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Department of Health

Australian National Diabetes Strategy

2021 – 2030



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Contents

Executive summary	2
Acknowledgements.....	4
Abbreviations	5
Introduction	6
The approach	8
The challenge of diabetes.....	11
Goal 1: Prevent people developing type 2 diabetes	14
Goal 2: Promote awareness and earlier detection of type 1 and type 2 diabetes.....	16
Goal 3: Reduce the burden of diabetes and its complications and improve quality of life	18
Goal 4: Reduce the impact of pre-existing and gestational diabetes in pregnancy	23
Goal 5: Reduce the impact of diabetes among Aboriginal and Torres Strait Islander peoples.....	25
Goal 6: Reduce the impact of diabetes among other priority groups.....	27
Goal 7: Strengthen prevention and care through research, evidence and data	32
References.....	34
Appendix A	38

Executive summary

The Australian National Diabetes Strategy 2021–2030 (the Strategy) aims to outline Australia's national response to diabetes and inform how health care and other resources can be better coordinated and targeted across all levels of government. Diabetes is a multi-system disorder. It affects many of the body's vital organs and systems, including the heart and blood vessels, brain, nerves, kidneys, liver, and immune system. Although people with diabetes are now living longer, the prevalence in Australia is not declining. This highlights the need for sustained action. The Strategy identifies the most effective and appropriate interventions to reduce the impact of diabetes in the community and lead the way internationally in diabetes prevention, management and research.

Overcoming the many barriers to improving diabetes prevention and care requires a multi-sectoral response led by governments and implemented at the community level. The Strategy provides a framework for collaborative efforts by governments and other parts of the community, including people with diabetes, health care professionals, non-government organisations, researchers, families, carers, communities and industry, to reduce the incidence of, and morbidity and mortality from, diabetes and its associated complications.

The Strategy's vision is to strengthen all sectors in developing, implementing and evaluating an integrated and coordinated approach to improve health outcomes by reducing the social and economic impact of diabetes in Australia. To achieve this, the Strategy outlines 7 high-level goals with areas for action and measures of progress. The goals span prevention, awareness, early detection and management of diabetes; specific populations impacted; and the research agenda.

The Strategy's principles underpin the goals by guiding implementation and strengthening efforts. They include the importance of person-centred care and reducing health inequities; the need for collaboration and cooperation and to coordinate care across settings; and the need for measurement of progress.

The Strategy also outlines enabling factors that influence capacity to achieve goals. They comprise leadership and governance, workforce, information and research capacity, financing and infrastructure, partnerships and networks, and the accelerated change opportunities and flexibility associated with emerging challenges.

COVID-19 has been a dominant issue for every Australian, and the pandemic presents an opportune time to pause and reflect on the many lessons that must be taken from this crisis in relation to diabetes. Through the COVID-19 pandemic we are learning that the effects of diabetes may worsen with infection and, additionally, that infection may induce new-onset diabetes in both adults and children. We have also seen deterioration in diabetes self-management and follow-up care, greater variability in glycaemic management, and declining mental health during the COVID-19 pandemic.

The Strategy recognises the need for increased preparedness, including guidelines and protocols during future public health challenges to ensure successful continuity of management and follow-up care for people with existing and new-onset diabetes.

Implementation involves all levels of government, in collaboration with the health sector and relevant organisations. The 2016–2020 Implementation Plan, which supported the 2016–2020 Strategy, will be updated to align with this Strategy. The Implementation Plan will be developed jointly by the Commonwealth and state and territory governments.

The Strategy includes measures of progress for each goal. The set of indicators mapped against the measures of progress in the 2016–2020 Strategy (compiled by the Australian Institute of Health and Welfare) will be updated to align with this Strategy.

The Strategy has been informed by an Expert Advisory Group and state and territory health departments, building on the expert input provided by the National Diabetes Strategy Advisory Group for the 2016–2020 Strategy. The Strategy has been updated based on contemporary evidence and emerging priorities including public health challenges, aged care, disability care, mental health and Aboriginal and Torres Strait Islander health.

The Strategy has been endorsed by Australian Health Ministers.

Acknowledgements

The Strategy

An Expert Advisory Group and a Jurisdictional Advisory Group were established as time-limited groups for the duration of the development of the Strategy. (Participant lists for these forums are available at Appendix A.) Expert Advisory Group participants included experts with a wide range of diabetes-related expertise in clinical health care, research and population health.

Both groups were chaired by the Australian Government Department of Health. Participants were invited to consult more broadly as they considered appropriate and to provide advice to the Department.

The Government thanks Expert Advisory Group participants and jurisdictional health departments for their expert advice and commitment throughout this process.

Background

The Strategy builds on the 2016–2020 Strategy, much of which is still relevant. Many individuals and organisations gave their time and expertise to inform the development of the 2016–2020 Strategy.

A National Diabetes Strategy Advisory Group was established in 2014 to provide advice on all aspects of the 2016–2020 Strategy development process. The Advisory Group, co-chaired by the Hon. Judi Moylan AO and Professor Paul Zimmet AO, possessed a wide range of experience and expertise in diabetes-related health care, research and population health, as well as links with key stakeholders.

The advice prepared by the Advisory Group was fundamental in developing the 2016–2020 Strategy. The Advisory Group developed 2 key documents which informed the development of the 2016–2020 Strategy:

- *A strategic framework for action: consultation paper for the development of the Australian National Diabetes Strategy* – developed for public consultation
- *A strategic framework for action: advice to Government on the development of the Australian National Diabetes Strategy 2016–2020* – presented to the Australian Government Minister for Health in August 2015.

Abbreviations

AIHW

Australian Institute of Health and Welfare

AUSDRISK

Australian Type 2 Diabetes Risk Assessment Tool

COVID-19

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)

DKA

Diabetic ketoacidosis

GDM

Gestational diabetes mellitus

GP

General practitioner

HbA1c

Glycated haemoglobin

My Health Record

The Australian Government's national electronic health record, previously known as the personally controlled electronic health record (PCEHR)

NDIS

National Disability Insurance Scheme

PHNs

Primary Health Networks

TGA

Therapeutic Goods Administration

The Strategy

Australian National Diabetes Strategy 2021–2030

Introduction

The Australian National Diabetes Strategy 2021–2030 (the Strategy) is an opportunity to consider current approaches to diabetes services and care; consider the role of governments and the diabetes sector; ensure current efforts and investments align with identified needs; maximise the efficient use of health care resources; and articulate a vision for preventing, detecting and managing diabetes. This will include developing policy responses that have arisen from the health impacts of the COVID-19 pandemic.

The Australian Government has an important role in maintaining access to affordable, high-quality medicines, devices and services to support people with diabetes in self-management and treatment. It provides support to people with diabetes through the National Diabetes Services Scheme, the Pharmaceutical Benefits Scheme, the Insulin Pump Program, and Medicare and other funding. The Strategy will not replace or override existing processes established by the Australian health system for assessing the safety, quality and cost-effectiveness of new medicines, devices, investigations and procedures. State and territory governments also have an important role in prevention and treatment of diabetes. All levels of government share responsibility for health services in Australia and have a responsibility to ensure that systems work together to produce the best options for people, regardless of their geographic location.

The health care system is subject to ongoing national reform improving health outcomes for all Australians, such as Australia's Long Term National Health Plan, the Primary Health Care 10 Year Plan, the National Preventive Health Strategy, the 2020–25 National Health Reform Agreement, the National Strategic Framework for Chronic Conditions, and the National Aboriginal and Torres Strait Islander Health Plan. Current health infrastructure – including Primary Health Networks (PHNs), My Health Record and the arrangements in place for medicines and technologies used in the management of diabetes and subsidised by the Australian Government – contributes to support

for people with diabetes. The implementation of the Strategy will be informed by, and aligned with, broader health system reforms and infrastructure.

The Strategy is also an opportunity to align with international policy, including the approach of the Global Action Plan for the Prevention and Control of Non-Communicable Diseases and the Global Monitoring Framework for Non-Communicable Diseases, which were developed by the World Health Organization (WHO) in 2013, and the WHO Global Diabetes Compact.

