

CHANGE THE FUTURE:

REDUCING THE IMPACT OF THE DIABETES EPIDEMIC

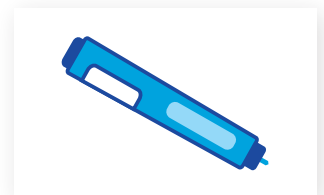
**UNITE IN THE
FIGHT FOR
CHANGE.**



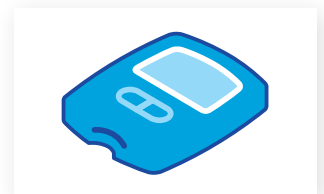
What is diabetes?

Diabetes is a metabolic condition characterised by high blood glucose levels which may arise from either the body's ability to produce insulin or its ability to respond to insulin.

Type 1 diabetes is an autoimmune condition in which the immune system is activated to destroy the cells in the pancreas which produce insulin. We do not know what causes this autoimmune reaction. Type 1 diabetes is not linked to modifiable lifestyle factors. There is no cure and it cannot be prevented.



Type 2 diabetes is a condition in which the body becomes resistant to the normal effects of insulin and gradually loses the capacity to produce enough insulin in the pancreas. The condition has strong genetic and family-related (non-modifiable) risk factors and is also often associated with modifiable lifestyle risk factors. We do not know the exact genetic causes of type 2 diabetes. People may be able to significantly slow or even halt the progression of the condition through changes to diet and increasing the amount of physical activity they do. Evidence shows that around half of all people with recently diagnosed type 2 diabetes can achieve remission through intensive dietary changes and weight loss.



Gestational diabetes mellitus (sometimes referred to as GDM) is a form of diabetes that occurs during pregnancy. Most women will no longer have diabetes after the baby is born. However, some women will continue to have high blood glucose levels after delivery. It is diagnosed when higher than normal blood glucose levels first appear during pregnancy.



Acknowledgements

Diabetes Australia acknowledges the Traditional Owners of the lands on which we live and work. We recognise their connection to land, waters and culture. We pay the upmost respect to them, their cultures and to their Elders past and present. We recognise that Australia is made up of hundreds of different Aboriginal and Torres Strait Islander peoples, each with their own culture, language and belief systems. Their relationship with country remains of utmost importance as it is the foundation for culture, family and kinships, song lines and languages.

© Diabetes Australia. This report is copyright. Apart from any use as permitted under the *Copyright Act 1968*, no part may be reproduced without written permission from Diabetes Australia. Requests and enquiries concerning reproduction and rights should be directed to Diabetes Australia, GPO Box 3156 Canberra ACT 2600 | E-mail: admin@diabetesaustralia.com.au.



Foreword

The diabetes burden in Australia shows no sign of slowing and its health and economic impact continues to be felt by people with diabetes, their families and the broader community.

This *Report* provides alarming predictions of the number of people who are expected to be affected by diabetes by 2050 and the associated cost to the health system. The findings are particularly disturbing in the context of Australia's advanced health system and the many significant evidence-based developments in diabetes prevention and care over the past 20 years.

Australia has an excellent foundation for limiting the impact of diabetes including universal health coverage through Medicare and the Pharmaceutical Benefits Scheme, the National Diabetes Services Scheme (NDSS) which is the envy of the world, and well trained and dedicated health professionals.

Diabetes management has improved dramatically over the past 20 years. Type 2 diabetes can be successfully prevented or delayed in many people. A range of new classes of medications are now available for not only improving diabetes control but also with proven benefits in minimising diabetes related cardiovascular and renal complications. Newer technologies have particularly benefited people with type 1 diabetes, including advances in insulin pumps and continuous glucose monitoring which is now subsidised through the NDSS.

So how do we alter the predicted course of diabetes outlined in this *Report*? It is clear that we have the evidence about what needs to be done to reduce the diabetes burden. The challenge is implementing this knowledge. Australia has a recently endorsed National Diabetes Strategy 2021-2030 to guide action. We need to start implementing this Strategy.

This timely *Report* serves as a call to action to avert the predicted increase in the diabetes burden and ensure that we are not having this same conversation in another 20 years.

Professor Stephen Colagiuri AO

The Boden Initiative at the University of Sydney

Co-Director, World Health Organization Collaborating Centre on Physical Activity, Nutrition and Obesity

Vice-President (Physician), International Diabetes Federation



Message from the Group CEO

The diabetes epidemic is one of the largest and most complex health challenges Australia has faced. It touches millions of lives across the country from Brisbane to Burnie to Broome, and everywhere in between, and impacts every part of our health system.

And its impact is growing. In the past 20 years, the numbers have dramatically increased from 459,678 people living with the condition in 2000 to more than 1.47 million in 2022, an increase of around 220%. If the growth rates of the past decade continue, there will be more than 3.1 million Australians, around 8.3% of the projected population, living with diabetes by 2050. The annual cost of the condition is forecast to grow to about \$45 billion per annum in this time.

