

‘It’s About Time’ we detected all types of diabetes earlier

Early detection of type 1 diabetes

Failure to recognise the early signs and symptoms of type 1 diabetes such as severe fatigue/tiredness, excessive thirst, frequent urination, and weight loss can mean that diagnosis of type 1 diabetes is delayed and too often these people develop diabetes ketoacidosis (DKA). This is an acute complication which can be life threatening and often requires hospitalisation.

Around one in five people who are newly diagnosed with type 1 diabetes only learn they’ve got type 1 diabetes after presenting to hospital with DKA.¹

In the past year, 3186 Australians were newly diagnosed with type 1 diabetes. That means around 640 people end up in hospital before finding out if they have type 1 diabetes. Around half of these newly diagnosed people are children, and half are adolescents.²

Internationally, rates of DKA at time of type 1 diabetes diagnosis range from around 11 per cent to 80 per cent. This significant level of variance reflects a number of factors including the successful implementation of education campaigns around the early signs and symptoms of type 1 diabetes.³

Diabetes ketoacidosis

Diabetic ketoacidosis (DKA) is a potentially life-threatening complication of type 1 diabetes caused by a lack of insulin. Without enough insulin, the body’s cells cannot use glucose for energy and, to compensate, the body burns fat for energy. This leads to the production of high levels of blood acids, known as ketones, which are also present in the urine.⁴

Signs and symptoms may include dehydration, rapid breathing, vomiting, frequent urination, tiredness, abdominal pain and confusion. In the lead-up to a DKA episode, unexplained weight loss may also be observed. If not treated, urgently DKA can lead to coma, acute kidney failure, cerebral injury or even death.⁵ A person’s breath may develop a specific, sweet smell. Onset of symptoms is usually rapid.⁶

¹ Craig, ME, Wong CH, Alexander J et al. 2009. Delayed referral of new-onset type 1 diabetes increases the risk of diabetic ketoacidosis. *Medical Journal of Australia* 190(4):219.

² National Diabetes Services Scheme 2017, *Type 1 Diabetes Statistical Snapshot at 31 March 2017*, viewed 31 May 2017, <<https://static.diabetesaustralia.com.au/s/fileassets/diabetes-australia/a6bc2b76-18f8-482d-98a4-b41b20cfdb11.pdf>>

³ Usher-Smith, J. A. et al. "Variation Between Countries In The Frequency Of Diabetic Ketoacidosis At First Presentation Of Type 1 Diabetes In Children: A Systematic Review". *Diabetologia* 55.11 (2012): 2878-2894. Web.

⁴ Craig ME, Twigg SM, Donaghue KC, Cheung NW, Cameron FJ, Conn J, Jenkins AJ, Silink M, for the Australian Type 1 Diabetes Guidelines Expert Advisory Group. National evidence-based clinical care guidelines for type 1 diabetes in children, adolescents and adults, Australian Government Department of Health and Ageing, Canberra 2011.

⁵ Australian Institute of Health and Welfare. (2016) *Diabetic ketoacidosis (DKA) among children and young people with type 1 diabetes*. Diabetes series no. 26. Cat. No. CVD 77. Canberra: AIHW.

⁶ Misra, Shivani, and Nick S Oliver. "Diabetic Ketoacidosis In Adults". *BMJ* (2015): h5660. Web. 22 May 2017.

Four T's

To promote awareness of the early signs of type 1 diabetes, the "Four T's" have been developed (by Diabetes UK).

Everyone should know the 4T's of Type 1 Diabetes:

- Thirst - are they really thirsty and unable to quench that thirst?
- Toilet – are they going to the toilet a lot?
- Tired - are they more tired than usual?
- Thinner - have they recently lost weight?

Early diagnosis and early treatment can help people avoid becoming seriously ill with DKA.⁷

Rates of DKA at diagnosis are reduced if there is a higher level of parental education about the symptoms of type 1 diabetes.⁸

Education campaigns work. A successful type 1 diabetes awareness campaign in Gosford decreased the proportion of children who were presenting with DKA at the time of type 1 diabetes from 37.5 per cent to 13.8 per cent.⁹ An Italian awareness campaign slashed these rates from 78 per cent to 12.5 per cent¹⁰.

Early detection of type 2 diabetes

Undiagnosed type 2 diabetes

There may be up to 500,000 Australians with silent, undiagnosed type 2 diabetes.

Complications

There are more than 4,400 amputations every year in Australia as a result of diabetes.¹¹

⁷ "Do You Know the 4Ts of Type 1 Diabetes?". DiabetesUK. N.p., 2017. Web. 31 May 2017.

⁸ Usher-Smith, J. A. et al. "Factors Associated With The Presence Of Diabetic Ketoacidosis At Diagnosis Of Diabetes In Children And Young Adults: A Systematic Review". *BMJ* 343.jul07 1 (2011): d4092-d4092. Web.

