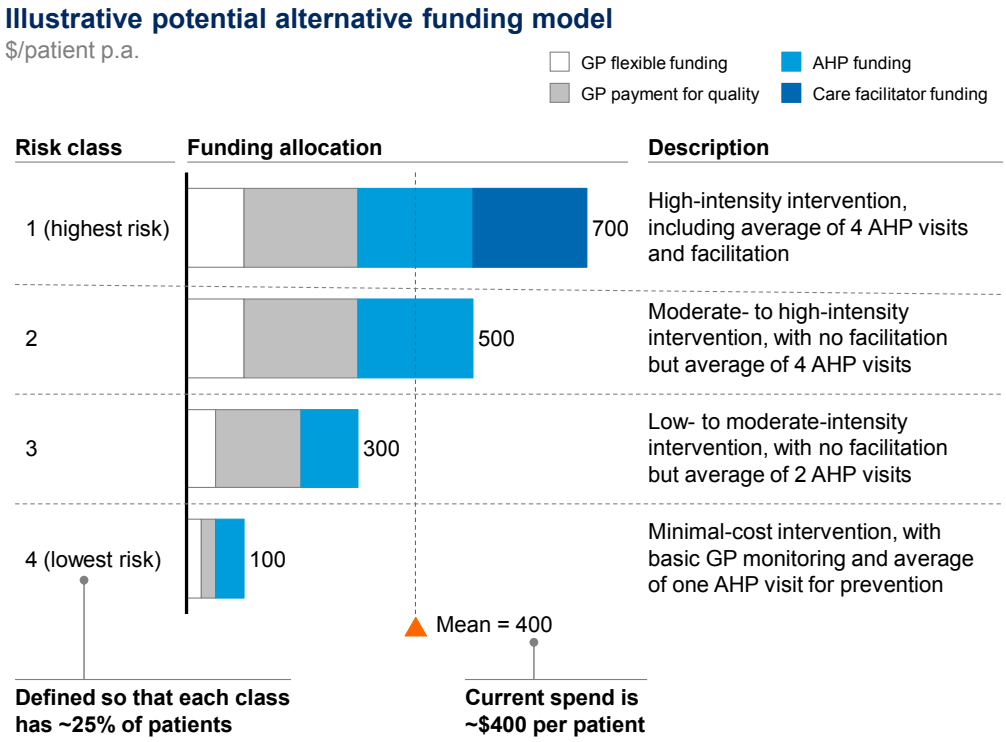
An alternative model could be developed reflecting these changes (Exhibit 36). For example, if the funding were to fit within existing chronic disease management budgets, it would need to cost approximately $400 per person per annum (the approximate average amount of chronic disease funding received by a person with a care plan in the baseline period). As an illustration, this money could be reallocated based on risk level so that the highest risk people (who are most likely to benefit from resources) receive an average of around $700 per year, while the lowest risk people (who are least likely to benefit from resources) receive an average of around $100 per year to assist in preventing their risk status from deteriorating (in addition to the Medicare funding available for standard visits on a fee-for-service basis). The funding could be broken into up-front flexible funding for enrolling patients, payment for quality, AHP funding (which would be paid to AHPs in a similar way as it is today) and, for the highest risk groups, funding to support care facilitation. By making some of the funds available contingent on quality outcomes, and assuming not all people use their maximum allocation of AHP funding, the maximum amounts available per group could be considerably higher. This model would require clinicians to be thoughtful in how they allocate their time. For example, it may not be necessary to complete a care plan for all people; it would be up to clinicians to optimise how they allocate their time to realise the greatest impact on outcomes. Patients could move between risk and funding tiers over time, allowing the system to respond to their changing needs.