The Strategy will build on the many successes Australia has achieved over the 2016–2020 period, including in early detection, prevention of complications, management of diabetes, and research investment. Success has not come by chance; it has involved sustained commitment by governments, dedicated non-government organisations, experts and the diabetes community.

Examples of diabetes-related achievements are:

- access to products and services under the National Diabetes Services Scheme
- continued and broadened access to diabetes-related technology
- a range of new diabetes-related medicines listed on the Pharmaceutical Benefits Scheme
- programs for the prevention of diabetes-related amputations, retinopathy, vision loss and blindness
- supporting Aboriginal and Torres Strait Islander health, including complication prevention programs and continued implementation of the National Aboriginal and Torres Strait Islander Health Plan
- a national program providing support for school students with type 1 diabetes, their families and school staff
- development of a new living guidelines approach for Australia's evidence-based clinical guidelines for diabetes

- increased uptake of the AUSDRISK tool
- investment in diabetes research through the National Health and Medical Research Council and the Medical Research Future Fund, including the Type 1 Diabetes Clinical Research Network and the Diabetes Research Centre.

Purpose

This Strategy supersedes the Australian National Diabetes Strategy 2016–2020 and the National Diabetes Strategy 2000–2004. It aims to prioritise Australia’s response to diabetes and identify approaches to reducing the impact of diabetes in the community, including consideration of the COVID-19 pandemic in relation to diabetes. It recognises the social and economic burden of the disease and provides action areas that:

- increase the focus on person-centred care and co-design of programs with consumers
- raise awareness of, prevent, detect and manage diabetes and its complications
- improve diabetes services and care
- emphasise the specific needs of people with diabetes in relation to their treatment adherence and psychological and mental health responses, including to the COVID-19 pandemic
- recognise the different roles and responsibilities of all levels of government and the non-government sector
- promote coordination of health resources across all levels of government
- facilitate coordinated, integrated and multidisciplinary care
- reduce inequities in diabetes-related health outcomes, including through addressing broader determinants of health
- improve use of primary care services
- recognise and build on the health system reform opportunities that have arisen due to the COVID-19 pandemic.

Audience

The Strategy has been developed for people affected by diabetes, carers, policymakers at all levels of government, non-government organisations such as national peak bodies, stakeholder organisations, health professionals, and researchers who advocate for and provide education, prevention, treatment, management and monitoring of diabetes.

Time frame

The time frame for the Strategy is 10 years, from 2021 to 2030. It is anticipated that a mid-term review will be undertaken in 2025 or when substantial change in the evidence base warrants it.

Next steps

An Implementation Plan and indicators for measuring progress will accompany the Strategy, building on the approach taken for the 2016–2020 Strategy. These will be developed in collaboration with stakeholders across all levels of governments, the health sector and relevant organisations. Progress against the Implementation Plan will be reviewed throughout the life of the Strategy.

The approach

The Strategy articulates a vision underpinned by principles to guide action and a set of enablers. It identifies 7 high-level goals. Each goal contains areas for action and measures of progress informed by extensive expert advice and consultations with key stakeholders.

An Implementation Plan will guide the actions associated with the Strategy.

Vision

Strengthen, integrate and coordinate all sectors to improve health outcomes and reduce the social and economic impact of diabetes in Australia.

Principles

Five key principles underpin the goals. These principles are expected to guide the policies and programs considered for the implementation of the Strategy.

1. Facilitation of person-centred care and self-management throughout life

- People are supported and empowered to take responsibility for their own care
- Individuals are at the centre of their own health care and involved in co-design of new initiatives

2. Reduction of health inequities

- Actions will be driven by a focus on minimising the social, environmental, structural and economic impacts that influence health, in particular those disproportionately affected by diabetes

3. Collaboration and cooperation to improve health outcomes

- Working in partnership across government, organisations, other sectors and health consumers can maximise use of resources and technology, and encourage coordination and integration in prevention, detection and management of diabetes

4. Coordination and integration of diabetes care across services, settings, technology and sectors

- Diabetes care is multidisciplinary across providers and settings: coordination and communication are therefore essential to ensure appropriate interventions and continuity of care

5. Measurement of health behaviours and outcomes

- To enable measurement of progress and success, relevant data will be collected, analysed and reported

Enablers

The enablers are factors that are embedded throughout the goals and influence capacity to achieve success:

- Leadership and governance – to ensure effective and appropriate oversight, attention to system design, and accountability
- Workforce – high-quality, person-focused and integrated multidisciplinary teams, including general practitioners (GPs), allied health professionals, diabetologists, endocrinologists, credentialed diabetes educators and Aboriginal and Torres Strait Islander health practitioners and health workers, as a pivotal focus spanning the health continuum and supporting all actions

- Information and research capacity – translating research into policy, innovation based on emerging evidence, and new medical technologies to support improvements in care
- Financing and infrastructure – the right mix of financial incentives and funding arrangements to better support coordinated care and access to services
- Partnerships and networks – integrated and coordinated interactions between patients, health care providers and the health care system to drive improved health outcomes
- Preparedness – increased adaptability and accelerated change opportunities when faced with emerging public health challenges.

The components of the Strategy are listed in Table 1.

Table 1: Components of the Australian National Diabetes Strategy

Vision

Strengthen, integrate and coordinate all sectors to improve health outcomes and reduce the social and economic impact of diabetes in Australia.

Principles

1. Facilitation of person-centred care and self-management throughout life
2. Reduction of health inequities
3. Collaboration and cooperation to improve health outcomes
4. Coordination and integration of diabetes care across services, settings, technology and sectors
5. Measurement of health behaviours and outcomes

Goals

1. Prevent people developing type 2 diabetes
2. Promote awareness and earlier detection of type 1 and type 2 diabetes
3. Reduce the burden of diabetes and its complications and improve quality of life
4. Reduce the impact of pre-existing diabetes and gestational diabetes in pregnancy
5. Reduce the impact of diabetes among Aboriginal and Torres Strait Islander peoples
6. Reduce the impact of diabetes among other priority groups
7. Strengthen prevention and care through research, evidence and data

Enablers

Factors that influence capacity to achieve goals, such as leadership and governance, workforce, information and research capacity, financing and infrastructure, partnerships and networks, and the adaptability and accelerated change opportunities associated with public health challenges.

Measures of progress

The Strategy outlines measures of progress against each goal. The Australian Institute of Health and Welfare (AIHW) identified a suite of diabetes-relevant indicators from existing national frameworks with associated metrics, data sources and reporting responsibilities to measure progress against the goals of the 2016–2020 Strategy. These were included in the associated Implementation Plan, which will be updated for this Strategy.

The AIHW released a baseline indicator report, *Diabetes indicators for the Australian National Diabetes Strategy 2016–2020*, in October 2018. In December 2020 it released an updated indicators report, *Indicators for the Australian National Diabetes Strategy 2016–2020: data update*.

The challenge of diabetes

Diabetes is a chronic disorder that impedes the body's ability to produce and/or use insulin (a hormone produced by the pancreas to regulate blood glucose levels). This results in high blood glucose levels, which leads to serious complications such as heart disease; stroke; eye disease, including retinopathy; kidney disease; peripheral vascular disease; nerve damage; foot problems; and gum disease. Diabetes is also associated with serious mental health challenges including treatment-related distress, anxiety and depressive symptoms (1). There are currently several recognised forms of diabetes:

- **Type 1 diabetes** – an autoimmune condition that results in the destruction of insulin-producing cells in the pancreas. It often has onset in childhood or early adulthood but can occur at any age. There is no cure. People with type 1 diabetes require daily insulin therapy for survival.
- **Type 2 diabetes** – the most common form of diabetes. It is a heterogeneous disorder with many causes associated with genetic, immunologic and lifestyle influences. Key organs in the body become resistant to the effects of insulin, which means they are less able to use glucose from the blood, and insulin production by the pancreas becomes progressively insufficient. Type 2 diabetes has strong genetic and family-related risk factors and potentially modifiable lifestyle risk factors (diet, physical inactivity). In the past, type 2 diabetes was typically diagnosed after 50 years of age, but diagnosis in younger adults, adolescents and even children is increasingly common.

