How to reduce the burden of type 2 diabetes in Aboriginal and Torres Strait Islander Youth: role of prevention, screening and interventions

Prof Maria Craig

St George Hospital, Children's Hospital Westmead

University of Sydney, University of NSW

AH&MRC Aboriginal Health & Medical Research Council of NSW

Deadly Doctors FORUM 2026

No conflicts of interests to declare

Outline

- Case example
  - T2D in youth is complex
- Aetiology and epidemiology
- Evidence based management of T2D
  - Australian and international guidelines
  - Diet and lifestyle
  - Therapy, including newer agents
  - Sleep
- Long term outcomes – complications, psychosocial
- Screening for T2D in youth
- Prevention – a public health imperative
- PMOS (formerly PCOS)



Angela Titmuss[1,2], Lisa Amato[3], Maria Craig[4,5], Jacqueline Curran[6], Elizabeth Davis[6,7], Gary Deed[8], Amelia Fisher[9], Kung-Ting Kao[9,10,11], Danielle Longmore[9,12], Joanna McClintock[13], Deanne Minniecon[14], Emily Papadimos[1,15], Meredith Paterson[9], Matire Ropiha[16], Shelley Rose[17], Mark Shah[6], Phoebe Stewart[18,19], Esko Wiltshire[20,21], Jencia Wong[22,23], Helen Woodhead[24], Alexia Pena[25,26]


ANZSPED
AUSTRALIA AND NEW ZEALAND
SOCIETY FOR PAEDIATRIC
ENDOCRINOLOGY AND DIABETES


ADEA
Your trusted partner in diabetes care


ads
Australian Diabetes Society


CYHNCN
Child & Youth Health National
Clinical Network


diabetes
australia


diabetes
new zealand


The
KIDS
RESEARCH INSTITUTE
AUSTRALIA


menzies
SCHOOL OF HEALTH
RESEARCH


murdoch
children's
research
institute


NACCHO
National Aboriginal Community
Controlled Health Organisation


New Zealand Society
NZSSD
for the Study of Diabetes


Endorsed
clinical
guideline
RACGP


THE ROYAL NEW ZEALAND COLLEGE OF GENERAL PRACTITIONERS
ENDORSED GUIDANCE
CUM SCIENTIA CARITAS
VALID UNTIL 31 AUGUST 2029
TE WHARE TOHU RATA O AOTEAROA

ISPAD Clinical Practice Consensus Guidelines 2022: Type 2 diabetes in children and adolescents

Amy S. Shah[1] | Philip S. Zeitler[2] | Jencia Wong[3] | Alexia S. Pena[4] | Brandy Wicklow[5] | Silva Arslanian[6] | Nancy Chang[7] | Junfen Fu[8] | Preeti Dabadghao[9] | Orit Pinhas-Hamiel[10] | Tatsuhiko Urakami[11] | Maria E. Craig[12,13]

Pediatric Diabetes, 2022

Case history

- 17 year-old female, pacific islander heritage
- Presented at age 10 with symptoms of diabetes
  - overweight, HbA1c 9.8%
- Mother had type 2 diabetes, died from renal failure at age 49
  - received dialysis for 3 years
- Psychosocial issues requiring child protection unit involvement
  - largely related to support and supervision
- Commenced on lifestyle intervention only
  - HbA1c decreased to 7.9%
- Referred to CHW team due to change of living circumstances
  - commenced Metformin XR graded up to 2g, HbA1c 6.1% after 2 months

Progress

- Despite initial success with treatment
  - ongoing social issues
  - lack of parental supervision
  - missed clinic appointments
  - allied health team unable to contact family
  - financial and social challenges to address lifestyle
- Unclear if regularly taking metformin
- Rising HbA1c
- Increasing BMI