Behind these numbers are real Australians whose lives have been impacted. They are people like Joseph, who was diagnosed with type 2 diabetes in his 20s and now, 30 years later, is on dialysis. And Freya, who was hospitalised in a life-threatening condition because the early signs of type 1 diabetes were missed. As well as Karla, who now lives with type 2 diabetes after developing gestational diabetes during both her pregnancies.

The diabetes epidemic will affect every Australian, either directly as a result of developing the condition or caring for someone who has diabetes or indirectly through its impact on the health system. Meeting the challenges associated with the growing numbers of people living with diabetes will require resolve, commitment and innovation. It also demands a dedicated investment. However, with smart policy and smart spending, we can reduce the impact of diabetes on Australians and reduce the long-term impact on the health system.

Diabetes Australia understands the size of the challenge. That's why we have unified to forge a stronger, louder and more effective organisation to advocate for lasting and meaningful change.

We know that no one chooses diabetes, NO ONE, so we need to do all we can to support every Australian with, or at risk of, developing diabetes. We need all Australians to join us in the fight for change.

Together we can change the lives of millions of Australians, mothers, fathers, sons, daughters, grandparents, and loved ones, who are living with diabetes or will develop the condition in the years ahead.

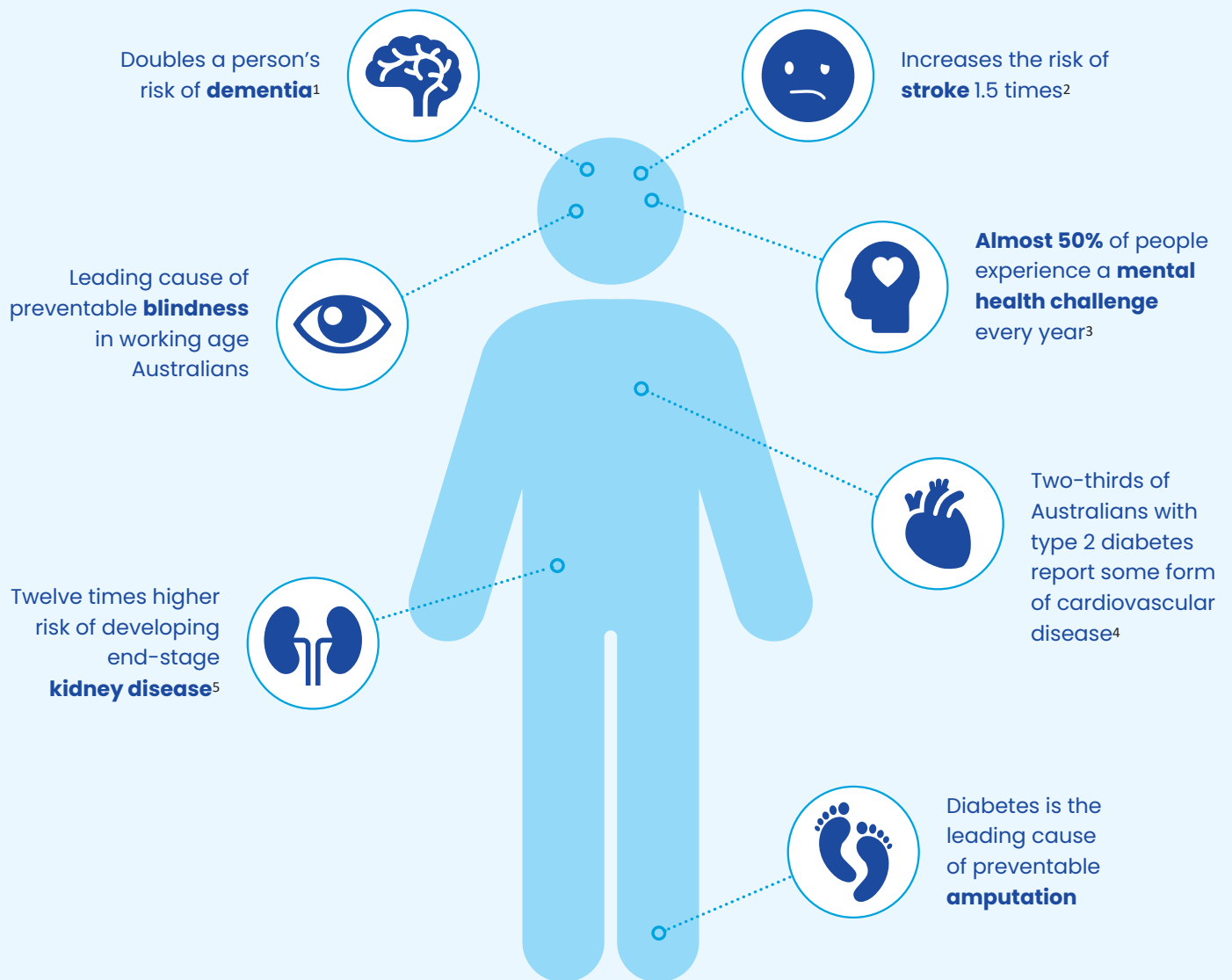
We have a major challenge in front of us but doing nothing is not an option. Without action, diabetes will continue to have an unacceptable impact on the physical, emotional and financial wellbeing of Australians as well as our health system.