- **Hyperglycaemia first detected during pregnancy**, which includes:
 - Gestational diabetes mellitus (GDM) – hyperglycaemia below diagnostic thresholds for diabetes which first occurs during pregnancy. It usually disappears following the birth of the baby, although women who have had GDM are at high risk of subsequently developing type 2 diabetes and cardiovascular disease
 - Diabetes mellitus in pregnancy – type 1 or type 2 diabetes first diagnosed during pregnancy.
- **Other specific forms of diabetes** – hybrid forms of diabetes including slowly evolving, immune-mediated diabetes of adults and ketosis-prone type 2 diabetes; diabetes resulting from specific gene mutations, diseases of the exocrine pancreas or endocrine disorders; drug-induced or chemical-induced diabetes; infection-related diabetes; rarer immune-mediated diabetes; and genetic syndromes. New-onset diabetes following COVID-19 is included here – it is thought to relate to direct infection and damage to pancreatic insulin-producing beta cells.

People with prediabetes (impaired fasting glucose and/or impaired glucose tolerance) have blood glucose levels that are higher than normal but not sufficiently high to diagnose type 2 diabetes (2).

Diabetes often occurs alongside (and shares risk factors with) other chronic conditions, including heart disease and chronic kidney disease (3). However, much of the impact of diabetes can be reduced, either through improving the health of the population to prevent or delay people getting type 2 diabetes or by optimising how the health system supports people who have diabetes to prevent or delay the onset of complications.

The impact of diabetes in Australia

In 2017–18, 1.2 million Australians (4.9% of the total population aged 15 years or over) had diabetes, based on self-reported data (4). However, self-reporting is known to underestimate the true prevalence. In 2011–12, information from the Australian Health Survey showed that there was one newly diagnosed case for every 4 cases of diagnosed diabetes (5).

In 2017–18, approximately 1 million Australians had type 2 diabetes, accounting for 83% of people with diabetes (4). Approximately 12% (145,000) of all Australians with diabetes had type 1 diabetes (4). Of mothers aged 15 to 49 years who gave birth in hospital in 2017–18, 14% were diagnosed with gestational diabetes¹ (6).

Diabetes has a significant, and often preventable, impact on the health and wellbeing of the Australian population. In 2018, diabetes was the underlying cause in 28% of deaths of people with diabetes (7). There are a significant number of diabetes-related complications, many of which are preventable. They include heart disease; stroke; eye disease, including retinopathy; kidney disease; peripheral vascular disease; nerve damage; foot problems; gum disease; and mental health impacts including treatment-related distress, anxiety and depression (1).

Prediabetes was examined as part of the Australian Diabetes, Obesity and Lifestyle Study (AusDiab), which reported in 2002 that 16% of adults over the age of 25 years – approximately 2.5 million people – had prediabetes (8). Between approximately 15% and 30% of people with prediabetes are likely to develop type 2 diabetes within 5 years (9).

It is difficult to estimate the total economic and social impact of diabetes. In 2015 an estimated 2.3% (\$2.7 billion) of total disease expenditure in the Australian health system was attributed to diabetes (10). Including indirect costs, the full cost of diabetes was estimated to be as high as \$14 billion per year (11). Indirect costs include reduced productivity, absence from work, early retirement, and premature death and bereavement. Costs are heavily concentrated in

particular sub-groups of people with diabetes. Annual direct costs for people with diabetes complications were found in 2015 to be more than twice as much as for people without complications: \$9,600 compared with \$3,500 (11).

Aboriginal and Torres Strait Islander peoples and other priority groups

Australia has enormous cultural and social diversity and, while diabetes is increasingly common across the country, prevalence rates are even higher within certain communities.

As with the general population, it is difficult to estimate the exact number of Aboriginal and Torres Strait Islander people with diabetes, and prevalence estimates vary considerably. A review of the prevalence of diabetes among Aboriginal and Torres Strait Islander peoples found that, across the 24 studies conducted, prevalence ranged from 3.5% to 33.1% (12).

The National Aboriginal and Torres Strait Islander Health Survey (2018–19) found that the proportion of the total population surveyed who reported having diabetes remained steady at 8%, the same as in 2012–13 (13). However, in the 2012–13 survey, 18% of the Aboriginal and Torres Strait Islander population aged 25 years and over had diabetes or high glucose levels, with rates ranging from 5% for those aged 25 to 34 years to 40% for those aged 55 years and over (14). We also know that self-reported data underestimate true diabetes prevalence and that there are regional differences and higher diabetes rates in remote Australia. For example, the AIHW reported in 2017 that 27% of Aboriginal and Torres Strait Islander people in the Northern Territory aged 18 and older had diabetes in 2012–13 (15). Another recent study reported a tenfold increase in rates of pre-existing diabetes among pregnant Aboriginal women over the past 30 years (from 0.6% in 1987 to 5.7% in 2016) (16). Over the same period, the rate of gestational diabetes in the same population rose from 3.4% to 13%. Additionally, the rate (8.4%) of pre-existing type 2 diabetes in pregnancy among Aboriginal women in Central Australia is currently the highest reported in the world (16).

¹ Percentages add to more than 100 because gestational diabetes is usually transient.

These high rates among Aboriginal and Torres Strait Islander peoples compare with rates of between 5.5% (5) and 7.4% (8) for the general population (aged 25 years and over). Diabetes was the third leading cause of death for Aboriginal and Torres Strait Islander people in 2019 (17). These data demonstrate that Aboriginal and Torres Strait Islander peoples experience a disproportionate share of the burden of diabetes.

There are several other groups for whom efforts should be prioritised due to their high risk of diabetes. These include people from South Asia, North Africa and the Middle East, Oceania (excluding Australia), and southern and eastern Europe.

In addition, efforts for the following groups with diabetes should be prioritised:

- older Australians
- people with diabetes who live in rural and remote communities
- children and young people
- people with disability
- people with mental health disorders.

Emerging challenges including the COVID-19 pandemic

The emergence of health system challenges and threats such as the COVID-19 pandemic has highlighted the importance of having an agile and flexible health system in order to enhance Australia's response to large-scale emergencies that impact our health. The COVID-19 pandemic has demonstrated that those who are most vulnerable in society are those who experience the impact of a population-wide public health emergency most severely. This demonstrates the importance of a health equity lens when planning and responding to health system challenges or threats.

Individuals with chronic conditions, including diabetes and its common comorbidity obesity, are at risk of poorer outcomes with COVID-19. Diabetes and obesity emerged in the pandemic as risk factors for severe COVID-19 disease, with

higher rates of intensive care unit (ICU) stays and of deaths (18). Diabetes appears to have a bi-directional relationship with COVID-19: the long-term effects of diabetes may worsen as a consequence of contracting COVID-19, and COVID-19 may induce new-onset diabetes in both adults and children (19). Whether the sudden onset of diabetes resulting from COVID-19 persists or remits on resolution of the infection is unclear.

Many patients admitted to intensive care units with COVID have been found to be hyperglycaemic or to have developed steroid-induced diabetes (exacerbated by use of the evidence-based dexamethasone treatment for moderate to severe COVID-19) (20). We have also seen deterioration in diabetes self-management and follow-up care, greater variability in glycaemic management, and decline in mental health during the COVID-19 pandemic (21, 22, 23).

It is important to harness the learnings and opportunities from such challenges to guide Australia's future planning and action in diabetes prevention and management.

Goal 1: Prevent people developing type 2 diabetes

The Strategy recommends a community and workplace based approach for the general population and those at high risk of developing diabetes. Health risk factors are attributes, characteristics or exposures that increase the likelihood of a person developing a disease or health disorder. These can be non-modifiable, such as age, sex and genetics; or potentially modifiable, such as overweight or obesity, physical inactivity, tobacco use, and poor nutrition and dietary patterns for which effective social and individual behavioural interventions are available.

People considered at high risk of developing type 2 diabetes are those with prediabetes, a family history of diabetes, a high-risk ethnic background, gestational diabetes, overweight/obesity, or insufficient physical activity (24). The strongest evidence of effective prevention is in this group. Numerous large-scale randomised trials in many countries have shown that progression to type 2 diabetes may be delayed or prevented in up to 58% of people with impaired glucose tolerance (prediabetes) (9, 25).