⁹ King, Bruce R et al. "A Diabetes Awareness Campaign Prevents Diabetic Ketoacidosis In Children At Their Initial Presentation With Type 1 Diabetes". *Pediatric Diabetes* 13.8 (2012): 647-651. Web.

¹⁰ Vanelli, M. et al. "Effectiveness Of A Prevention Program For Diabetic Ketoacidosis In Children. An 8-Year Study In Schools And Private Practices". *Diabetes Care* 22.1 (1999): 7-9. Web.

¹¹ Australian Commission on Safety and Quality in Health Care, (2016). *Australian Atlas of Healthcare Variation*. [online] Australian Government. Available at: <http://www.safetyandquality.gov.au/atlas/> [Accessed 29 Jun. 2016].

60 per cent of Australians with type 2 diabetes will experience some form of diabetes related eye disease within 20 years of developing diabetes.¹²

Diabetes is the leading cause of end-stage kidney disease.¹³

Around 65 per cent of all cardiovascular disease-related deaths in Australia occur in people with diabetes or pre-diabetes.¹⁴

Complications start before diagnosis

By the time people with diabetes receive a diagnosis, as many as half have already developed one or more diabetes-related complications.¹⁵¹⁶¹⁷

Between 1 in 10 and 1 in 5 people show signs of diabetic retinopathy, which leads to blindness, at the time of a clinical type 2 diabetes diagnosis.¹⁸

The onset of diabetes related retinopathy occurs approximately 4 – 7 years before diagnosis.¹⁹

Up to 48 per cent of people had impaired foot sensitivity at the time of diabetes diagnosis. Impaired foot sensitivity is an early indicator of the potential for serious foot conditions that can lead to amputations.²⁰

Between 17.2 per cent and 26.7 per cent had microalbuminuria at the time of diagnosis. This leads to kidney disease.²¹

¹² Out of Sight: A Report into Diabetic Eye Disease in Australia

¹³ Shaw, J., Tanamas, S., eds. (2012). *Diabetes: the silent pandemic and its impact on Australia*. Melbourne: Baker IDI Heart and Diabetes Institute.

¹⁴ Shaw, J., Tanamas, S., eds. (2012). *Diabetes: the silent pandemic and its impact on Australia*. Melbourne: Baker IDI Heart and Diabetes Institute.

¹⁵ Astra Zeneca. A Call To Action For Early Diagnosis In Diabetes: 2015. Print.

¹⁶ Spijkerman, A., Dekker, J., Nijpels, G., Adriaanse, M., Kostense, P., Ruwaard, D., Stehouwer, C., Bouter, L. and Heine, R. (2003). Microvascular Complications at Time of Diagnosis of Type 2 Diabetes Are Similar Among Diabetic Patients Detected by Targeted Screening and Patients Newly Diagnosed in General Practice: The Hoorn Screening Study. *Diabetes Care*, 26(9), pp.2604-2608.

¹⁷ Harris, M. and Eastman, R. (2000). Early detection of undiagnosed diabetes mellitus: a US perspective. *Diabetes/Metabolism Research and Reviews*, 16(4), pp.230-236

¹⁸ Harris, M., Klein, R., Welborn, T. and Knudman, M. (1992). Onset of NIDDM occurs at Least 4-7 yr Before Clinical Diagnosis. *Diabetes Care*, 15(7), pp.815-819.

¹⁹ Harris, M., Klein, R., Welborn, T. and Knudman, M. (1992). Onset of NIDDM occurs at Least 4-7 yr Before Clinical Diagnosis. *Diabetes Care*, 15(7), pp.815-819.

²⁰ Spijkerman, A., Dekker, J., Nijpels, G., Adriaanse, M., Kostense, P., Ruwaard, D., Stehouwer, C., Bouter, L. and Heine, R. (2003). Microvascular Complications at Time of Diagnosis of Type 2 Diabetes Are Similar Among Diabetic Patients Detected by Targeted Screening and Patients Newly Diagnosed in General Practice: The Hoorn Screening Study. *Diabetes Care*, 26(9), pp.2604-2608.

²¹ Spijkerman, A., Dekker, J., Nijpels, G., Adriaanse, M., Kostense, P., Ruwaard, D., Stehouwer, C., Bouter, L. and Heine, R. (2003). Microvascular Complications at Time of Diagnosis of Type 2 Diabetes Are Similar Among Diabetic Patients Detected by Targeted Screening and Patients Newly Diagnosed in General Practice: The Hoorn Screening Study. *Diabetes Care*, 26(9), pp.2604-2608.

