DIABETES IN RURAL AUSTRALIA

Healthy and sustainable rural, regional and remote communities across Australia

There are 1.3 times as many people living with diabetes in *Remote* and *Very Remote* Australia as there are in *Major Cities*.[1]

People living in rural, regional and remote (hereafter rural) areas experience a higher burden of disease due to diabetes, higher rates of hospitalisation and higher rates of death. They are exposed to poorer social determinants of health and have a higher prevalence of type 2 diabetes risk factors.[2] Access to prevention and management programs and services is affected by geographic distance and reduced access to workforce.[2] Innovation in the provision of diabetes care is key to improving the health outcomes of people living with diabetes in rural Australia.

Diabetes

Diabetes refers to a group of chronic conditions characterised by high levels of glucose in the blood. Diabetes is the result of an inability to produce insulin (the pancreatic hormone that regulates blood glucose levels), or to use insulin effectively, or both. There are three main types of diabetes: type 1 diabetes, type 2 diabetes and gestational diabetes.

Diabetes increases the risk of other health conditions including heart disease, stroke, kidney disease, vision loss and lower limb amputation, and in pregnancy stillbirth, large babies and pre-eclampsia.

Summary of diabetes[a]

Type 1 diabetes is a lifelong autoimmune condition that can be diagnosed at any age. It is thought to be due to a combination of genetic and environmental factors but is not caused by modifiable lifestyle factors. People with this type of diabetes need insulin replacement to survive.

In type 2 diabetes, the body becomes resistant to the normal effects of insulin and gradually loses the capacity to produce enough insulin. The condition has strong genetic and familial risk factors and is also often associated with modifiable lifestyle risk factors. People may be able to slow or stop the progression of type 2 diabetes with changes to diet and increasing physical activity.

Gestational diabetes is diagnosed when high blood glucose levels are first detected during pregnancy. Gestational diabetes usually resolves after pregnancy, but it increases the risk of recurrence in subsequent pregnancies and of type 2 diabetes being diagnosed later in life in both mother and baby.

[a] www.diabetesaustralia.com.au

Diabetes in Australia

In 2024, over 1.4 million (1 in 20) Australians were living with diabetes.[3] Males were 1.3 times more likely to be newly diagnosed (incidence) with type 1 diabetes as females in 2021, while type 1 diabetes incidence rates remained relatively stable between 2000 and 2021.[4] The prevalence and incidence of type 2 diabetes increases with age and is higher in males than females.[4] Aboriginal and Torres Strait Islander people are three times more likely to be living with diabetes, and between 2 and 2.4 times as likely to be diagnosed each year compared with Australians as a whole.[4]

The prevalence of diabetes is also correlated with socioeconomic status, increasing as disadvantage increases.[4] Type 2 diabetes is much more common than both type 1 and gestational diabetes.[4]

Diabetes in rural Australia

Epidemiology

In 2021, the age-standardised prevalence of diabetes was highest in *Remote*[b] and *Very Remote* areas combined (5.6 per cent) – 1.3 times that of *Major Cities* (4.3 per cent).[4]

Given the proportion of Aboriginal and Torres Strait Islander people within the population increases with geographic remoteness[4] and people living outside *Major Cities* are also known to have lower incomes on average[4], it is likely that the elevated prevalence of diabetes seen in Aboriginal and Torres Strait Islander people contribute to the elevated prevalence in *Remote* and *Very Remote* areas. Increasing socio-economic disadvantage in Australia also contributes to higher prevalence.

Health outcomes

The **burden of disease** due to type 2 diabetes increases with geographic remoteness.[4] The burden of disease in *Remote* and *Very Remote* areas combined is twice that in *Major Cities*. Type 2 diabetes is within the top five leading causes of disease burden in *Remote* and *Very Remote* areas combined.[4]

Hospitalisation due to diabetes is much more common in rural Australia. Rates increase from 4,245.6 admissions per 100,000 population in *Major Cities* to 9,581.9 per 100,000 population in *Remote* and *Very Remote* areas combined.[5] Hospitalisations are also much more frequent for First Nations people, who make up 31.6 per cent of the population in *Remote* and *Very Remote* areas combined.[5]

Deaths due to diabetes also occur at a much higher rate outside of *Major Cities*, increasing with remoteness in 2018-2022 from 14.6 deaths per 100,000 population in *Major Cities* to 53.7 deaths per 100,000 population in *Very Remote* areas.[6] The age-standardised death rate in *Very Remote* Australia is 3.7 times higher than the rate in *Major Cities*.