It is important to emphasise that, in addressing common modifiable risk factors, diabetes prevention programs are multi-dimensional and can have broader impacts contributing to population health and quality of life and reducing the strain on the health system. It is also important to ensure diabetes prevention programs are culturally appropriate and safe, and feasible in regional and remote parts of Australia.

The impact of poor health is experienced unevenly in Australian communities, with many contributing factors sitting outside the health system. Generally people in lower socioeconomic groups are at greater risk of poor health, including developing type 2 diabetes. There are also many groups in society who have disproportionate health needs. They include Aboriginal and Torres Strait Islander people, those living in rural and remote areas, people with disability, the elderly, those from culturally and linguistically diverse backgrounds, and those affected by mental illness. Many members of these groups experience a

greater burden of disease compared with the rest of the population.

The National Preventive Health Strategy will provide the overarching long-term approach to prevention in Australia by building systemic change. It will identify areas of focus for the next 10 years and outline evidence-based approaches to underpin identified priorities.

Areas for action

Reduce modifiable risk factors in the general population

- Drive change to support the development of health-promoting environments that encourage people to eat more healthily; increase their physical activity, including active travel; prevent unhealthy weight gain; and reduce sedentary behaviour.
- Undertake regular reviews of the Australian Dietary Guidelines and Eat for Health resources to ensure they continue to recommend eating behaviors that align with the best available and most up-to-date scientific evidence for the prevention of chronic disease such as diabetes.
- Embed healthy eating and physical activity in everyday life (e.g. workplaces, schools, communities, active travel).
- Encourage social prescribing by primary care professionals, linking people to community groups and services for healthy living.
- Undertake education and social media campaigns (leveraging public health and health education strategies strengthened during the response to COVID-19) to encourage people to increase their levels of healthy eating and physical activity (e.g. a campaign to educate children and parents about nutrition and physical activity).

- Increase the availability of and demand for healthier food and beverages and reduce the availability of and demand for unhealthy food and beverages (including through continued implementation of and targeted education on the front-of-pack labelling Health Star Rating system and the Healthy Food Partnership).
- Reduce the exposure of children and others to marketing, advertising and promotion, including through sponsorship, of discretionary foods and beverages (e.g. through strengthened voluntary or compulsory advertising measures).
- Strengthen, upskill and support the health workforce to support people in making healthy choices, including in Aboriginal Community Controlled Health Services, in line with the Aboriginal and Torres Strait Islander Health Plan.
- Promote maternal, family and child health, particularly the first 2,000 days of an infant's life.
- Develop, co-design, implement and evaluate diabetes prevention programs that are culturally appropriate, available in regional and remote Australia, and tailored for disadvantaged groups.
- Align implementation of this Strategy with the National Preventive Health Strategy to ensure a system-wide and cross-sectoral approach to addressing the risk factors of chronic conditions, including diabetes.
- Promote population-wide maintenance of healthy eating and physical activity as far as possible during periods of health system challenges.

Identify high-risk individuals and consider effective, evidence-based interventions

- Promote, encourage and embed evidence-based type 2 diabetes prevention programs for all people with prediabetes (particularly impaired glucose tolerance) and for women who have previously had gestational diabetes.
- Continue to evolve and implement the use of AUSDRISK and other health risk assessment tools among populations.

Measures of progress

- People developing type 2 diabetes or prediabetes
- Modifiable risk factors in the general population such as overweight and obesity, and low levels of physical activity
- People accessing diabetes prevention programs
- Meeting targets of the National Preventive Health Strategy

Goal 2: Promote awareness and earlier detection of type 1 and type 2 diabetes

Diabetes awareness in the community and early detection programs in targeted settings leading to timely diagnosis are critical to avoid preventable morbidity and deaths. Awareness and timely diagnosis are also critical to ensure prompt and optimal treatment and management to reduce diabetes-related complications and improve quality of life (Goal 3).

The Australian Health Survey (4) found that for every 4 people diagnosed with diabetes in Australia, there was one person with undiagnosed diabetes (the vast majority being type 2 diabetes).

Type 1 diabetes

Failure to recognise the early symptoms of type 1 diabetes, such as severe fatigue and thirst, sudden weight loss and excessive urination, can lead to diabetic ketoacidosis (DKA). This is an acute complication which can be life-threatening and often requires hospitalisation. Around one in 5 people who are newly diagnosed with type 1 diabetes only learn about the diagnosis of diabetes upon presenting to hospital (26).

Type 2 diabetes

People with undiagnosed type 2 diabetes are often unaware of their condition and are therefore not accessing the necessary care. They may already have complications of their diabetes. Providing information on and increasing awareness and early detection of type 2 diabetes will prompt people to attend a clinical setting (e.g. general practice, opportunistic checks in emergency departments), receive support to make informed health-related decisions and actions, and improve their health literacy (27).

Areas for action

Type 1 diabetes

- Increase awareness, education and recognition of the symptoms of type 1 diabetes in all communities, including adults, parents, teachers and carers.
- Ensure education and awareness for timely detection among health care providers (particularly GPs and primary care settings), including early detection of DKA.
- Develop and implement population screening approaches to reduce DKA (28, 29).
- Maintain population-wide awareness and early detection of type 1 diabetes during periods of health system challenges.

Type 2 diabetes

- Increase recognition, awareness and early detection capacity among health care providers and the community.
- Identify and implement opportunities for opportunistic screening across health care settings. This may include targeting people presenting to emergency departments or being admitted to hospital for reasons other than diabetes-related health issues.
- Promote increased use of risk assessment tools such as AUSDRISK and early detection of diabetes, with a focus on groups at high risk of developing type 2 diabetes.
- Promote integrated health checks – that is, integrating diabetes testing with assessment of other chronic conditions such as cardiovascular and kidney disease.
- Maintain population-wide awareness and early detection of type 2 diabetes during periods of health system challenges.

Measures of progress

- People with type 1 diabetes who present with DKA upon diagnosis
- People assessed for risk of type 2 diabetes

Goal 3: Reduce the burden of diabetes and its complications and improve quality of life

Best-practice, high-quality diabetes care is achieved when health care professionals work seamlessly and in partnership across primary health, allied health, community and specialist care services with direct consumer (the person with diabetes), carer and family involvement. Achieving this is not easy, however, because it requires a transformation in the way care is delivered in order to make it more consumer focused, team based and proactive. Consumer engagement, awareness and self-management are major factors in achieving this goal.

Primary Health Networks (PHNs) have been established to increase the efficiency and effectiveness of medical services, particularly for those at risk of poor health outcomes, and to improve coordination of care for patients. PHNs work directly with GPs, other primary care providers (including Aboriginal Community Controlled Health Organisations), secondary care providers and hospitals to better coordinate care across the local health system so that people requiring help from multiple health care providers (such as people with diabetes) receive the right care in the right place at the right time.

Diabetes may result in a range of health complications, including heart disease; stroke; eye disease, including retinopathy; kidney disease; peripheral vascular disease; nerve damage; foot problems; and gum disease. Diabetes is also associated with significant mental health challenges including treatment-related distress, anxiety and depression (1). The risk of most diabetes-related complications can be reduced through evidence-based advice and self-management. Reducing the occurrence and severity of diabetes-related complications is important to improve quality of life among people with diabetes.

Remission of type 2 diabetes (HbA1c < 6.5% while not taking any blood glucose lowering medication) can be achieved with dietary interventions. Total diet replacement for 12 to 20 weeks followed by stepped food reintroduction and then structured support for weight-loss maintenance resulted in diabetes remission in 46% of subjects at 12 months and 36% remission at 24 months, compared with 4% at 12 months and 3% at 24 months in the control group (30). These findings have been confirmed in another study (31). Diabetes remission has also been reported with low-carbohydrate diets (32). However, a recent systematic review and meta-analysis found no effect on increasing diabetes remission (HbA1c < 6.5% with no diabetes medications) with a low or very low carbohydrate diet (33).

More evidence is needed to clarify the longer term effects of dietary interventions on diabetes remission. Australian translational research is underway in this important area, focusing on issues such as how to resource, implement and sustain dietary and lifestyle interventions in community-based programs in the Australian health care setting.