That's why we are asking all Australians to join us and fight for change.

Justine Cain

Group CEO, Diabetes Australia

DIABETES IMPACTS EVERY PART OF THE BODY



Pregnancy – Twice as likely to require **caesarean birth** (women living with type 1 and type 2 diabetes)



Children born to mothers with type 2 diabetes and gestational diabetes are at higher risk of developing type 2 diabetes

Why we need to change?

Diabetes is one of the biggest health challenges currently confronting Australia. There are currently 1.47 million Australians (about 5.5% of the population) living with all types of diabetes⁶ and up to 500,000 people living with silent, undiagnosed type 2 diabetes.⁷

There are 134,000 people living with type 1 diabetes, almost 1.3 million people living with type 2 diabetes, almost 50,000 women diagnosed with gestational diabetes every year, and more than 11,000 people living with other types of diabetes.

These numbers have increased dramatically over the past two decades as the number of people living with diabetes has risen from 459,678 in 2000 to 1,471,761 in 2022 – a 220% increase.

It is a leading cause of blindness, dementia, stroke, mental and emotional health challenges, heart and kidney disease, preventable blindness and severe COVID-19. It is a major contributor to hospitalisations and is associated with around 10.5% of all deaths.⁸ The number of diabetes-related deaths increased by 72.5% from 2000 to 2020.⁹

As well as the massive personal cost, the diabetes epidemic also carries a substantial financial burden. A recent report put the annual cost to the health

system at more than \$3 billion; however, this doesn't capture the real cost burden including the impact of other diabetes-related complications, such as heart and kidney disease and dementia, or the broader productivity costs.¹⁰ A 2013 study¹¹ found diabetes costs the Australian economy \$17.6 billion (inflation adjusted) while a Deloitte Access Economics report from 2014 put the productivity costs of diabetes at \$5.63 billion per annum.¹²

While we lack a current comprehensive assessment of the diabetes epidemic cost burden, it is clear it is increasing rapidly. According to Australian Institute of Health and Welfare data, over the past two decades the direct health care costs have increased by 289%, the hospital costs have increased by 308% and the Pharmaceutical Benefits Scheme costs have increased by 282%.

220% increase
in the number of people with
diabetes since 2000



Trajectory changers – where we can have a major impact on the diabetes epidemic

1. Almost 2 million people currently living with diabetes

More than 1 million people have been diagnosed with diabetes over the past decade, and there are more who had already been diagnosed. And up to 500,000 people live with silent, undiagnosed type 2 diabetes. We still haven't experienced the full health or economic impact of people currently living with diabetes.

2. Younger age of diagnosis

There are more than 42,000 Australians aged 39 years and under living with type 2 diabetes including 1,155 Australians under the age of 20.¹³ Type 2 diabetes that develops before the age of 40 is generally more severe with a higher risk of complications.

3. Diabetes in Aboriginal and Torres Strait Islander peoples

Aboriginal people living in Central Australia have the highest rates of type 2 diabetes in the world. Across the country diabetes is a leading

contributor to the gap in life expectancy between Aboriginal and Torres Strait Islander Australians and other Australians. Aboriginal and Torres Strait Islander people are more than three times as likely to have diabetes.¹⁴

4. Gestational diabetes

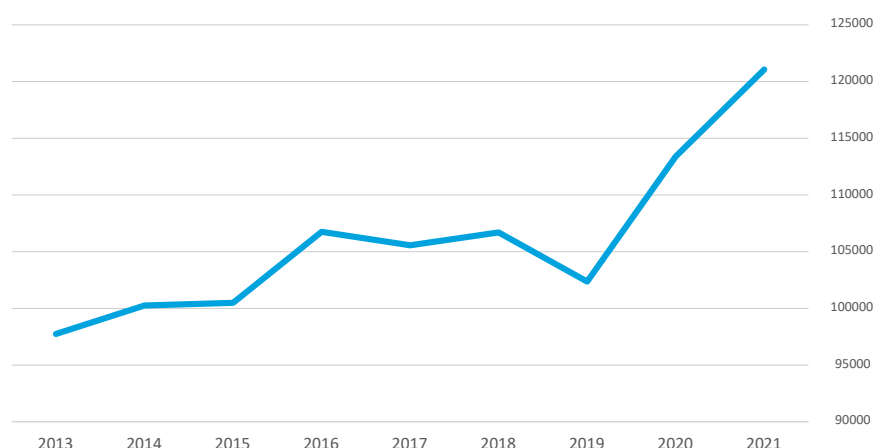
Almost 400,000 mothers have developed gestational diabetes (GDM) over the past decade, with up to 500,000 additional diagnoses expected over the coming decade.¹⁵ About 60 per cent of women diagnosed with GDM will develop type 2 diabetes over the next 20 years.¹⁶

5. New complications driving hospitalisations

Diabetes contributes to around 1 in 10 hospitalisations.¹⁷ While established complications such as kidney and heart conditions and diabetes-related amputations major drivers, a range of newly documented complications, including dementia, cellulitis, iron deficient anaemia and mental health challenges, are increasing the burden on the health system.

