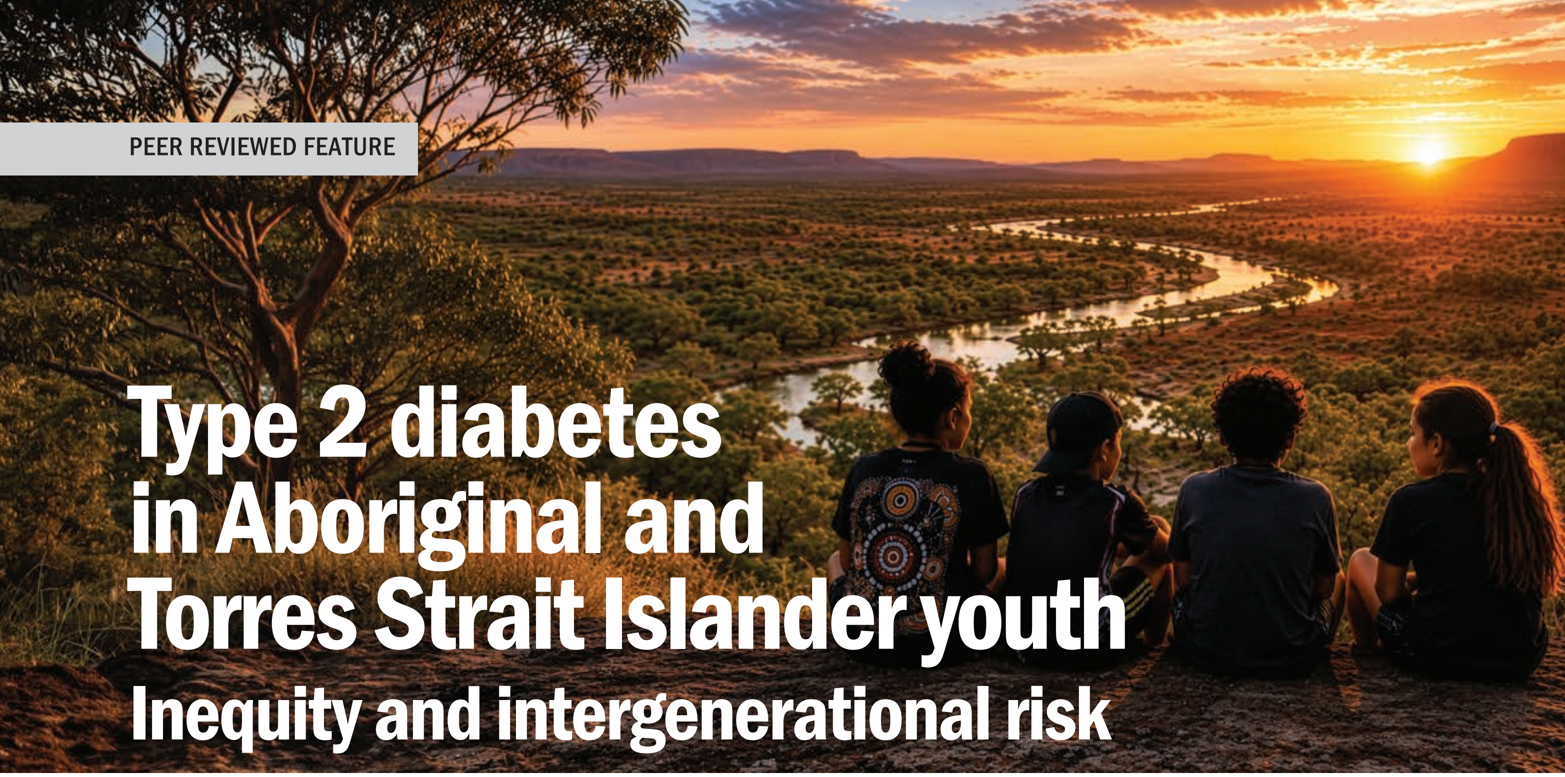

PEER REVIEWED FEATURE

Type 2 diabetes in Aboriginal and Torres Strait Islander youth

Inequity and intergenerational risk

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Aboriginal and Torres Strait Islander young people are at high risk of developing type 2 diabetes. The condition reflects inequity in the social determinants of health and carries significant intergenerational risk. Supportive, holistic and strengths-based healthcare provides the basis for effective primary management.