Changes in technology and implications for the management of diabetes

The Strategy will be delivered in the context of a rapidly changing health care system. Technology is already actively used in the health system, with a range of targeted online educational materials and interactive resources available to patients. Given the likely pace of future growth of diabetes in Australia and the related cost of interventions and new initiatives, technology-enabled care regimes and e-health interventions can often be scaled up at a lower marginal cost than traditional and face-to-face support, helping to more cost-effectively meet the growing demand for diabetes management in the future.

A wave of novel diabetes and healthcare devices and applications are being offered by both existing and new providers, including mobile and wearable devices, software and phone apps. Depending on their function and intended purpose, some of these will be subject to regulation by the Therapeutic Goods Administration (TGA) as medical devices. Consumer interest is substantial, and technology provides the opportunity to improve health outcomes by better empowering, informing and supporting people with all types of diabetes to play a more active role in self-management. Technology can also be more actively used to help improve the delivery, integration and coordination of diabetes care by better connecting and sharing information across the diabetes care team to improve longitudinal care management and care coordination.

Areas for action

Develop nationally agreed clinical guidelines, local care pathways and complications prevention programs

- Continue to develop the Living Evidence for Diabetes Guidelines, including support for their implementation and monitoring.
- Develop concise guidance for health professionals and people with diabetes to inform the metabolic management of diabetes, including during the COVID-19 pandemic.
- Support the development of clinical care guidelines for diabetes care, including complications prevention and management programs.
- Encourage PHNs in developing locally tailored pathways of care for people with diabetes and other chronic conditions, reflecting the local service configuration and population needs.
- Consider offering more intensive dietary interventions to people with type 2 diabetes aiming for remission.
- Promote hospitalisation prevention strategies and complication prevention programs in PHNs and across the health system more generally. These may be integrated programs covering multiple complications or single-complication prevention programs.
- Explore the role of My Health Record in clinical workflows so as to better manage complex conditions and medication among the individual's health care providers.

Empower consumers through expanding consumer engagement and self-management

- Increase access to structured self-management education programs for people with diabetes, especially the newly diagnosed and people starting insulin therapy. Give particular attention to programs for children with diabetes, adolescents transitioning into adult services, older people and their carers, Aboriginal and Torres Strait Islander people, people with disability and their carers, and people from culturally and linguistically diverse communities.
- Ensure that peer support programs (face-to-face, telephone or online) are accessible to all people with diabetes.
- Support education and awareness campaigns, with a focus on people with diabetes, their carers and primary health staff, and on the importance of regular diabetes-related complication prevention and monitoring – for example regular assessment for diabetes-related retinopathy, renal and foot problems.
- Integrate new monitoring technologies for self-management and create early intervention protocols to assist with their optimal usage. Ensure approvals are in place for products regulated by the TGA as medical devices.

Develop and implement quality improvement processes

- Support the involvement of people with diabetes, and of health care providers who care for people with diabetes, in quality improvement processes. This may include health care providers reporting data against clinical guidelines and outcomes, and data collection in partnership with Aboriginal Community Controlled Health Organisations.
- Consider how specialist skills can be shared across the GP and specialist relationship – for example, using case conferencing approaches.
- Encourage uptake and use of My Health Record among health care providers as an accessible online management tool for conditions and treatment regimens.
- Enhance data linkage to improve clinical care.

Support diabetes care and management during times of health system challenge or threat

- Develop and promote systems, resources and communications to support people with diabetes in self-management of their diabetes during times of health system challenge or threat. This includes support to continue to access their usual diabetes care, including diabetes medications, products and technologies; pathology testing; and specialised diabetes care from their diabetologist, endocrinologist, credentialled diabetes educator, or diabetes complications prevention service.
- Review processes and infrastructure to ensure adequate supplies and supply chains of essential medications, glucose monitoring equipment and insulin pump consumables, and measures to manage panic buying and stockpiling in times of health system challenge or threat.
- Plan for future health system challenges or threats, by reviewing and incorporating the learnings from recent events (e.g. the 2020 bushfires and floods and the COVID-19 pandemic) and from the associated physical and mental health impacts on people with diabetes and the diabetes workforce.

Use information and communication technology

- Facilitate and encourage the use of My Health Record by consumers and health care providers through supported software technology.
- Support current access to flexible telemedicine consultations (e.g. consultations for diabetes, early detection eye programs and telephone-based lifestyle coaching) and explore the expansion of telehealth services.
- Facilitate the use and application of consumer engagement and education platforms.
- Harness emerging remote monitoring technologies with appropriate availability of skilled health professional services to support data interpretation and resultant management decisions.

- Facilitate the availability of connected and consistent software programs for diabetes management for GPs, credentialed diabetes educators and allied health professionals in the primary health care system. TGA approval is required for all medical device technologies.
- Conduct an assessment of Australia's digital diabetes health readiness, including exploring the effectiveness and cost-effectiveness of new, more technology-enabled models of diabetes-related support and care.
- Explore a range of information and communication technology formats in order to be inclusive of people with disability and focus on addressing health inequities.

Improve access to affordable medicines and devices

- Continue to develop and design efficient pathways for assessment, evaluation and funding that enable timely and equitable access to new diabetes treatments and devices, taking into account geographic, socioeconomic and other barriers.
- Continue to expand access to all essential treatments and ensure that they are available in public hospitals – for example, intravitreal injections for diabetic retinopathy.
- Support consumer involvement in assessment and evaluation of diabetes medicines and devices.

Improve workforce capacity and capability

- Enable mechanisms by which the capacity of the specialist diabetes workforce (diabetologists, endocrinologists and credentialed diabetes educators) is increased to deal with the increasing prevalence of diabetes and its complications.
- Upskill the existing generalist health workforce on diabetes, including the role of social determinants in diabetes, education on new diabetes technologies, and training to address complex diabetes issues and health promotion, including appropriate diet and exercise recommendations.

- Provide clear models of care that include access to GP clinics and appropriate referral to specialist and allied health care.
- Upskill and train Aboriginal and Torres Strait Islander workers and practitioners on diabetes complications, treatments and devices.
- Upskill and support the aged care and disability workforce on diabetes complications, treatments and devices.
- Review and develop clear competencies, training pathways and scope of practice for the specialist diabetes workforce and other health professionals involved in diabetes care (including nurses, allied health workers, pharmacists, dietitians, dentists and podiatrists) based on national clinical guidelines in a patient-centred, culturally informed and language-appropriate way.
- Promote the uptake and implementation of national evidence-based guidelines for diabetes management for the whole spectrum of diabetes management across the health sector and diabetes workforce.

Improve funding mechanisms

- Explore and consider innovative funding mechanisms for diabetes care – for example, for patients who require higher utilisation of health care services, including allied health and Aboriginal and Torres Strait Islander health services.

Provide mental health care for people with diabetes

- Routinely monitor people with diabetes for mental health issues, noting the bi-directional relationship.
- Perform a mental health assessment upon diagnosis of diabetes, monitor regularly and consider adding the assessment to the Annual Cycle of Care.
- Provide access to interventions that improve mental health, wellbeing and quality of life outcomes.

Provide high-quality hospital care

- Consider adding diabetes to the Australian Commission on Safety and Quality in Health Care clinical care standards program. Clinical care standards can play an important role in delivering appropriate care and reducing unwarranted variation, as they identify and define the care people should expect to be offered or receive, regardless of where they are treated. The National Association of Diabetes Centres has developed diabetes care standards and an accreditation process that can help to make diabetes care nationally consistent.
- Provide ongoing education and training to hospital staff involved in the inpatient, emergency and ambulatory care of patients with diabetes.
- Consider implementing virtual (or electronic) glycaemic management systems to support management of diabetes in hospital, especially in the context of the COVID-19 pandemic and increased use of barrier nursing care.
- Explore expanding the scope of the National Safety and Quality Health Service Standards to include a standard for diabetes clinical handover that broadens the plan for discharge from services to ensure principles of continuity and coordination of care between clinicians and organisations, including primary care and residential aged care facilities.