The DCP demonstrated that improving diabetes care has the potential to increase pharmaceutical use and costs. In Group 2, there was a trend toward higher pharmaceutical costs (although it was not statistically significant) due to increased prescribing of long-acting insulin and newer-generation anti-diabetic drugs (Figure 32). However, there is a potential for cost-savings in this area that may mitigate this risk. The Drug Utilisation Sub Committee (DUSC) of the Pharmaceutical Benefits Advisory Committee (PBAC) recently highlighted (in its Analysis of Medicines for Type II Diabetes) a number of opportunities for reducing the cost of diabetes drugs, including reducing insulin wastage and preventing over-prescription (outside of PBS criteria) of newer-generation antidiabetics.[48] Furthermore, given the high cost and increasing use of long-acting insulins, there may be opportunities to optimise their use.[49]

In the future, innovative models of care such as those tested in the DCP could be used across multiple chronic diseases. Approximately two-thirds of people with diabetes in the DCP had at least one other chronic disease. As one GP participating in the DCP explained: “The speciality of general practice is all about the management of poly-pathology, or patients with complex and interlocking needs.” Practice feedback from the DCP also highlighted the operational complexity of having to learn and manage multiple

programs in order to manage different chronic diseases. Unified models of care would reduce this operational complexity and enable economies of scale, primarily because many of the components of better integrated models of care—such as patient registration, information technology, care facilitation, continuous quality improvement processes, and the funding model principles—could be shared across diseases. One key challenge would be developing integrated risk stratification and incentives systems that could be applied across patients with different chronic diseases, taking into account a much broader range of factors than those included in the DCP's risk stratification.

EXHIBIT 36



4.2.2. Recommendation 2: Continue to develop both eHealth and continuous quality improvement processes

While the trial showed that better eHealth infrastructure and continuous quality improvement processes were not, on their own, sufficient to improve the quality of care or outcomes, they were nonetheless integral to the Group 2 model of care.

The IT system enabled most of the other elements in the model, including conducting risk stratification, automating funding flows, helping Care Facilitators prioritise where they spent time, and providing the data that underpinned the QISP system. While manual methods could have been used to replace some of these functions, they would have been slow and labour-intensive. These methods would also have required additional personnel (and the related expenditure associated with this) and they would have reduced the ability of practices and Care Facilitators to rapidly identify and fix problems.

One of the important differences between Group 1 and Group 2 was the rate at which clinicians adopted the IT tool. In Group 2, GPs used it twice as often, Practices Nurses used it three times as often, and AHPs used

it six times as often as their counterparts in Group 1. While both groups received the same training and technical support, use of the system in Group 2 was most likely reinforced by the tool's automated payment functionality, and by the presence of Care Facilitators who supported its adoption. This highlights the interconnected nature of the changes introduced to Group 2—they tended to reinforce each other, and it is likely that the intervention would have been less effective had some of the elements been removed.

As described in Chapter 2, there were nine key functionalities of the IT tool: patient registration, risk scoring, care planning and clinical protocols, provider bookings, care tracking, a common patient record, a patient portal, performance management and analytics, and billing management. While all of these elements may be individually available in the marketplace today in some form, none of them are yet at scale nationally. Current Commonwealth initiatives have so far focused primarily on infrastructure such as a standard patient identifiers, secure messaging and record sharing (e.g. the Personally Controlled Electronic Health Record). Once this infrastructure has been established in the general practice setting, the next step may be to add the type of functionality demonstrated in the DCP.

The continuous quality improvement processes were also an important part of the improvements seen in Group 2. These discussions provided an opportunity to communicate progress towards QISP outcomes and, when needed, alter course. Anecdotal feedback from primary care organisations suggests that without these discussions, the QISP payments and performance reports would not have been well communicated to many clinicians. This is consistent with observations from other studies of clinical incentive programs, which have found that fostering 'extensive and direct communication with involved providers' results in positive effects on outcomes.[29] Practices generally appreciated seeing their performance data in an easy-to-understand format, and they responded positively to seeing their outcomes relative to peers. In a comment that was indicative of feedback from several practice staff involved in the DCP, a GP stated "The statistics were great, because you could have a look at them personally and question yourself. And that was nice… it gave you an idea of how you were going." This is consistent with experiences from the Australian Primary Care Collaboratives Program, which encourages practices to communicate with each other, share data and participate in continuous improvement programs.[50]

4.2.3. **Recommendation 3:** Better integrate primary and secondary care and reduce avoidable hospital costs

The baseline data from the DCP highlighted that hospital costs were highly concentrated in a relatively small portion of the population. The most costly five percent of participants accounted for 62 percent of potentially-preventable hospital costs and 47 percent of other hospital costs. Their average healthcare cost per year was $48,623, with hospitalisation accounting for $38,099 of this cost (78 percent). Finding ways to reduce hospitalisations across this cohort of people will be an important aspect of improving the financial sustainability of the system.