The prevalence of type 2 diabetes among children and adolescents is increasing worldwide, including in Australia.[1] Youth-onset type 2 diabetes (YOT2D), defined as type 2 diabetes diagnosed before the age of 25 years, disproportionately affects young people from high-risk ethnic groups, particularly First Nations communities.[2,3] This pattern is also seen in Australia, although data for Aboriginal and Torres Strait Islander youth remain limited in some areas, and the risk is likely to vary substantially across language groups and regions. Aboriginal and Torres Strait Islander youth have the highest reported prevalence of type 2 diabetes in the world, at 14.4 per 1000 (95% confidence interval, 12.2–17.0) in the Central Australian region and 6.7 per 1000 (95% confidence interval, 6.0–7.4) across Northern Australia.[4] In Western Australia, the incidence of type 2 diabetes in young people aged less than 16 years is 18.3 times higher in Aboriginal and Torres Strait Islander youth compared with non-Indigenous Australians.[5] Aboriginal and Torres Strait Islander adolescents across Australia also have a 10 times higher likelihood of hospitalisation for type 2 diabetes than non-Indigenous adolescents.[6] In addition, Aboriginal and Torres Strait Islander youth tend to be affected by type 2 diabetes at a younger age than non-Indigenous youth, with cases reported in early childhood.[7]

KEY POINTS

- Youth-onset type 2 diabetes (YOT2D), diagnosed before 25 years of age, progresses more rapidly and is associated with increased cardiometabolic complications compared with later-onset type 2 diabetes.
- In recent years, Aboriginal and Torres Strait Islander young people have experienced the highest reported prevalence of YOT2D worldwide.
- Intergenerational transmission of cardiometabolic risk plays a key role in the high prevalence, particularly through in utero exposure.
- Aboriginal and Torres Strait Islander young people living with YOT2D report stigma and distress at the diagnosis.
- GPs are central to the holistic and multidisciplinary care required to adequately and appropriately support young people living with YOT2D.
- Annual screening for YOT2D using glycated haemoglobin should be undertaken in all Aboriginal and Torres Strait Islander young people with any risk factor.

Although an increase in the prevalence of type 2 diabetes has been seen among all Australian youth over the past 20 years,

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Figure. Intergenerational transmission of risk in youth-onset type 2 diabetes.[11]
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Aboriginal and Torres Strait Islander youth have experienced a much greater rise in new diagnosis rates.[8] Data from Western Australia indicate a high burden of comorbidity in Aboriginal and Torres Strait Islander children with type 2 diabetes, with 59% affected by hypertension, 24% by dyslipidaemia and 61% by obesity.[5] These findings have significant implications for future morbidity and mortality.

However, new phenotypes of type 2 diabetes are emerging in Aboriginal and Torres Strait Islander young people, in which obesity is less prominent. Risk factors for diabetes and metabolic syndrome have been reported at a significantly earlier age and at much higher frequency among Aboriginal and Torres Strait Islander people, suggesting that the prevalence of YOT2D will continue to increase in the future.[9]

Youth-onset type 2 diabetes is a condition of inequity

YOT2D is recognised internationally as a ‘disease of poverty’ and the condition reflects underlying structural and social inequities.[10,11] These inequities contribute to an increased risk of YOT2D and diabetes- related complications, limit access to culturally safe healthcare and effective clinical management, and exacerbate food insecurity. The social determinants of health underpin these inequities by shaping both diabetes risk and the extent to which health systems enable equitable access to care and support effective lifestyle change.[12,13] These social determinants of health have impacts at the individual, family and community level. For Aboriginal and Torres Strait Islander young people, these determinants include education, income, food and housing security, psychological trauma, and structural, commercial and political forces, including the ongoing experience of racism and discrimination.[14] The influence of these factors extends beyond individual behaviours or healthcare quality, accounting for up to 55% of health outcomes.[15] Current models of healthcare often do not adequately address these issues or holistically consider the sociopolitical inequity a young person faces.

A further issue is the limited data on pharmaceutical options for type 2 diabetes in children and adolescents. Globally, it is estimated that only 2% of youth with type 2 diabetes are eligible and able to participate in randomised controlled trials, despite YOT2D being a high-risk condition for poor outcomes.[16] In the limited trials taking place, First Nations youth are particularly under-represented.[16]

Intergenerational transmission of type 2 diabetes

Intergenerational transmission of type 2 diabetes has been described as an epidemic affecting Aboriginal and Torres Strait Islander youth (Figure).[11,17] YOT2D is associated with exposure to maternal hyperglycaemia during pregnancy, compounding any underlying genetic susceptibility to diabetes. This is likely an important factor in the intergenerational transmission of cardiometabolic conditions at successively younger ages, a pattern that has been observed in other First Nations populations worldwide.[18,19] Among First Nations peoples of Canada, 43% of children born to mothers diagnosed with type 2 diabetes in adolescence developed diabetes themselves by 10 to 19 years of age and 25% developed diabetes by 7 years of age.[20]

