Type 2 Diabetes: Co-designing models of care with Aboriginal and Torres Strait Islander youth

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Youth health and wellbeing
WHO, Health for the World’s Adolescents 2014

- **Macro**
  - National wealth, income disparities, war/social unrest, effects of globalization

- **Structural**
  - Policies and laws, racism, equity, gender attitudes, discrimination

- **Environment**
  - Physical environment (built environment, urban/rural, water and sanitation, pollution), socio-cultural environment, biological environment (epidemiology), media

- **Organizational**
  - Community values and norms, community networks and support, social cohesion, community and religious leaders

- **Community**
  - Roads, schools (availability, ethos), health facilities (availability, appropriateness), opportunities (for work, for play)

- **Family, friends (peer support), teachers, social networks – expectations, conflict, financial and social capital**

- **Individual**
  - Age, gender, education, knowledge, skills, self-efficacy, expectations
Brain development

A time of vulnerability

• Health risks:
  • substance misuse, physical inactivity, obesity and poor diet

• ↑ non-communicable diseases
Youth type 2 diabetes

- Increasing globally
- Associated with socio-economic disadvantage
- Associated with central obesity
- Higher risk of diabetes complications
- High rate of mental health issues
A 5-year-old girl with type 2 diabetes

Devendra, Dyanne Wilson, Ashim Sinha

In August, 2013, a 5-year-old Indigenous girl accompanied her mother to her diabetes outreach appointment in a remote community in Australia. Towards the end of her consultation, the mother mentioned concerns about non-healing sores on her daughter's hips. Noting the child's obesity, two random blood glucose level tests were done, showing concentrations of 19.2 mmol/L and 18.7 mmol/L. A urine dipstick test was negative for ketones. The girl's mother reported that the sores had been present for roughly 5 weeks, and bedwetting for the past 12 months. There was no history of diarrhea or vomiting. The child was born macroscopic (4.5 kg) at 38 weeks by caesarean section after a pregnancy complicated by poorly controlled gestational diabetes. Her diet was high in large portions of refined carbohydrates and simple sugars. There was a strong family history of type 2 diabetes.

The patient was above the 95th centile for weight (36 kg), body-mass index (24.5 kg/m²) and height (123 cm). Crusted sores on both upper thighs and right axilla were consistent with impetigo. The rest of the examination was unremarkable except for acanthosis nigricans in the axillae and around the neck (figure). The patient had high concentrations of Hba1c (11.9%, normal range 4–6%), or 107 mmol/mol, 23–47), plasma glucose (19.5 mmol/L, 3.0–7.8), C-peptide (1.6 mmol/L, 0.3–1.4), and insulin (201 pmol/L, 14–60). Urine albumin:creatinine ratio was normal (0.3 g/mol creatinine, normal <1.0). Tests for type 1 diabetes autoantibodies and genetic tests for MODY1 (HNF4A) and MODY3 (HNF1A) were negative. The patient was transferred to a tertiary centre and given intravenous antibiotics for infection, and metformin and insulin for type 2 diabetes. When seen for follow-up in November, 2013, she was no longer taking metformin because of intolerance, but remained on insulin. Blood glucose concentrations remained above target levels at 10–13 mmol/L.

Driven by increased urbanisation, high calorie diets, and increasingly sedentary lifestyles, the worldwide rise in the incidence of type 2 diabetes has predominantly occurred in adults. However, children are also being affected. The continued burden of infectious diseases (e.g., respiratory and diarrhoeal illnesses) coupled with an increasing prevalence of chronic diseases (particularly cardiovascular disease and type 2 diabetes) has resulted in Indigenous Australians having an additional 7% disease burden compared with the general Australian population. Remove Indigenous communities are generally socioeconomically poor yet pay high prices for fresh food because of transport costs and limited competition. In addition to adverse socioeconomic determinants, genetic factors and in utero exposure to hyperglycaemia probably contributed to this child's risk of developing type 2 diabetes. The US SEARCH study provides epidemiological data about the incidence of diabetes in young people. In our experience with this population, compliance and good diabetic control is often difficult to achieve and sustain—the TODAY trial showed that even under ideal conditions 52% of children on metformin alone, and 39% of children on combined oral treatments lost glycaemic control (Hba1c >8% for 6 months or required insulin), over an average follow-up period of 3–9 years. Further long-term outcome studies are needed to determine the most efficacious combinations of interventions for type 2 diabetes in children who have extra decades to accrue disabling complications.

Contributions
DK wrote the report and initially managed the patient. DW and AS helped with the review and assisted with referencing, and have provided ongoing care to the patient. Written consent to publish was obtained.

Declaration of interests
AS has been on advisory boards for Sanofi-Aventis and AstaZeneca RMI, has been on speaker sessions for Eli Lilly, AstaZeneca RMI, Novo Nordisk, Sanofi-Aventis, Merrell Sharp & Dohme, Takeda, Servier, and Novartis, and reviewed research grants from Novo Nordisk and Merrell. DK and DW declare that they have no competing interests.

References
Barriers in management

- Socioeconomic disadvantage
- Access to health services
- Competing health needs
- Shame of diagnosis
- Normalisation of diabetes in family
- Food insecurity
- Limited health service resources
- Limited local resources for lifestyle change
- Health literacy
- Mental health

Type 2 diabetes in youth is a disease of poverty

We commend the Review by Russell Viner and colleagues (June 3, p 2252) on the topic of type 2 diabetes in adolescents. We were pleased that the authors acknowledged the crucial importance of the psychological and social challenges that adolescents with type 2 diabetes face. However, few clinical guidelines or expert recommendations acknowledge that these challenges might be grounded in the social conditions in which these adolescents live. Specifically, a substantial proportion of young people with type 2 diabetes live in poverty or socially disadvantaged households (table). Factors that typically co-exist with poverty, such as food insecurity, disparities in access to care, and related mental health challenges, make the adoption of behavioural lifestyle changes, a cornerstone in clinical management of type 2 diabetes, challenging.

McGovack et al, 2017. Lancet
“One cannot tackle the epidemic of youth diabetes without addressing the underlying social issues that contribute to the disease and create barriers to its management…..”

‘If we are to make gains in the health of young Aboriginal people, we must allow their voices to be heard, their ideas listened to and their experiences acknowledged.’

Vicki O’Donnell
(Chairperson from the Aboriginal Health Council of Western Australia)
NT & FNQ Diabetes in Pregnancy Partnership
Aims of the research

• To understand the lived experiences of Aboriginal and Torres Strait Islander youth with Type 2 diabetes in Northern Australia

• To co-design enhanced models of care with young people and relevant stakeholders
Methods

Component 1:

Mixed-methods case-study (youth, carer, health professional)

- **Qualitative methods**: In-depth interviews
- **Quantitative methods**: Medical record & survey data (variables include age of diagnosis, pathology results, smoking and alcohol use, social-economic status, medications, major clinical disease)

Component 2:

Qualitative data collection (youth only)
Progress to date

Ethics:
• Approval in Top End and Central Australia
• Application in progress in FNQ

Sites:
• Top End – identified; awaiting confirmation
• Central Australia & FNQ – community consultation phase
Significance and Innovation

Identification of:
- Knowledge and perceptions of diabetes and its treatment
- Health behaviours that impact its management
- Experiences of care
- Resource gaps
“Because our children, they are – our children’s future. They’re the ones that gotta look after our land, our language, our culture. It’s important.”

Strong Woman Worker
Thank you

- Associate Professor Louise Maple-Brown
- Dr Angela Titmuss
- Youth Diabetes Working Group
- NT & FNQ DIP Indigenous Reference Group
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