Number of Australians diagnosed with diabetes every year (2013-2021)

Source: National Diabetes Services Scheme (NDSS)



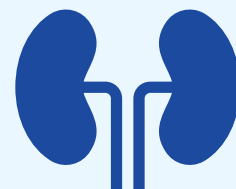
EVERY YEAR DIABETES CONTRIBUTES TO:



1.1M

hospitalisations

21,000 a week



250,000

hospitalised with
kidney complications

4,807 a week

19,000

visits to **emergency**

365 a week



100,000

hospitalisations because
of **eye complications**

1,923 a week



3,980

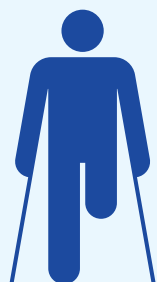
people develop
dementia

75 a week

5,163

amputations

100 a week



17,477

deaths

336 a week



Source: AIHW data



Changing how we support people currently living with diabetes

The health and economic impact of the diabetes epidemic will increase over the coming decades.

Up to 2 million Australians living with or at very high risk of type 2 diabetes

In the past 10 years, more than 1 million Australians have been diagnosed with diabetes. In addition, there are up to 500,000 people living with silent, undiagnosed type 2 diabetes¹⁸ and more than 400,000 people living with impaired fasting glucose, or prediabetes, who are at a significantly higher risk of developing type 2 diabetes.¹⁹

Diabetes complications often take several years to develop and it is likely that many people who have been diagnosed in the past decade have not yet developed complications. While access to good healthcare and diabetes management can reduce the risk of complications, many people may still develop both widely known complications such as kidney and heart disease and vision loss, as well as a range of recently identified diabetes-related complications, including dementia.

Even routine healthcare is becoming more expensive

New treatments are helping to reduce the impact of some complications but the cost of providing these treatments is also growing. While new type 2 diabetes medications are very effective at reducing the risk of

some diabetes-related complications, Australia needs to do more to prevent more people from developing type 2 diabetes to reduce long-term costs.

Every Australian living with diabetes is at risk of diabetes-related complications. As the extraordinarily high number of people diagnosed with diabetes in the past decade continues to age, they will increasingly be at risk of diabetes-related complications, as well as requiring more costly support from across the health system to manage the condition.

How do we change the trajectory

The National Diabetes Strategy 2021 – 2030 is a road map to ensure we help people living with diabetes reduce their risk of diabetes-related complications and we help prevent more people from developing type 2 diabetes. It's been endorsed by Federal, State and Territory Governments. The time to act is now.

“

2 million
Australians at risk of
diabetes-related complications
in the next two decades

”



“The impact of the diabetes epidemic will get worse, but the reality is the impact is here. Almost 1 in 5 adults visiting Emergency Departments or GPs in my community are living with diabetes. This means that heart failure, heart attacks, strokes, dementia, cancer, amputations and kidney disease are stretching our health system. We need to slow the progression and better manage diabetes now”.

Professor Glen Maberly, Director, Western Sydney Diabetes

THE COST OF DIABETES-RELATED COMPLICATIONS IN EACH PERSON



Retinopathy

\$14,775

Vitreous haemorrhage

\$13,405

Blindness / Low vision

\$12,941

Neuropathy

\$15,637



Foot ulcer / Gangrene

\$29,803



Lower extremity amputations

\$63,575

Source: Dinh, N., de Graaff, B., Campbell, J., Jose, M., Burgess, J., Saunder, T., Kitsos, A., Wiggins, N. and Palmer, A., 2022. Costs of major complications in people with and without diabetes in Tasmania, Australia. *Australian Health Review*.

Ischemic heart disease

\$29,160

Angina pectoris

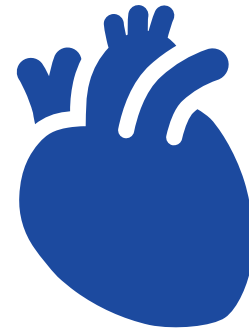
\$18,430

Non-fatal myocardial infarction

\$30,827

Transient ischemic attack

\$13,905



Non-fatal stroke

\$27,782

Heart failure

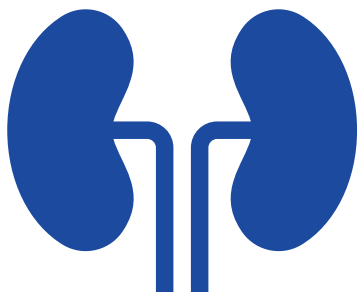
\$27,379

Nephropathy

\$15,133

Kidney failure

\$24,904

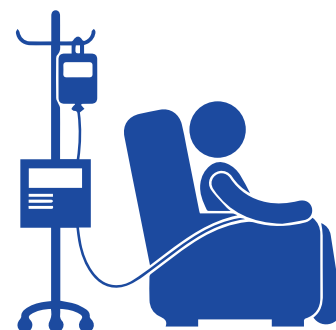


Kidney transplant

\$48,487

Dialysis

\$78,152





Changing the number of younger people developing type 2 diabetes

While the onset of type 2 diabetes has traditionally developed later in life, we are increasingly seeing more younger people (aged <39) develop the condition. Over the past 10 years, the number of people living with type 2 diabetes in this age group has increased by 37% from 30,775 people in 2012²⁰ to 42,131 people in 2022.²¹