Offspring exposed to maternal type 2 diabetes during pregnancy are at greater risk of adverse outcomes than those exposed to gestational diabetes mellitus,

1. RISK FACTORS FOR YOUTH-ONSET TYPE 2 DIABETES

- Overweight or obesity (body mass index Z score ≥1 with or without waist-to-height ratio >0.5)
- *In utero* exposure to maternal diabetes, including gestational diabetes
- First-degree relative with type 2 diabetes
- Signs of insulin resistance (e.g. acanthosis nigricans)
- Other conditions associated with obesity or metabolic syndrome (e.g. hypertension, dyslipidaemia, hepatic steatosis, polyendocrine metabolic ovarian syndrome, obstructive sleep apnoea)
- Use of psychotropic medications

potentially reflecting sustained hyperglycaemia preconception and throughout pregnancy.[18] The mechanism of increased cardiometabolic risk may relate to epigenetic changes and in utero organ programming in offspring.[11] This highlights the importance of optimising cardiometabolic health in adolescence and preconception, enhancing the health of any future offspring.

In utero exposures may also influence the diabetes phenotype. The classic phenotype for type 2 diabetes includes a high body mass index, central adiposity and clinical evidence of insulin resistance. However, young people exposed to maternal hyperglycaemia in pregnancy may have less overweight or obesity, lower insulin secretion, milder but evident insulin resistance and earlier onset of type 2 diabetes.[21,22] Aboriginal youth diagnosed with type 2 diabetes before 15 years of age have a lower prevalence of overweight or obesity (87%), compared with those diagnosed between 15 and 24 years of age (97%).[4]

These differing phenotypes are still poorly understood, but in utero organ programming likely affects pancreatic beta-cell function, potentially reducing the age of diagnosis and resulting in altered adiposity to that seen in the past. Waist-to-height ratio, as a marker of central adiposity, may be more clinically useful than body mass index in Aboriginal and Torres Strait Islander youth, using a ratio of greater than 0.5 as a marker of increased cardiometabolic risk.[23,24] The Pregnancy and Neonatal Diabetes Outcomes in Remote Australia (PANDORA) birth cohort study in the Northern Territory, in which 175 women (15%) had type 2 diabetes in pregnancy, is expected to provide further insights into intergenerational risk in Aboriginal and Torres Strait Islander communities as the offspring reach adolescence.[25]

Screening for youth-onset type 2 diabetes

Active screening for type 2 diabetes is recommended in all Aboriginal and Torres Strait Islander young people with any risk factor, even if they are asymptomatic, from 10 years of age or earlier if puberty occurs before this age (Box 1).[24] Upcoming Australian and New Zealand consensus guidelines will lower the recommended age of screening to 8 years. Annual screening can be carried out using glycated haemoglobin (HbA$_{1c}$), including point-of-care testing. An HbA$_{1c}$ level of 6.5% (48 mmol/mol) or more is consistent with a diagnosis of diabetes. Complication screening for cardiometabolic comorbidities should begin at the time of diagnosis.

2. FIVE MAIN THEMES IN THE EXPERIENCES OF ABORIGINAL AND TORRES STRAIT ISLANDER YOUNG PEOPLE LIVING WITH TYPE 2 DIABETES[32]

- Shock, shame and distress at the diagnosis and a sense of isolation from other youth, which can cause disengagement from healthcare
- A normalisation–shame paradox, where stigma exists despite a high diabetes prevalence among family members, contributing to a sense of powerlessness to change their health trajectory
- Complex behaviours relating to the diagnosis, including resentment, denial and avoidance, which affect diabetes self-management
- A lack of understanding of diabetes and recognition that current diabetes education styles and content are not culturally or age appropriate
- Social complexities and competing priorities for youth, including carer responsibilities, which can create challenges in diabetes management