Measures of progress

- People with diabetes who achieve target levels of HbA1c, albuminuria, cholesterol and blood pressure
- Mental health and wellbeing outcomes, particularly related to depression, anxiety/distress and positive coping
- People with diabetes who receive regular testing for complications
- People with diabetes who achieve target rates of regular assessment for complications
- People who have had their medication plan reviewed by a doctor or pharmacist
- People with diabetes complications
- People with diabetes-related blindness
- People with diabetes-related foot amputations
- People treated for diabetes-related end-stage kidney disease requiring dialysis
- People with diabetes admitted to hospital with diabetes-related illnesses
- Quality standards for diabetes in hospitals
- Quality standards for self-management programs in primary care

Goal 4: Reduce the impact of pre-existing and gestational diabetes in pregnancy

Diabetes in pregnancy places women and children at significant risk during and after the pregnancy. Foetal and infant death (34) and congenital malformations are 4 times more likely among women who have diabetes prior to pregnancy (35). It is important that steps are taken to mitigate this risk before pregnancy (i.e. through pre-conception care for women and men), during pregnancy and following delivery. Equity of access to appropriate diabetes care in pregnancy is critical, particularly for women in rural and remote communities.

While all women should be included in general preventive care, women with a history of gestational diabetes mellitus (GDM) warrant a particular focus in terms of health and lifestyle because of their high risk of future diabetes and cardiovascular disease. The provision of ongoing support and care after pregnancy is essential to help prevent or delay the development of type 2 diabetes.

Long term, approximately half of women who have had GDM will develop type 2 diabetes. In addition, the children of women who have had diabetes in pregnancy are at increased risk of developing obesity and subsequent type 2 diabetes (7, 36, 37, 38). Identification and normalisation of maternal hyperglycaemia gives the opportunity to minimise the short-term complications and reduce the later development of diabetes and obesity and their associated complications. In addition, there is evidence suggesting that breastfeeding reduces the risk of diabetes not only in the baby but also in the mother (39).

Areas for action

- Provide accessible pre-pregnancy programs to women with pre-existing type 1 or type 2 diabetes, including Aboriginal and Torres Strait Islander women, to identify and address risk factors, including glycaemic status, that may result in adverse outcomes.
- Ensure that all women with pre-existing type 1 or type 2 diabetes receive pre-pregnancy programs and advice, coordinated through a collaborative approach across primary and specialist care with allied health professionals.
- Provide accessible pre-pregnancy programs to women with a previous history of GDM to assess current glycaemic status and to identify and address risk factors that may result in adverse outcomes.
- Ensure that all pregnant women not already known to have diabetes are appropriately tested for diabetes.
- Ensure that women with diabetes in pregnancy have access to a diabetes management team including a credentialed diabetes educator, accredited practising dietitian and/or exercise physiologist, and that they receive expert advice on diet and physical activity, glucose monitoring and diabetes management during the pregnancy.
- Ensure that pre-pregnancy and post-pregnancy programs are adapted to ensure equity (e.g. for Aboriginal and Torres Strait Islander people and people in remote Australia).
- Provide post-pregnancy programs, including education and support regarding future risk and risk mitigation, for all women with GDM to prevent the development of type 2 diabetes.
- Provide paediatric follow-up for at-risk children (e.g. children of mothers with pre-existing diabetes, GDM or obesity) to help prevent the development of obesity and type 2 diabetes.

- Continue the reminder system for those registered on the National Gestational Diabetes Register to promote ongoing healthy lifestyle approaches, type 2 diabetes prevention programs and future diabetes testing.
- Ensure that GDM services are resilient and have rapidly implementable plans during periods of health system challenge or threat such as the COVID-19 pandemic.

Measures of progress

- Pregnant women with pre-existing diabetes who have measurements of HbA1c in each trimester
- Reduction in perinatal and infant deaths of children of mothers with diabetes
- Mothers with GDM who have postpartum testing and monitoring
- Pregnant women being tested for GDM

Goal 5: Reduce the impact of diabetes among Aboriginal and Torres Strait Islander peoples

Australia's Aboriginal and Torres Strait Islander communities have one of the highest rates of type 2 diabetes and its complications both nationally and globally. Increasingly diabetes is being diagnosed in children, adolescents and young adults (40), with rising rates of diabetes in pregnancy establishing intergenerational patterns of premature disease (41, 42). The prevalence and severity of diabetes-related complications among Aboriginal and Torres Strait Islander peoples is of particular concern.

To prevent diabetes and improve diabetes management, it is essential to ensure that the communities have access to, and can benefit from, diabetes support, education and services (e.g. Aboriginal and Torres Strait Islander Community Controlled Health Services, where they exist, or culturally competent mainstream services) as an integral part of their primary health care services. Food security, healthier choices and lifestyle changes need to be encouraged and facilitated; and family and child health needs to be improved through pregnancy and early years programs.

Aboriginal and Torres Strait Islander peoples may experience cultural and linguistic barriers, as well as geographic and socioeconomic barriers, that limit their access to diabetes-related services and education. Actions for rural and remote Australians (see Goal 6) apply to this group. Cultural diversity, along with varying local and regional circumstances, needs to be recognised and respected and should inform the development of action that serves to reduce the burden and impact of diabetes. Ensuring diabetes prevention and management programs are designed and delivered in partnership with Aboriginal communities and Aboriginal Community Controlled Health Organisations is critical (43).

Areas for action

The actions under the preceding goals also apply to this goal. The following additional actions, to be co-developed in consultation with communities and Aboriginal Community Controlled Health Organisations, are recommended.

- Ensure that Aboriginal and Torres Strait Islander communities have access to community-wide, culturally relevant services and awareness programs (including school education programs) that communicate the seriousness of diabetes and its complications and the fact that the onset of type 2 diabetes can be delayed or possibly prevented. Education should be provided in a culturally and linguistically appropriate manner, which includes translating materials and services.
- Provide health promotion and diabetes prevention programs that are designed and delivered in partnership with Aboriginal communities and Aboriginal Community Controlled Health Organisations.
- Develop and implement community-wide, culturally relevant awareness programs for young people about diabetes to encourage their engagement with services— that is, emphasising that diabetes can also affect young people.
- Upskill health professionals about diabetes in youth.
- Promote and provide pre-conception, pregnancy and early years programs (e.g. well person's health check) that enhance the education and health of Aboriginal and Torres Strait Islander men and women, detect gestational and previously undiagnosed diabetes and manage it through pregnancy, and coordinate follow-up and postnatal care for mothers and babies.

- Enhance the pre-conception education and health of Aboriginal and Torres Strait Islander women, including through targeted efforts to reduce the use of alcohol, tobacco and other drugs and to promote a healthy diet and physical activity.
- Collaborate with non-health sectors to develop and implement community-wide interventions to increase the availability, accessibility, affordability and consumption of fresh foods and reduce the consumption of sugar-sweetened beverages and unhealthy foods.
- Promote access to models of care that provide necessary specialist support through regional networks of care, optimising telehealth services and linked facilities for treatment of serious complications of diabetes – particularly heart, kidney, eye and foot disease.
- Strengthen and provide support to primary health care services to better identify and manage diabetes (including among adolescents and children, acknowledging its intergenerational nature), and incorporate risk calculators and electronic decision support mechanisms that increase opportunities for Aboriginal and Torres Strait Islander people to better self-manage their diabetes.
- Develop youth referral pathways for early identification and improved management of young people with diabetes.
- Support and upskill the diabetes educator and dietitian workforce working with and within Aboriginal and Torres Strait Islander primary care settings and support the capacity development of the workforce to improve access to essential high-quality, evidence-based diabetes care.
- Promote and monitor the uptake of regular retinopathy assessment among Aboriginal and Torres Strait Islander people with diabetes.
- Provide stimulating early years education and intervention programs that help address developmental vulnerabilities and the social and environmental determinants of Aboriginal and Torres Strait Islander people's health.
- Encourage the collection of culturally appropriate data and the use of My Health Record by health care providers in rural and remote locations, with online access to the individual's medical history and prescriptions.