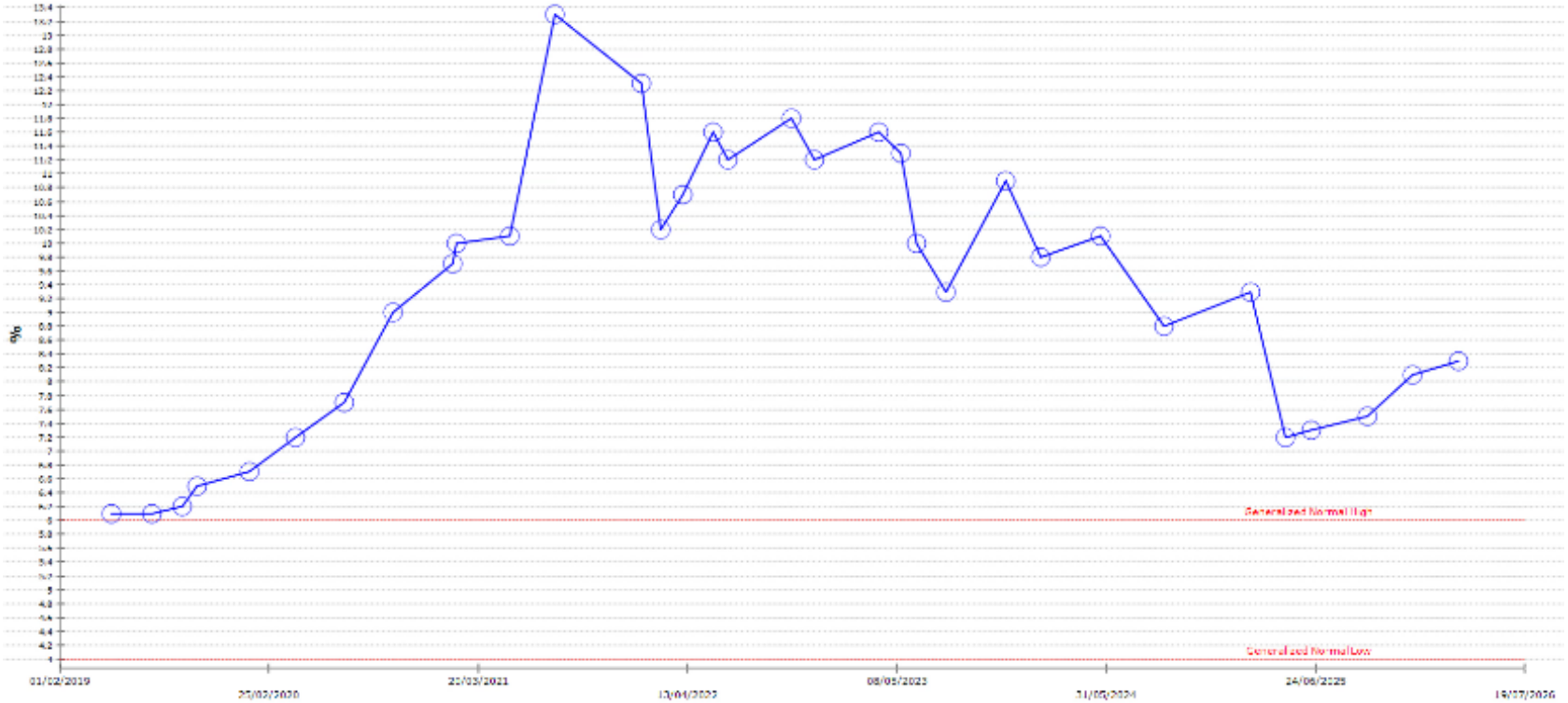
Management

- Insulin commenced at age 13
  - Ryzodeg (degludec/aspart) twice daily
  - CGM (libre)
    - compassionate use, showed both pre and postprandial elevation of BGLs
- Dulaglutide (Trulicity) commenced at age 14
- Quinapril for elevated ACR and hypertension
- Significant allied health team input
- HbA1c remained above target
- Other options?