Concerning future trajectories

The concerning trajectory of YOT2D represents an equity issue. The pathophysiology, phenotype, comorbidities, complications and treatment response of YOT2D all appear significantly worse than later-onset diabetes.[2,11] Glycaemic control is chronically suboptimal in YOT2D, with only 14% of Aboriginal and Torres Strait Islander young people living in Northern Australia meeting glycaemic targets.[4] Very limited data are available for non-Indigenous Australian youth. These glycaemic control outcomes are consistent with the situation worldwide; 34% of youth with type 2 diabetes are reported to have HbA$_{1c}$ levels greater than 10% (86 mmol/mol), and 80% to have at least one microvascular or macrovascular complication, at 15 years after diagnosis.[12] Canadian data suggest that almost 50% of youth will have end-stage renal failure by 20 years after diagnosis with type 2 diabetes.[26] YOT2D is associated with a 23 times higher risk of kidney failure and a 39 times higher risk of requiring dialysis compared with young people without diabetes.[26]

The implications for Aboriginal and Torres Strait Islander families and communities are substantial if young people diagnosed with diabetes in adolescence progress to requiring dialysis by 30 years of age. Data from Far North Queensland demonstrate worse outcomes for young people with type 2 diabetes compared with type 1 diabetes, even with shorter diabetes duration and lower median HbA$_{1c}$ levels.[27]

Young people with type 2 diabetes appear to respond differently to pharmacological management, with a higher rate of treatment failure compared with adult cohorts.[16,28,29] In light of these concerns, YOT2D has been described as a ‘severe

TABLE. ENHANCING ENGAGEMENT OF ABORIGINAL AND TORRES STRAIT ISLANDER YOUNG PEOPLE IN DIABETES CARE – WHAT YOUNG PEOPLE WANT YOU TO KNOW[32,33,39]

Focus	Possible strategies	Young people's voices
Be prepared for the shock of diagnosis and subsequent complex emotions	• Consider the young person's priorities and motivators • Share more information at the next appointment if the young person appears to be overwhelmed • Identify supports for the young person	• 'I was full-on crying' • 'I just wanted to get out of there, I didn't want to believe it. It was horrible. Horrible, when I found out' • 'I thought […] just old people [got it] … I didn't know younger people get it as well' • 'It's like your second nightmare, you're running away from it'
Provide hope, acknowledging that the normalisation–shame paradox can lead to a sense of powerlessness	• Support the young person to decide on achievable goals • Explore how everyone's diabetes story is different • Use strengths-based language and carefully consider terminology • Talk about shame and avoid language that blames the individual for their diagnosis	• 'I was a bit scared because my sister's got diabetes, my mum, my grandmother, sort of runs in the blood' • '…before, I wouldn't want to like tell you my story at all because I was pretty much, at first, I was ashamed of it'
Opportunities to improve understanding of type 2 diabetes	• Use simple explanations, diagrams, pictures and videos where possible • Check understanding and health literacy • Ensure consistency of key messages, goals and diabetes education among the healthcare team • Ensure age-appropriate and culturally safe education • Recognise and prioritise Aboriginal and Torres Strait Islander ways of knowing and being	• '[They have] explained it to me heaps of times; I still can't get [it] right' • 'It was the first time I heard "diabetes". I didn't really understand it so I didn't really listen' • 'And 'cause every time I used to research type 2 diabetes it was like – yeah, the information was there, but it wasn't, you might as well say broken down, where it'd be explained simple, just like how we're talking now, just simple'
Importance of psychological and social supports	• Identify key support people in the young person's life, and the role of family • Discuss mental and emotional wellbeing and refer to other services when needed • Link the young person in with other young people living with type 2 diabetes • Consider support beyond the health sector • Screen for psychosocial health. Use the HEEADSSS framework approach exploring the many domains of young people's lives • Engage family members with lived experience of diabetes and explore beliefs and perceptions, acknowledging that these may support or hinder the young person	• 'But it's hard you know. You think you're alone' • 'Confused about what it meant and […] where I could go from there […] but there was hardly any help' • 'It'd be good [to be] around people the same age and stuff you know. Be good to hear their side of the story and how they got it and what they're doing'
Prioritise the therapeutic relationship	• Be flexible with where and when healthcare is provided (i.e. a young person may feel more comfortable to talk outside the clinic) • Focus on building rapport first and find common ground • Prioritise continuity of care • Identify achievable goals • Involve an Aboriginal health or community practitioner where possible • Recognise that young people live in many different environments and are more likely to engage with flexible approaches to healthcare and with trusted people in their lives • Develop processes and structures to facilitate continuity of care when young people move locations or between services	• 'Because the doctor there, she's really good; supportive and she really understands and is concerned' • 'Aboriginal health workers provide "help like family"' • 'I wouldn't listen to the diabetes educator, I'd just be very disrespectful – because I despised her for giving me the diagnosis' • 'It's not easy – you've already got other stuff going through your mind and diabetes is just a thing that just tops it off, you know, takes the cake' • 'Mum would argue with me to go to doctor's appointments and I'd say, "No, I don't want to go," because I wouldn't want the doctor to tell me that … because I haven't taken my medication'