It is possible to predict who is at risk of potentially preventable hospitalisations using data from the DCP. Admission for a potentially-preventable hospitalisation in the last 18 months is the strongest predictor of readmission within the next 18 months (OR=2.89, 95% CI 1.59 – 5.26). The other significant predictors of potentially-preventable hospitalisations are being treated with insulin (OR=2.01, 95% CI 1.39 – 2.90) and age (OR=1.04, 95% CI 1.02 – 1.05). In terms of all hospitalisations (avoidable and not avoidable), there is a broader range of significant predictors including previous admission within 18 months, coronary heart

disease, social disadvantage, depression, age, years since diabetes diagnosis, and urban/rural compared to metro locations (Appendix 3).

The DCP was not designed to specifically reduce avoidable hospitalisations in the short term through, for example, close integration with hospital networks. Rather, it focused on coordinating primary care to improve long-term health indicators such as glycaemic control, among other outcomes. While glycaemic control has been shown to reduce the long-term occurrence of diabetes-related complications and hospital costs, it usually takes several years to see an effect. For example, research on the UKPDS over a ten year follow-up period has demonstrated that for each one percent reduction in mean HbA1c, there are significant reductions in risks of death related to diabetes, myocardial infarction and microvascular complications.[45] In the DCP, Group 2 did show a trend toward a reduction in potentially-preventable hospital costs within the 18 months of the trial (although the reduction was not statistically significant) as well as a reduction in the length of stay for avoidable hospitalisations.

Experience from other programs has shown that interventions can be designed to specifically target reductions in avoidable hospitalisations within one to two years. A recent systematic review and meta-analysis—which looked at the evidence from six COPD controlled trials from different countries with an average study duration of 14 months—found a significant reduction in hospital costs as a result of integrated care-type interventions of €1,060 (A$1,527) per patient (95% CI €2040-€80; p=0.006).[51] Another review that looked at the economic impact of coordinated care programmes for diabetes, heart disease and asthma provides an analysis of findings from 67 studies (79 percent of which had a follow-up duration of less than 15 months) that included more than 32,000 participants. This research found a combined economic effect size of 0.311 (95% CI = 0.272-0.350), meaning that the average mean difference in costs between intervention groups in all these studies and care as usual equated to around 31 percent in intervention savings. [52] Furthermore, the research suggests that interventions are most effective when program intensity is aligned with disease severity. Future programs may be able to build on these findings by better integrating primary and secondary care to create more significant reductions in avoidable hospitalisations.

There are several international examples of primary care interventions designed to target downstream hospital savings. In New Zealand, the Canterbury health system has developed deep interfaces between primary and secondary care, including an acute demand management system (to shift people from hospitals to general practice), community rehabilitation support (to reduce hospital length of stay), and 24-hour general practices (to provide out-of-hours care).[53] In the UK, the North West London Integrated Care Pilot utilises many of the changes to care that were tested in the DCP (such as risk stratification, continuous quality improvement, innovations to funding) but with the express objective of reducing hospital admissions for people with diabetes and the elderly.[54] Health providers such as Kaiser Permanente and other integrated medical groups in the United States have also demonstrated 'downstream' reductions in hospital costs and admissions with interventions such as triage and rapid response teams for high-risk patients, post discharge community care programs to reduce readmission rates (and decrease the burden on hospital outpatient services), mental and social health liaisons, and hospital-in-the-home programs.[55] Implementing any of these models in Australia will require cooperation from the Commonwealth and State Governments to align incentives and ensure hospitals and primary care are better integrated.

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