Children under 20 are developing type 2 diabetes

Of particular concern is the dramatically increasing number of children and young people (aged <20) being diagnosed with type 2 diabetes. There are now 1,155 children and young people living with the condition, a 18.3% increase in the past decade.²² Thirty years ago, children and young adults living with type 2 diabetes was almost unheard of.

It is a more devastating condition in young people

The younger people are when they develop type 2 diabetes the longer they live with the condition and their risk of developing diabetes-related complications increases over time. In particular, type 2 diabetes in children progresses much faster and diabetes complications develop much earlier than in people who develop type 2 diabetes later in life. While the number of children living with type 2 diabetes may



be small compared to the number of Australians living with the condition, it is likely to be more severe among these people.

How do we change the trajectory?

Australia needs a national type 2 diabetes prevention strategy that is appropriately funded and supported by evidence-based public health measures including limits on junk food advertising and a levy on sugar-sweetened beverages.



37% increase
in people under 40 years old
developing type 2 diabetes



"Type 2 diabetes in younger people is a much more aggressive condition than it is in older people. Young people have greater difficulty maintaining optimal glucose levels and advanced complications often develop at a much younger age. It is imperative that we work towards preventing type 2 diabetes in young people and develop an evidence base for the optimal treatment."

Professor Jencia Wong, Senior Staff Specialist Endocrinologist at the Royal Prince Alfred Hospital and Clinical Professor at The University of Sydney

Changing how we support Aboriginal and Torres Strait Islander peoples

Diabetes is the largest contributor to the gap in life-expectancy between Aboriginal and Torres Strait Islander Australians and other Australians.²³ They are more than three times as likely to live with diabetes and nearly five times more likely to be hospitalised with diabetes-related complications. With regards to end-stage renal disease requiring dialysis, Aboriginal and Torres Strait Islander people are 10 times more likely than other Australians to develop the condition.²⁴

Some of the highest rates in the world

As shocking as these figures are, there are communities within Australia where the rates are even higher. Recent research has found that rates of type 2 diabetes in Central Australia, where around 40% of adults are living with the condition, are the

highest reported in the world.²⁵ This is having major health outcomes and diabetes is now the leading cause of death in Aboriginal people living in the Northern Territory.

Diabetes in young people

Of particular concern is the fact that the condition is impacting younger and younger Aboriginal and Torres Strait Islander people with around 3.4% of males and 7.2% of females aged 20-29 and 15.6% of males and 24.7% of females aged 30-39 living with diabetes.²⁶ Recent research has found that rates of youth onset type 2 diabetes (aged <25 years of age) are the highest in the world with children as young as four developing the condition. The prevalence of diabetes amongst Aboriginal and Torres Strait Islander young people (15-24) has increased by 100% over the past five years.²⁷



Aboriginal & Torres Strait
Islander people are
10 times more
likely to require dialysis



How do we change the trajectory?

New approaches in preventing more Aboriginal and Torres Strait Islander people from developing type 2 diabetes, as well as a focused effort to reduce the devastating complications of the condition, must be a priority if we are going to close the gap in life-expectancy.



"The rapidly accelerating diabetes epidemic is having devastating impacts on Aboriginal and Torres Strait Islander communities, particularly in our most remote and vulnerable communities of Central Australia. It is imperative that we work in partnership with communities to break the intergenerational cycle of type 2 diabetes. This is the only way we are going to improve, what are, very dire health outcomes."

Professor Louise Maple-Brown, Head of Endocrinology at the Royal Darwin Hospital, Senior Principal Research Fellow at Menzies School of Health Research





Changing the impact of gestational diabetes

Gestational diabetes (GDM) is the fastest growing type of diabetes in Australia. While it 'goes away' after pregnancy, the condition dramatically increases a mother and baby's risk of developing type 2 diabetes in the future. Evidence suggests women with a history of GDM are seven times more likely to develop type 2 diabetes later in life.²⁸

Potential type 2 diabetes surge

Almost 400,000 mothers have been diagnosed with gestational diabetes over the past decade, with up to 500,000 additional diagnoses expected over the coming decade.²⁹ This could lead to more than half-a-million new diagnoses of type 2 diabetes by 2050.

Other future health risks

Women with a history of GDM are at twice the risk of major cardiovascular events, even if they do not develop type 2 diabetes.³⁰ Cardiovascular complications may begin as soon as 10 years after pregnancy.³¹

Why are numbers increasing?