Abbreviation: HEEADSSS = Home; Education and employment; Eating; Activities; Drugs; Sexuality; Suicide and depression; Safety.

aggressive phenotype' and must be considered and managed differently from later-onset type 2 diabetes.[30] Guidelines suggest focused and intensive clinical management, active treatment to tight glycaemic targets, and collaborative shared care between primary healthcare and paediatricians or endocrinologists from the time of diagnosis.[31]

Models of care

Pharmaceutical treatments provide a limited solution in the context of such inequity in social determinants of health and access to services. Research with Aboriginal and Torres Strait Islander young people living with type 2 diabetes has highlighted some key experiences and perceptions that influence their lives.[32,33] Five main themes emerged (Box 2).[32]

Type 2 diabetes is associated with a greater risk of mental health concerns, potentially further isolating affected young people.[34,35] Addressing the social and emotional wellbeing needs of young people is an essential first priority, with ongoing engagement and effective clinical care possible only once this has been achieved.

This research has highlighted the voices of Aboriginal and Torres Strait Islander youth and what they need from health services and health professionals. Current models of care use individual patient education and management approaches that are incongruent with the needs or world views of Aboriginal and Torres Strait Islander youth. Persistent barriers to care include insufficient cultural safety, intergenerational trauma, stigma and shame, structural inequities, and limited understanding by health professionals of young people's priorities and perceptions.[32,33]

There are significant differences in access to health services and multidisciplinary diabetes teams across Australia. Primary healthcare services, particularly community-controlled health services, are crucial in providing culturally safe, contextually relevant and holistic care that addresses the social determinants of health. Effective communication and a collaborative approach between primary care and diabetes services are essential. This includes integrating specialist diabetes outreach services into primary care and acknowledging the fundamental importance of continuity of care and the therapeutic relationship that is developed between the young person and their primary care service.

Aboriginal and Torres Strait Islander young people are facing an intergenerational epidemic of type 2 diabetes

Innovative strategies are urgently required to alter the trajectories for those at risk and to ensure strengths-based models of care. One such strategy is to incorporate peers with lived experience of type 2 diabetes to provide peer support and peer-led diabetes education from the time of diagnosis. This strengths-based approach of engaging peers to support youth affected by YOT2D has been shown in other First Nations populations to be culturally appropriate, strengthen health systems, improve health outcomes and enhance wellbeing, building capacity, connection and support.[36-38] Peers can support continuity of care and facilitate navigation of the health system in a way that is person-centred and enhances cultural safety.

Aboriginal and Torres Strait Islander young people have provided some clear messages to health professionals regarding optimal models of care (Table).[32,33,39] They have called for health professionals to actively explore holistic support that is strengths-based, reduces stigma, and enhances wellbeing and social connections. They have also highlighted the crucial role of Aboriginal health practitioners and community-based workers in providing culturally tailored and contextually appropriate healthcare, acknowledging the unique differences in Aboriginal and Torres Strait Islander communities across Australia.

Young people have called for intersectoral responses to provide wraparound support. Codesign of support strategies with Aboriginal and Torres Strait Islander youth living with YOT2D has highlighted the importance of schools in enhancing diabetes management and capacity building for diabetes self-care.[39] This has also highlighted the need for community awareness of YOT2D to reduce stigma and isolation.[32,39]

Conclusion

Aboriginal and Torres Strait Islander young people are facing an intergenerational epidemic of type 2 diabetes, a condition reflecting inequity and social determinants of health. The condition is associated with a high risk of cardiometabolic complications at an early age. Effective primary healthcare needs to be community-led, person-centred, culturally safe, strengths-based and holistic, aimed at enhancing support, maintaining connection and building capacity. Current evidence gaps in terms of emerging phenotypes, reducing intergenerational risk, effective treatment and enhanced models of care require research that is conducted in true partnership with Aboriginal and Torres Strait Islander communities and reconsiders the existing paradigm. Meaningful progress will depend on ensuring that the voices of Aboriginal and Torres Strait Islander young people, families and communities are central to service design, research priorities and models of care. MT

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A list of references is included in the online version of this article (https://medicinetoday.com.au/mt/2026/july/supplements/type-2-diabetes-in-youth).

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