Another study found that 24.6 per cent of adults aged 40 years and over with undiagnosed diabetes had signs of nephropathy (a precursor to kidney disease) and 21.5 per cent had signs of peripheral neuropathy (a precursor to limb amputation).²²

Type 2 diabetes risk assessment and checks

Everyone over the aged of 40 should be screened for diabetes every three years.²³

People at high risk should be screened with a fasting blood glucose test every three years. People who are at high risk include people with an AUSDRISK score over 12, people who have had a cardiovascular event, women who have been previously diagnosed with gestational diabetes, women with polycystic ovary syndrome and people who are using certain kinds of antipsychotic medication.²⁴

Aboriginal and Torres Strait Islander people should begin having risk assessments from the age of 18.²⁵

General statistics

Diabetes is the biggest challenge confronting Australia's health system in the 21st century.

Diabetes is estimated to cost the Australian economy around \$14.6 billion per annum.²⁶

Nationwide prevalence (31 March 2017)

Type 1 diabetes:	118,142
Type 2 diabetes	1,076,970
Gestational	37,424 (during the previous 12 months)
Other	7,615
Total	1,240,151 ²⁷

Around 1.7 million Australians have diabetes. This includes all types of diagnosed diabetes (1.2 known and registered) as well as silent, undiagnosed type 2 diabetes (up to 500,000 estimated).

²² Koopman, R. (2006). Evidence of Nephropathy and Peripheral Neuropathy in US Adults With Undiagnosed Diabetes. *The Annals of Family Medicine*, 4(5), pp.427-432.

²³ The Royal Australian College of General Practitioners. *General practice management of type 2 diabetes: 2016–18*. East Melbourne, Vic: RACGP, 2016.

²⁴ The Royal Australian College of General Practitioners. *General practice management of type 2 diabetes: 2016–18*. East Melbourne, Vic: RACGP, 2016.

²⁵ The Royal Australian College of General Practitioners. *General practice management of type 2 diabetes: 2016–18*. East Melbourne, Vic: RACGP, 2016.

²⁶ 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.

²⁷ National Diabetes Services Scheme figures.

An estimated 2 million Australians have impaired glucose tolerance or impaired fasting glucose (collectively pre-diabetes) and are at high risk of developing type 2 diabetes in coming years.

Evidence shows type 2 diabetes can be prevented in up to 58% of high risk cases.

280 Australians develop diabetes every day. That's one person every five minutes.

Internationally

There are more than 415 million people living with all types of diabetes. That is around one in 11 adults.²⁸

Around \$673 billion is spent on diabetes - around 12 per cent of global health expenditure.²⁹

There are around 5 million deaths per annum for diabetes and related conditions – that is one person every six seconds.³⁰

By 2040, the International Diabetes Federation estimates diabetes-related health spending will top \$800 billion.³¹

By 2040, more than 642 million people will be living with diabetes, around 10 per cent of all adults.³²

The seriousness of diabetes

There is no such thing as 'mild' diabetes.

All types of diabetes are serious, progressive and complex diseases which can have a major impact on quality of life and life-expectancy.

Early diagnosis, optimal treatment and effective ongoing support and management reduce the risk of diabetes-related complications.

Diabetes:

- is the leading cause of blindness in adults³³
- is a leading cause of kidney failure and dialysis³⁴

²⁸ IDF Diabetes Atlas. (2015). Brussels: International Diabetes Federation.

²⁹ Ibid.

³⁰ Ibid.

³¹ Ibid.

³² Ibid.

³³ Shaw, J., Tanamas, S., eds. (2012). *Diabetes: the silent pandemic and its impact on Australia*. Melbourne: Baker IDI Heart and Diabetes Institute.

³⁴ Tanamas, S.K., Magliano, D.J., Lynch, B., Sethi, P., Willenberg, L., Polkinghorne, K.R., Chadban, S., Dunstan, D., Shaw, J.E. (2013). *AusDiab 2012. The Australia Diabetes, Obesity and Lifestyle Study*. Melbourne: Baker IDI Heart and Diabetes Institute.

- is the leading cause of preventable limb amputations³⁵
- increases the risk of heart attacks and stroke by up to four times.³⁶

Types of diabetes

Type 1 diabetes is a serious, autoimmune condition in which the cells in the pancreas that produce insulin are destroyed. Type 1 diabetes can occur at any age. Type 1 diabetes is not linked to lifestyle factors, it cannot be cured and it cannot be prevented.

Type 2 diabetes is a serious, progressive and complex condition in which the body becomes resistant to the normal effects of insulin and/or gradually loses the capacity to produce enough insulin. We don't know what causes type 2 diabetes, however it is associated with both genetic and modifiable lifestyle risk factors.

Gestational diabetes is a form of diabetes that occurs in about 5-10 per cent of pregnancies and usually disappears after birth. It significantly increases a woman's risk of developing type 2 diabetes in the future.

³⁵ Shaw, J., Tanamas, S., eds. (2012). *Diabetes: the silent pandemic and its impact on Australia*. Melbourne: Baker IDI Heart and Diabetes Institute.

³⁶ Shaw, J., Tanamas, S., eds. (2012). *Diabetes: the silent pandemic and its impact on Australia*. Melbourne: Baker IDI Heart and Diabetes Institute.