Health risk factors

Health and behavioural risk factors for diabetes include unhealthy diet, inadequate physical activity, smoking, and being overweight and obese.[4] The prevalence of all these risk factors are elevated in rural Australia. The differences are statistically significant for smoking in all areas outside of *Major Cities* and overweight and obesity in *Outer Regional* and *Remote* areas combined.[7]

Social determinants of health

People living in rural Australia have, on average, higher rates of unemployment (in *Very Remote* areas); lower incomes; lower educational attainment; poorer internet access and mobile phone reception; and higher levels of overcrowding, people living in social housing, and homelessness (in *Remote* areas).[2] The tyranny of distance results in reduced access to services and infrastructure, including public transport.[2] In rural Australia and disadvantaged communities, it is harder to access affordable and nutritious food, affecting both food insecurity and the health of rural residents.[8] Individually and in combination, these factors can influence the epidemiology in rural areas, along with the ease with which diabetes can be managed over time.

These statistics illustrate the fact that diabetes affects more people living in *Remote* and *Very Remote* areas, and its complications result in high health costs and reduced quality of life for rural Australians.

Prevention and management of diabetes in rural Australia

There are three main domains of healthcare for diabetes: primary prevention, acute care, and complication prevention/monitoring.

Prevention includes both upstream actions on the social determinants of health that aim to improve educational attainment, reduce unemployment, increase household incomes, increase access to healthy housing and appropriate community infrastructure (for example, public transport) and access to affordable health services; along with addressing specific health and behavioural risk factors, such as poor diet, inadequate physical activity, high rates of smoking, and high rates of overweight and obesity.

Action on the **social determinants of health** requires a 'whole-of-society' approach involving health and non-health sectors (for example, education, jobs and training, housing, transport and infrastructure, social services), all levels of government, relevant private businesses and non-government community agencies.

Health and behavioural risk factor modification requires access to healthy foods, infrastructure that enables physical activity (for example, walking paths and sporting facilities), and health promotion/disease prevention

[b] Refers to the Australian Statistical Geography Standard – Remoteness Areas, with categories: Major Cities, Inner Regional, Outer Regional, Remote and Very Remote areas. See the Australian Bureau of Statistics for more details.

programs designed according to the local context to meet local needs. These measures would aim to improve health literacy and facilitate behavioural change.

Primary healthcare services such as general practices, nurse or midwife-led services, Aboriginal Community Controlled Health Services, community pharmacies, and private and community allied health services are also the mainstay of primary prevention, complication prevention and monitoring. This is especially true in rural Australia where distances are vast and it might be a long way to the nearest hospital or private specialist services. To prevent and manage chronic conditions such as diabetes, comprehensive, multidisciplinary primary healthcare is required. Specific to diabetes, health professionals might include general practitioners and rural generalists, nurse practitioners, nurses, midwives, diabetes educators, pharmacists, Aboriginal and Torres Strait Islander Health practitioners and workers, dieticians, optometrists, podiatrists, accredited exercise physiologists and physiotherapists, among others. Access to consultant medical specialists such as endocrinologists might also be required.

Access to services

In 2023, 32,359 people living in *Remote* and *Very Remote* Australia did not have access to the services of a GP within a 60-minute drive of their home (one way) and those without access were found in greatest numbers in the Kimberley region, Western Australia; Alice Springs, Northern Territory; and Far North Queensland.[9] It is also true that people living in rural Australia utilise Medicare (such as for GP visits) up to 50 per cent less than those in *Major Cities*. In 2022-23, Monash Modified Model[c] 7 (*Very Remote* communities) averaged just 3.4 services per person, compared to 6.6 in MM1 (Metropolitan areas).[7] According to the Australian Bureau of Statistics, people living in *Outer Regional*, *Remote* or *Very Remote* areas also experience longer waiting periods to see a GP or other medical specialist.[10]

Hence, rural but especially those living in *Outer Regional*, *Remote* and *Very Remote* areas have reduced access to the primary healthcare services that are essential in the prevention and ongoing management of diabetes.