Measures of progress

- Aboriginal and Torres Strait Islander people with diabetes
- Obesity and overweight in Aboriginal and Torres Strait Islander people aged 10 to 24 years and 25 years and older
- Aboriginal and Torres Strait Islander people with diabetes complications
- Aboriginal and Torres Strait Islander women with gestational diabetes
- Aboriginal and Torres Strait Islander people who achieve target levels of HbA1c, albuminuria, cholesterol and blood pressure
- Aboriginal and Torres Strait Islander people who receive regular testing for complications
- Rates of smoking and alcohol consumption among pregnant Aboriginal and Torres Strait Islander women with diabetes
- The cost of a healthy food basket, monitored to assess the availability and affordability of foods required for a healthy diet
- Aboriginal and Torres Strait Islander children participating in evidence-based childhood education programs

Goal 6: Reduce the impact of diabetes among other priority groups

Australia is socially and culturally diverse and this has important implications for the Strategy. The areas for action that have been suggested for all Australians in relation to the preceding goals also apply to communities who have a higher prevalence of diabetes or more difficulty accessing health services. Examples are culturally and linguistically diverse communities, older Australians, rural and remote communities, and people with mental health disorders. Each of these groups warrants particular attention and may require different policy or health system approaches. In addition, children and young people, people with disability and elderly people need particular focus as priority groups for reducing the impact of diabetes.

Culturally and linguistically diverse people

People from some cultural and linguistic backgrounds are at higher risk of developing type 2 diabetes (perhaps reflecting a predisposition to diabetes in their environmental or genetic backgrounds). People from these backgrounds who have diabetes may also experience cultural and linguistic barriers that limit their access to diabetes-related services and education. Actions for both the prevention and the management of diabetes need to be tailored to the specific needs of the particular culturally and linguistically diverse community to ensure person-centred, culturally safe care that respects the languages, religious beliefs and cultural practices in that community.

Older Australians

Type 2 diabetes is more prevalent among older Australians (5). Furthermore, older people with diabetes experience higher rates of multimorbidities (i.e. higher rates of diagnosis with other medical conditions alongside diabetes) and disability, as well as earlier onset of functional decline and frailty (44). Diabetes can significantly increase a person's risk of dementia, which may

impact their ability to self-manage their diabetes. Elderly people with type 2 diabetes are a high-risk group for COVID-19 and are a high-priority group for vaccination.

Older Australians with diabetes living in residential care facilities have specific needs, including in relation to the appropriateness of special diabetes diets and the risk of malnutrition. These special needs could be addressed by guideline-based care, enhanced workforce skills and innovative use of technologies to optimise their care.

Children and young people

The incidence of diabetes in children and young people is increasing. Almost all children and young people with diabetes have type 1 diabetes. In addition, children are developing type 2 diabetes at younger ages (45). Children and young people with type 1 and type 2 diabetes have specific needs: their care must be family centred, multidisciplinary and specialist (46, 47). Equitable access to care from a multidisciplinary paediatric diabetes team and to diabetes treatments and supporting technologies is essential.

Potential barriers to accessing care include geographical location, socioeconomic status and family educational level (46). Outreach services from a paediatric multidisciplinary team and support to local general paediatric services may go some way to addressing these inequities. Children and young people have additional needs, such as for support and management of diabetes at school and the often difficult transition from paediatric to adult health services.

An audit of 1,425 young people (14 to 18 years) found that only a quarter of them met the recommended glycaemic targets (48). Suboptimal glycaemic control increases the risk of microvascular and macrovascular complications. There is a correlation between suboptimal glycaemic control and mental health disorders (49). Onset of diabetes complications is more rapid

and severe in young people with type 2 compared with type 1 diabetes (50). Enhanced clinical care can reduce mental health morbidity and reduce diabetes complications. Access to technology may assist children and young people with type 1 and type 2 diabetes to meet recommended glycaemic targets.

Australians living in rural and remote areas

People with diabetes who live in rural and remote communities may experience geographical barriers that limit their access to services (51). Rural and remote communities are associated with areas of social disadvantage. This includes both Aboriginal and Torres Strait Islander people and people from all ethnic and cultural backgrounds, some of whom may experience additional cultural and linguistic barriers to accessing services.

People with mental health disorders

People with diabetes may experience diabetes stigma, distress, depression or anxiety and may also find themselves overwhelmed by the demands of self-management.

Attending to behavioural and mental health factors at diagnosis and as the illness progresses is crucial to preventing complications, maximising outcomes and minimising the costs of diabetes care. The transition from child to adult diabetes services can also be a time when people require extra support.

In addition, people being treated for mental health disorders such as depression, anxiety and schizophrenia may be at higher risk of diabetes due to the impact of therapies such as psychotropic medications and resulting weight gain (52).

GPs and allied health professionals can facilitate mental health assessment and monitoring as a component of holistic, ongoing patient care. Mental health professionals can provide support and education, including about adverse effects of medication.

The COVID-19 pandemic appears to have had significant impacts on people with diabetes in

terms of treatment adherence, health behaviours and medical follow-ups, glucose control, and mental health (21, 22, 23).

People with disability and diabetes

Addressing the needs of people with disability and diabetes is a complex and specialised area, with the risk of enhanced health inequity for the person and their carers. Of the one in 5 Australians who have disability, 11% also have diabetes (53). People with disability are 2 to 3 times more likely to develop diabetes (54). This increased risk can be attributed to multiple factors such as limited mobility and/or physical inactivity, increased appetite and/or food intake, limited food preparation skills, poor mental health status (e.g. depression) and some medications (55).

Poorly managed diabetes can also result in disability, including vision loss and blindness, lower limb amputation, hearing loss, cognitive deterioration and other permanent limitations. Half of all Australians with diabetes report that they also have disability, and people with diabetes are almost 3 times more likely to have severe disability than people without diabetes (56).

People with diabetes who also have disability may require specialised assistance in managing their diabetes, including accessing health services, administering insulin and operating diabetes devices/technologies such as blood glucose monitors.

There is a strong correlation between disability and socioeconomic status, and people with disability often have lower average incomes than people without disability. This can impact their ability to access diabetes care and support and to access and use diabetes devices, aids and technologies.

There are additional challenges for people with intellectual disability who have diabetes. A reliance on others to access health services and to provide support for a healthy lifestyle can be challenging and requires disability support workers who are health literate.

Health professionals' understanding of the capacity of the National Disability Insurance Scheme (NDIS) to support clients with diabetes to achieve improved health outcomes is an important focus, as is the role of disability support workers in enabling people with disability to access injectable diabetes medications and avoid treatment delays.

Areas for action

Culturally and linguistically diverse people

- Translate and adapt consumer resources on prevention and management to be culturally and linguistically appropriate and promote these in appropriate ways.
- Encourage the use of appropriate translation services during health care encounters.
- Improve health literacy by disseminating culturally appropriate information and programs for the management and care of diabetes.
- Support and upskill the specialist diabetes workforce with relevant education, knowledge transfer and training to support implementing and maintaining best practice in primary care.

Older Australians

- Promote the implementation of relevant guidelines on managing diabetes in older people to inform care and clinical decision-making across health and aged care settings.
- Ensure that staff in aged care settings are trained in managing diabetes, including recognising and reducing risks of malnutrition.
- Ensure appropriate care transitions between health and other services.
- Facilitate early discharge planning and communication with the diabetes care team and/or treating GP or primary care team.
- Support the role of carers for older people with diabetes through information, education and links to services, including culturally appropriate local support groups.

- Encourage sharing of care and transition plans between health professionals and individual patients through the use of My Health Record.
- Ensure consideration of care contexts, care planning and diabetes-specific risk assessments to enable proactive and preventive care approaches.
- Support and upskill the specialist diabetes health care workforce with relevant education, knowledge transfer and training to support them in implementing and maintaining best practice in primary care.
- Ensure strategies are in place to minimise exposure to COVID-19 in older Australians with diabetes, who are more vulnerable to the complications of COVID-19.
- Ensure that older Australians have ready access to diabetes care, with readily implementable contingency plans for times of health system challenges and threats such as pandemics and natural disasters.

Children and young people

- Children and young people with type 1 and type 2 diabetes are a distinct group. Paediatric representation is required in planning and development of strategies, guidelines and policy.
- Ensure equity of access to multidisciplinary paediatric diabetes specialist health care.
- Examine and review the equity of access for young people to evidence-based diabetes therapies, including treatments using new technologies and appropriate support from health care professionals with experience in the use of these technologies; and encourage approaches that support equity.
- Ensure support of the national Diabetes in Schools program (57) for children with type 1 diabetes and encourage extension of the program to kindergarten, preschool and daycare settings.
- Develop and implement programs to support children and young people with type 2 diabetes in schools, including in regional and remote Australia.