This dramatic increase is being driven by a number of factors including the increasing average age of mothers (up from 26.3 in 1978 to 30.9 in 2020), increased number of Australians from countries with a genetic predisposition to gestational diabetes, and increased rates of maternal overweight and obesity.³²

Pre-existing diabetes

Pre-existing type 1 and type 2 diabetes can also have a major impact on pregnancies. Birth defects and other complications including pre-eclampsia are up to nine times more likely in babies born to women with pre-existing diabetes.³³ This risk can be reduced through appropriate management and support.

How do we change the trajectory?

New approaches are needed for pre-pregnancy planning, support and management during pregnancy, and post-pregnancy follow-up for ongoing type 2 diabetes screening and to prevent the development of type 2 diabetes. This would include more support to help women achieve an optimal weight before pregnancy.



Gestational diabetes
could lead to
500,000
people developing
type 2 diabetes by 2050



"We have to ensure women with type 1 or type 2 diabetes can access pre-conception resources, support, counselling and appropriate contraception to reduce the risk of unacceptable, and largely preventable, pregnancy complications. Additionally, we need to take action to stem the rising rates of gestational diabetes and support women who do develop gestational diabetes, both during their pregnancies as well as throughout their lives."

Associate Professor Glynis Ross, Visiting Endocrinologist at Royal Prince Alfred Hospital

Dealing with the changing nature of diabetes-related complications

Diabetes-related complications represent the most costly and debilitating aspect of the diabetes epidemic. Established complications include limb amputation, vision loss, heart disease, stroke and kidney failure. Research has also established strong links between diabetes and dementia, and mental and emotional health impacts. The links between diabetes and a range of dental health conditions are also well established.

New serious complications are emerging

New published research suggests the impact of diabetes could be broadening with a range of new conditions increasing to excess hospitalisations. These include cellulitis, a potentially serious bacterial skin infection which is responsible for around 364 excess annual hospitalisations per 100,000.³⁴

“
Diabetes is a leading cause of dementia
”

The leading cause of excess hospitalisation in women with diabetes was found to be iron deficiency anaemia, which was responsible for 558 excess hospitalisations per 100,000.

Other major sources of excess hospitalisation include mental health disorders such as stress and adjustment disorders, depression, and mental health challenges. Other infections include pneumonia, gastroenteritis and sepsis.

Dementia

The risk of developing dementia is roughly double in people living with diabetes. Every year, around 5000 people living with diabetes develop dementia.³⁵

COVID-19

Diabetes is also a factor in severe COVID-19 infection and death. It is the most common co-morbidity for people admitted to intensive care with COVID-19.³⁶

How do we change the trajectory?

The best way to reduce the risk of diabetes-related complications is to ensure people with diabetes have access to the healthcare, treatments, medicines and technology to manage the condition well. If we do this we help protect people's quality of life.



“As Australians with diabetes begin to reach older ages, we need to be aware that while we can manage cardiac, stroke and renal complications of diabetes relatively well, less is known about how to manage the diverse set of complications which are now appearing. The impact of these emerging complications on quality of life and cost to people with diabetes and to the government are largely unknown.”

Professor Dianna Magliano OAM, Head of Diabetes and Population Health at the Baker Heart and Diabetes Institute

Preparing for an uncertain future

Everyone has felt the impact of the COVID-19 pandemic, but people with diabetes have been acutely affected. People living with diabetes are at a higher risk of severe COVID-19 including hospitalisation, intensive care unit admission and even death. Around one in five deaths from COVID-19 (third most common co-morbidity) and around one third of all intensive care hospitalisations (most common co-morbidity) involved people living with diabetes.³⁷

With the CSIRO forecasting an increased risk of infectious disease outbreaks in the future, there is a very real risk that the diabetes epidemic could worsen the severity of any future outbreaks.³⁸

Long-term impact

We do not know what the long-term impact of COVID-19 mitigation measures are for the development of type 2 diabetes, or for a potential increase in diabetes-related complications because of deferred health checks or delayed diagnoses. Reports from across the health system highlight significant declines in the number of people accessing various health services and checks during the pandemic.

Long COVID

There is a growing body of evidence that people infected by COVID-19 are at increased risk of Long COVID. Complications of this condition range from extreme tiredness and body pains, through to long-term damage to key organs including the pancreas, heart, brain and lungs. This is likely to have a significant health and economic impact in the years ahead.

New diabetes diagnoses

There is also a body of emerging evidence indicating that a COVID-19 infection could increase a person's risk of developing type 1 and type 2 diabetes.

How do we change the trajectory?

Prevention is the best defence. The more people we can help prevent or delay diabetes the less likely they are to be severely impacted by a pandemic.



Diabetes is a
major driver
of severe COVID-19



"We may still have to face serious challenges from COVID-19 infection even if the pandemic eventually goes into decline. Our governments need to understand this and include it in ongoing funding and planning. There may still be a long road ahead and very heavy health and economic costs for Australia and the community to bear from the serious complications of Long Covid."

Professor Paul Zimmet AO, Monash University



UNITE IN THE FIGHT FOR CHANGE.