Workforce

The presence of a multidisciplinary health workforce is reduced in rural Australia, contributing to reduced access to services. The prevalence of GPs providing primary care is lowest in MM6-7.[11] Similarly, the prevalence of consultant medical specialists and their trainees is much lower in MM 4-7 than in MM1-3.[d,12] Small rural towns (MM5) and very remote communities (MM7) experience disparities in the presence of pharmacists, optometrists and allied health professionals such as physiotherapists and podiatrists (who are found at a very low rate between MM5-7).[d,12]

Innovative approaches to improve health status and outcomes in rural areas

The prevention and management of diabetes in rural Australia requires concerted, collaborative efforts by both the Australian and jurisdictional governments, and stakeholders at the local community level, to design and fund primary healthcare services. These services would address local issues and meet local needs, thereby improving access to the health promotion and primary healthcare services which healthy communities require. This includes consideration of alternate models of funding to address the thin markets and market failure that is common in small rural towns and remote areas; models of care that make the most of the workforce that is present by empowering them to work across their full scope of practice; and that address social, professional and financial barriers to recruiting and retaining the health workforce. Locally designed and led models of care should align with population needs and employ innovative methods of service delivery, incorporating telehealth and other emerging forms of digital healthcare as a supplement to face-to-face care.

Telehealth and digital technology can be utilised to improve access to more specialised services not available in all rural and remote areas, reducing the need for travel, and to support local clinicians in the provision of care in between consultant medical consultations.[13] Use of digital communication mechanisms such as the My Health Record is essential to the provision of integrated, coordinated care between members of a team, which need to include both face-to-face and virtual mechanisms.

Rural communities are extremely diverse in terms of geographic, economic, environmental, cultural and socio-demographic characteristics. This means that interventions to prevent and manage diabetes in rural communities need to be localised and developed through community engagement and co-design. This is especially true for Aboriginal and Torres Strait Islander people and communities, where healthcare design and implementation needs to be culturally safe and adopt a holistic approach to health and wellbeing.

Locally tailored models of care and programs can sit alongside larger virtual programs, for those with the digital literacy and internet connectivity to utilise them. There are numerous examples of these programs for all types of diabetes. See next page for some case studies on how digital innovation and telehealth can be used to support rural diabetes patients.

[c] For more information see Modified Monash Model at the Department of Health and Aged Care.
[d] National Rural Health Alliance analysis of National Health Workforce Dataset data.

Programs, services and support

Currently the main strategy in Australia targeted at diabetes prevention, management and research is the Australian *National Diabetes Strategy 2021-2030*. The strategy provides a framework for collaborative efforts by governments and other parts of the community to improve diabetes prevention and care, including mental health.

There are various organisations, programs and services for people living with all types of diabetes, as well as preventative programs for those at risk, available both nationally and locally to support rural people. These include but are not limited to:

- **Diabetes Australia**
  Diabetes Australia is the national body for Australians living with all types of diabetes, as well as those at risk. Diabetes Australia works in collaboration with people living with diabetes, those at risk of developing diabetes, health professionals, researchers, and the community. Diabetes Australia is a respected and valued source of information, advice and views utilised by government and the community. Diabetes Australia delivers a range of programs and services both nationally and locally.
- **National Diabetes Services Scheme (NDSS)**
  The National Diabetes Services Scheme (NDSS) is an initiative of the Australian Government that commenced in 1987 and is administered by Diabetes Australia. The NDSS aims to enhance the capacity of people with diabetes to understand and self-manage their life with diabetes, and access services, support and subsidised diabetes products.
- **Local diabetes organisations**
  Local diabetes organisations operate in many states and territories providing a range of tailored support, community programs, and resources locally.
- **Resources for Aboriginal and Torres Straight Islander peoples with diabetes**
  A range of resources can be found at the NDSS website: www.ndss.com.au/about-diabetes/aboriginal-and-torres-strait-islander-peoples

Case Study: Digital Innovation (case study provided by Diabetes Australia)

Augie was six years old when she was diagnosed with type 1 diabetes in 2019. She lives with her Mum, Dad, and sister Willa in Broken Hill. Augie's Mum, Danielle, says prescriptions by text, telehealth medical appointments, and the GLOOKO portal, which allows the family to download Augie's blood glucose levels and HbA1c results and share them with her Adelaide-based endocrinologist and credentialled diabetes educator, have made it possible for the family to stay in Broken Hill after Augie's diagnosis.