- Co-design and implement appropriate models of care for children and young people with type 2 diabetes in regional and remote Australia, including culturally appropriate models of care for Aboriginal and Torres Strait Islander youth.
- Improve access for children and young people with type 2 diabetes to current and emerging evidence-based treatments and technologies and support them to properly use these systems.
- Encourage approaches that create efficiencies in upskilling health care teams, such as national coordination of development of educational resources, especially pertaining to new evidence-based technologies.
- Establish or support systems, such as databases, to monitor outcomes in young people with diabetes, including glycaemic outcomes and complication assessments.
- Support benchmarking of diabetes outcomes, including glycaemic control, and encourage provision and sharing of expertise among paediatric diabetes centres.
- Ensure safe delivery of insulin in education and care settings for children who are too young to self-administer or unable to self-administer due to co-occurring disability.
- Implement specialised teams including psychology and social work input for children and adolescents with diabetes.
- Ensure safe administration of insulin for those who are too young to self-administer.
- Strengthen programs that assist young people with diabetes in the transition from paediatric to adult care services, including access to psychological support services.
- Recognise and address the different needs and challenges of children and young people with type 2 diabetes and their families, and design services appropriately.
- Support collaborative efforts between parents, the health care team and the education environment to allow children with type 1

diabetes to participate fully and safely in the school experience.

- Ensure provision of advice and support for parents and carers of infants with newly diagnosed type 1 diabetes.
- Support and upskill the specialist diabetes workforce with relevant education, knowledge transfer and training to support implementing and maintaining diabetes management best practice in primary care.

Australians living in rural and remote areas

- Coordinate regional services across primary, secondary and tertiary care to facilitate access to care and the necessary support services.
- Support community-based health workers through training and education.
- In addition to face-to-face services, ensure the availability of telehealth and internet medical and mental health services and ensure equitable access to other technologies and services as appropriate, including for the care and management of diabetes in children and young people.
- Examine the possible benefits of promoting enhanced primary care service provision by incorporating community pharmacies and other health professionals to provide diabetes advice and care where other primary health care access is limited.
- Encourage uptake and use of My Health Record among health care providers in rural and remote locations, providing online access to a patient's medical conditions and prescriptions through this record.
- Develop and promote partnerships, flexible models of care and linkages between local clinicians and health professionals and major specialist diabetes centres.
- Support and upskill the specialist diabetes workforce with relevant education, knowledge transfer and training to support implementing and maintaining diabetes management best practice in primary care.

People with mental health disorders

- Perform a mental health assessment upon diagnosis of diabetes and ensure regular ongoing monitoring of mental health. Consider adding the assessment to the Annual Cycle of Care.
- Routinely monitor people with mental health disorders for diabetes.
- Support and upskill the specialist diabetes workforce with relevant education, knowledge transfer and training to support implementing and maintaining diabetes management best practice in primary care.
- Provide accessible mental health resources that have specific reference and relevance to diabetes.

People with disability and diabetes

- Prevent diabetes-related disability in people with diabetes through effective management of their diabetes (i.e. avoid amputations, visual impairment/blindness).
- Provide training for disability support workers in the monitoring and administration of injectable diabetes medications for people living with diabetes and disability who are unable to self-administer insulin or appropriately monitor their diabetes themselves.
- Ensure people with diabetes and disability can access appropriate diabetes devices, aids and technologies; and, where required, ensure disability support workers are appropriately trained to assist people with diabetes to use them.
- Ensure adjustments by health services to create equitable access to health services for people with disability.
- Explore access to NDIS-funded supports by NDIS participants with diabetes, including a focus on prevention of diabetes-related disability.

- For health professionals providing diabetes care:
 - increase education and training on the needs of people with disability and diabetes
 - increase understanding of the NDIS-funded supports people with diabetes and an eligible level of disability can access to support their diabetes management
 - ensure development of comprehensive person-centred Diabetes Management Plans (including sick day management) for NDIS participants with diabetes.
- Ensure that people with diabetes and an intellectual disability have access to an annual intellectual disability health assessment by a GP.
- Ensure safe administration of insulin for those who are unable to self-manage due to disability.
- Provide education and resources to support people with disability and diabetes who have low literacy or communication challenges.

Measures of progress

- People developing or with type 2 diabetes among priority groups
- People with diabetes among priority groups who have a Chronic Disease Management Plan
- People with diabetes among priority groups who achieve target levels of HbA1c, cholesterol, albuminuria and blood pressure
- People among priority groups who are overweight or obese or have other modifiable risk factors
- People among priority groups who receive testing for complications
- Complications in people with diabetes among priority groups
- Hospitalisations among people with diabetes, including older Australians

Goal 7: Strengthen prevention and care through research, evidence and data

Diabetes has a significant impact on Australia's health and productivity, and diabetes research – including the basic/discovery science of the disease, its social and economic impacts and appropriate clinical responses and prevention – is an important priority. Basic/discovery science is a pathway that can identify better, more durable and more effective treatments and management strategies that can be translated to clinical practice to prevent diabetes and its complications. Although Australia currently has multiple diabetes research funding streams, research efforts need to be further focused on strengthening evidence-based practice for the prevention of diabetes and its complications, implementation research, identifying a cure for diabetes, informing health policy decisions and potentially offering more timely access to newer and improved medications and technology.

Integrated data through national health care data linkage is important for monitoring population health and providing an evidence base for strategic planning for health policy and services. Information sharing between primary and secondary care providers and people with diabetes is essential for effective health care delivery and to provide the right service for patients at the right time.

Areas for action

Develop a national research agenda

- Develop a national research agenda designed to coordinate diabetes research across multiple funding streams, with particular attention to:
 - examining the barriers to best practice and the availability of, and access to, appropriate health services in order to develop specific strategies to address and overcome these barriers
 - identifying the cause(s) of type 1 diabetes and how to prevent, cure and treat the condition (including research into the potential benefits of stem cell technology and islet cell transplantation)
 - identifying the cause(s) of type 2 diabetes and ways to improve outcomes for people, including a focus on Aboriginal and Torres Strait Islander peoples, on children and adolescents and on other priority groups
 - developing the evidence base for, and the optimal use of, technology in contributing to equitable improvements in diabetes care, including continuous glucose monitoring and insulin pump therapy
 - translating research into improved therapies for the optimal management of diabetes, including behavioural, preventive, mental health and wellbeing measures
 - developing databases of critical diabetes data to inform policies and indicators for their monitoring and assessment

- examining the impact of the COVID-19 pandemic on incidence of diabetes and related complications, as well as impacts on mental health and behavioural effects and on access to health care, including through data linkage and burden of disease methods
 - conducting studies to understand the impact of the COVID-19 pandemic on the future health of those affected
 - collating and disseminating research findings in a timely manner.
- Support research and reporting on the cost of diabetes to the community and the health system, including the AIHW Australian Burden of Disease Study expenditure database.
 - Continue and enhance Australian translational research into dietary interventions in community-based settings to reduce type 2 diabetes.
 - Consider translational intervention research on the association of sleep and stress as risk factors and in treatment for type 2 diabetes.
 - Consider translational intervention research with a focus on mental health and reduction of diabetes distress.
 - Support research into diabetes, its basic/discovery science, its complications and effects and its prevention and management through various funding channels including the National Health and Medical Research Council and the Medical Research Future Fund.
 - Undertake a regular national biomedical health survey that includes diabetes and chronic conditions and has an Aboriginal and Torres Strait Islander people component.

Improve and expand data linkage and facilitate ease of access

- Facilitate access to diabetes-relevant datasets for research purposes.
- Facilitate and improve the linkage of key data systems across different providers of health care, including through increased participation in My Health Record.
- Within the recognised legislative and privacy requirements, link existing datasets to provide de-identified aggregate data that can be analysed to inform the knowledge base for diabetes.

Measures of progress

- Development of a national research agenda
- Development of one-off and enduring diabetes-relevant linked datasets
- Regular reports from national datasets and surveys on diabetes parameters such as the National Diabetes Register, the Australian Burden of Disease Study and health system usage information

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