Even if we start changing the trajectory of the diabetes epidemic today, we have still not seen its full impact.

In the years ahead, we will see a growing number of people developing diabetes, as well as increases in the impact of diabetes-related complications and the costs associated with supporting people with diabetes.

If growth rates continue at the same pace as recorded in the past decade, Australia would see the number of people developing diabetes increase by 2.6% every year. This means by 2050 there would be more than 3.1 million Australians living with all types of diabetes. That's between 7.6% and 9% of the population, which represents a 40 – 66% increase in prevalence.

While there is a lack of up-to-date modelling on the total cost burden of the diabetes epidemic, Diabetes Australia estimates, using available sources adjusted for inflation, that the health and productivity costs of diabetes would be around \$45 billion per annum by 2050.

However, a number of factors could push this cost significantly higher, including increasing numbers of people developing diabetes, increasing numbers of people developing type 2 diabetes at a younger age, and a rise in rates of debilitating and costly complications.

Endnotes

- 1 Ohara, T., Doi, Y., Ninomiya, T., Hirakawa, Y., Hata, J., Iwaki, T., Kanba, S. and Kiyohara, Y., 2011. Glucose tolerance status and risk of dementia in the community: The Hisayama Study. *Neurology*, 77(12), pp.1126-1134.
- 2 American Diabetes Association 2022, *American Diabetes Association* website, accessed 3 November 2022, <<https://diabetes.org/diabetes/stroke>>
- 3 Diabetes Australia survey, 2020.
- 4 Australian Bureau of Statistics. National Health Survey: First Results, 2014-15. 2015; Available from: <http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4364.0.55.0012014-15?OpenDocument>.
- 5 Pálsson, R. and Patel, U., 2014. Cardiovascular Complications of Diabetic Kidney Disease. *Advances in Chronic Kidney Disease*, 21(3), pp.273-280.
- 6 National Diabetes Services Scheme. (30 Sept 2022) *NDSS Snapshots – All Types of Diabetes* [Fact Sheet]. National Diabetes Services Scheme. <https://www.ndss.com.au/wp-content/uploads/ndss-data-snapshot-202206-all-types-of-diabetes.pdf>
- 7 Sainsbury, E. *et al.* (2020) “The diagnosis and management of diabetes in Australia: Does the ‘Rule of halves’ apply?,” *Diabetes Research and Clinical Practice*, 170, p. 108524. Available at: <https://doi.org/10.1016/j.diabres.2020.108524>.
- 8 Australian Institute of Health and Welfare (2020) *Diabetes: Australian facts*, AIHW, Australian Government, accessed 28 October 2022. Australian Institute of Health and Welfare. *Diabetes*. July 2020.
- 9 Australian Institute of Health and Welfare (2022) *Diabetes: Australian facts*, AIHW, Australian Government, accessed 31 October 2022.
- 10 Ibid.
- 11 Lee C, Colagiuri R, Magliano D, Cameron A, Shaw J, Zimmet P, and Colagiuri S, 2013. The cost of diabetes in adults in Australia. *Diabetes Research and Clinical Practice*, 99(3), pp.385-390.
- 12 Deloitte Access Economics. (2014) *Productivity impacts of diabetes*.
- 13 National Diabetes Services Scheme. (30 Sept 2022) *NDSS Snapshots – All Types of Diabetes* [Fact Sheet]. National Diabetes Services Scheme. <https://www.ndss.com.au/wp-content/uploads/ndss-data-snapshot-202206-all-types-of-diabetes.pdf>
- 14 Australian Bureau of Statistics 2014. Australian Aboriginal and Torres Strait Islander Health Survey: Biomedical Results, 2012-13.
- 15 Diabetes Australia, (2020) *Gestational Diabetes in Australia*. <https://www.diabetesaustralia.com.au/wp-content/uploads/Gestational-Diabetes-in-Australia-Position-Statement-2020.pdf>
- 16 Agency for Healthcare Research and Quality. *Gestational diabetes: caring for women during and after pregnancy*. Publication No.09-EHC014-3. 2009
- 17 Australian Institute of Health and Welfare. (2022) *Admitted patients*. Australian Institute of Health and Welfare. 30 Oct 2022. <https://www.aihw.gov.au/reports-data/myhospitals/sectors/admitted-patients>
- 18 Sainsbury, E., Shi, Y., Flack, J. and Colagiuri, S., 2020. The diagnosis and management of diabetes in Australia: Does the “Rule of Halves” apply?. *Diabetes Research and Clinical Practice*, 170, p.108524.
- 19 Australian Institute of Health of Welfare. (2022) *Diabetes: Australian facts*. Australian Institute of Health and Welfare. 16 Sept 2022. <https://www.aihw.gov.au/reports/diabetes/diabetes/contents/about>