The closest paediatric endocrinologist and hospital diabetes centre in Adelaide is more than 500 kilometres away, and it would have been impossible for Danielle to continue her work and for her husband to run his successful small business in Broken Hill without the digital health innovations.

Danielle is the Director of Student Services for a network of regional university study hubs and is a Fellow at the University of Technology Sydney who researches access to higher education for regional people. They have many extended family members living in Broken Hill. It's their home and they want to stay there.

Case study: Telehealth and Mobile Care (case study provided by Optometry Australia)

James Jordan, a 58-year-old male with type 2 diabetes was recently seen by a visiting optometrist in a rural town in Western Australia. The optometrist was set up in a GP clinic where a slit lamp examination was performed. During the examination, vision threatening proliferative diabetic retinopathy was discovered. James had limited access to specialist care due to the town's isolation, with the nearest regular ophthalmologist located over 500km away in Perth. Recognising the need for urgent intervention, the optometrist utilised telehealth to connect James with an ophthalmologist. Thanks to the fundus camera and slit lamp available at the GP clinic, the ophthalmologist was able to review the images and recommended laser treatment.

Instead of requiring James to endure a long, costly journey to Perth, he was advised that he could visit the Vision Van, a mobile health service that travels to remote communities to provide specialised care.

The Vision Van was visiting the next town over, only 100km away, so James underwent laser therapy there, effectively stabilising his condition and preventing further vision deterioration. The visiting specialists on the Vision Van also created a long-term management plan which meant regular reviews with ophthalmologists locally every 6 months and the visiting optometrist every other 6 months to ensure his condition remained stable. James appreciated this approach as it meant a timely intervention; reducing financial burden and the time travelled to Perth. It also reduced the emotional strain on James where he spends less time away from home and his two dogs.

This case highlights the power of telehealth, mobile healthcare units, and multidisciplinary collaboration in improving diabetes management in rural areas, offering a sight-saving solution for patients otherwise at risk of delayed care.

Prevention programs

A range of type 2 diabetes (and other chronic disease) prevention programs and services covering Australian jurisdictions can be found at the Diabetes Australia website: www.diabetesaustralia.com.au/prevention-programs. These include the *Get Healthy Service* in New South Wales and *My health for life* in Queensland. Many of these programs include exploring healthy food choices, setting personal goals, keeping track of risk factors (weight, blood pressure, cholesterol) and health professional advice, physical activity and online structured behaviour change.

Glossary of terms

Endocrinologist	A medical specialist who treats a range of conditions that are caused by problems with hormones, including diabetes
Fundus camera	A specialised camera used to take detailed images of the back of the eye (the retina/fundus), helping detect and monitor eye diseases
GLOOKO	A digital health platform for managing diabetes management data
HbA1c	A blood check that measures the average blood glucose level over the past three months
Proliferative diabetic retinopathy	An advanced stage of diabetic eye disease where abnormal blood vessels grow on the retina, which can lead to vision loss if untreated
Slit lamp	A microscope with a bright light used by optometrists and ophthalmologists to examine the eye in detail

Further resources

- Diabetes Australia (the national body for Australians living with all types of diabetes, as well as those at risk): www.diabetesaustralia.com.au
- Australian Diabetes Society (peak national medical and scientific body in Australia for diabetes): www.diabetessociety.com.au
- Australian Diabetes Educators Association (national peak body for diabetes education, management and care in Australia): www.adea.com.au
- Australasian Diabetes in Pregnancy Society (professional body established to advance clinical and scientific knowledge of diabetes in pregnancy): www.adips.org
- National Diabetes Services Scheme (NDSS) www.ndss.com.au/about-diabetes/diabetes-facts-and-figures/diabetes-data-snapshots
- Australian Indigenous HealthInfoNet www.healthinfonet.ecu.edu.au
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