- 20 National Diabetes Services Scheme. (30 Sept 2022) *NDSS Snapshots – All Types of Diabetes* [Fact Sheet]. National Diabetes Services Scheme. <https://www.ndss.com.au/wp-content/uploads/ndss-data-snapshot-202206-all-types-of-diabetes.pdf>
- 21 National Diabetes Services Scheme. (30 Sept 2022) *NDSS Snapshots – All Types of Diabetes* [Fact Sheet]. National Diabetes Services Scheme. <https://www.ndss.com.au/wp-content/uploads/snapshots/2013/ndss-data-snapshot-201312-all-types-diabetes.pdf>
- 22 Ibid.
- 23 Australian Bureau of Statistics 2014. Australian Aboriginal and Torres Strait Islander Health Survey: Biomedical Results, 2012-13.
- 24 Hoy WE, Kincaid-Smith P, Hughson MD, *et al.* CKD in Aboriginal Australians. *AMJ Kidney Dis* 2010; 56: 983-993.
- 25 Hare MJL, Zhao Y, Guthridge S, *et al.* Prevalence and incidence of diabetes among Aboriginal people in remote communities of the Northern Territory, Australia: a retrospective, longitudinal data-linkage study. *BMJ Open* 2022;12.
- 26 Ibid.
- 27 Titmuss, A., Davis, E.A., O'Donnell, V., Wenitong, M., Maple-Brown, L.J., Haynes, A., Titmuss, A., Davis, E.A., O'Donnell, V., Wenitong, M., Barr, E.L.M., Boffa, J., Brown, A.D.H., Connors, C., Corpus, S., Dowler, J., Graham, S., Griffiths, E., Kirkham, R., Lee, C., Moore, E., Pearson, G., Shaw, J.E., Singleton, S., Sinha, A., White, G., Zimmet, P., Maple-Brown, L.J., Haynes, A., 2022. Youth-onset type 2 diabetes among First Nations young people in northern Australia: a retrospective, cross-sectional study. *The Lancet Diabetes & Endocrinology* 10, 11-13.
- 28 Bellamy L, Casas JP, Hingorani AD, Williams D. Type 2 diabetes mellitus after gestational diabetes: a systematic review and meta-analysis. *Lancet*. 2009; 373:1773-1779.
- 29 Diabetes Australia, (2020) *Gestational Diabetes in Australia*. <https://www.diabetesaustralia.com.au/wp-content/uploads/Gestational-Diabetes-in-Australia-Position-Statement-2020.pdf>
- 30 Di Cianni G, Lacaria E, Lencioni C, Resi V. Preventing type 2 diabetes and cardiovascular disease in women with gestational diabetes – the evidence and potential strategies. *Diabetes Res Clin Pract*. 2018; 145:184-192.
- 31 Kramer CK, Campbell S, Retnakaran R. Gestational diabetes and the risk of cardiovascular disease in women: a systematic review and meta-analysis. *Diabetologia*. 2019; 62:905-914.
- 32 Diabetes Australia, (2020) *Gestational Diabetes in Australia*. <https://www.diabetesaustralia.com.au/wp-content/uploads/Gestational-Diabetes-in-Australia-Position-Statement-2020.pdf>
- 33 Gabbay-Benziv R, Reece EA, Wang F, Yang P. Birth defects in pregestational diabetes: Defect range, glycemic threshold and pathogenesis. *World J Diabetes*. 2015;6(3):481-488.
- 34 Tomic D, Salim A, Morton J, Magliano D, Shaw J. Reasons for hospitalisation in Australians with type 2 diabetes compared to the general population, 2010-2017. *Diabetes Research in Clinical Practice*. (forthcoming)
- 35 Ohara T, Doi Y, Ninomiya T, Hirakawa Y, Hata J, Iwaki T, Kanba S, Kiyohara Y. Glucose tolerance status and risk of dementia in the community: the Hisayama study. *Neurology*. 2011 Sep 20;77(12):1126-34.
- 36 *Commun Dis Intell* (2018) 2022;46 Epub. 12 Sept. 2022.
- 37 COVID-19 National Incident Centre Surveillance Team. COVID-19 Australia: Epidemiology Report 64: Reporting period ending 31 July 2022. *Commun Dis Intell* (2018). 2022 Sep 12;46.
- 38 Naughtin C, Hajkowicz S, Schleiger E, Bratanova A, Cameron A, Zamin T, Dutta A (2022) *Our Future World: Global megatrends impacting the way we live over coming decades*. Brisbane, Australia: CSIRO.

DIABETES AUSTRALIA

Phone: +61 2 6232 3800

Fax: +61 2 6230 1535

E-mail: admin@diabetesaustralia.com.au

Website: diabetesaustralia.com.au

***Diabetes Australia** recognises the generous support of our partner organisations, none of which have contributed to the content.*

Lilly has been a global leader in diabetes care since 1923, when they introduced the world's first commercial insulin. Today, they are building upon this heritage by working to meet the diverse needs of people with diabetes and those who care for them. Through research, collaboration and quality manufacturing, Lilly strives to make life better for people impacted by diabetes.

Novo Nordisk is a leading global healthcare company, founded in 1923 and headquartered in Denmark. Our purpose is to drive change to defeat diabetes and other serious chronic diseases such as obesity and rare blood and endocrine disorders.