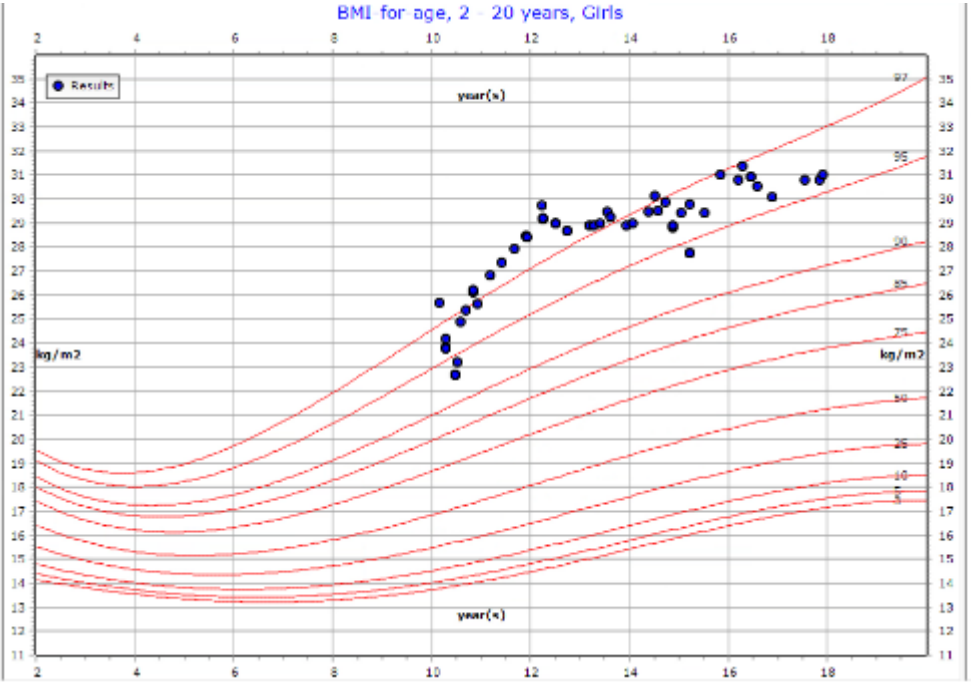
2026 update

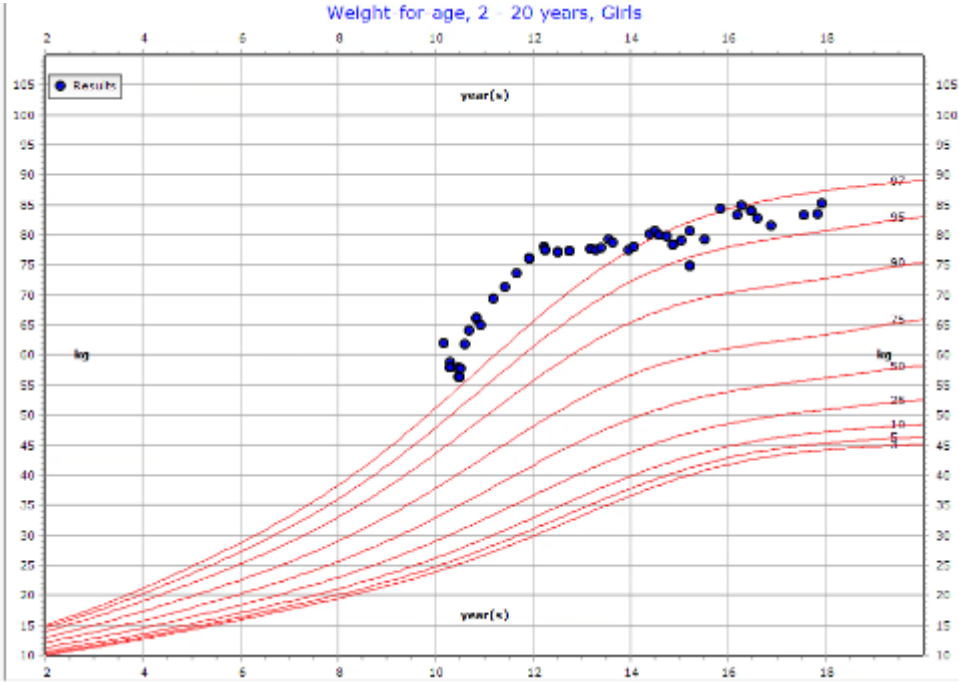
- Ongoing intermittent clinic attendance
- HbA1c
  - Generally between 8-9%
- Renal team review in Jan 2025
  - switched to perindopril/amlodipine (for better renal outcomes), considered SGLT-2
- Commenced Ozempic on 24/02/2025

HbA1c


%
Generalized Normal High
Generalized Normal Low
01/02/2019
25/02/2020
22/03/2021
13/04/2022
08/05/2023
31/05/2024
24/06/2025
19/07/2026

Weight and BMI





So where to from here?

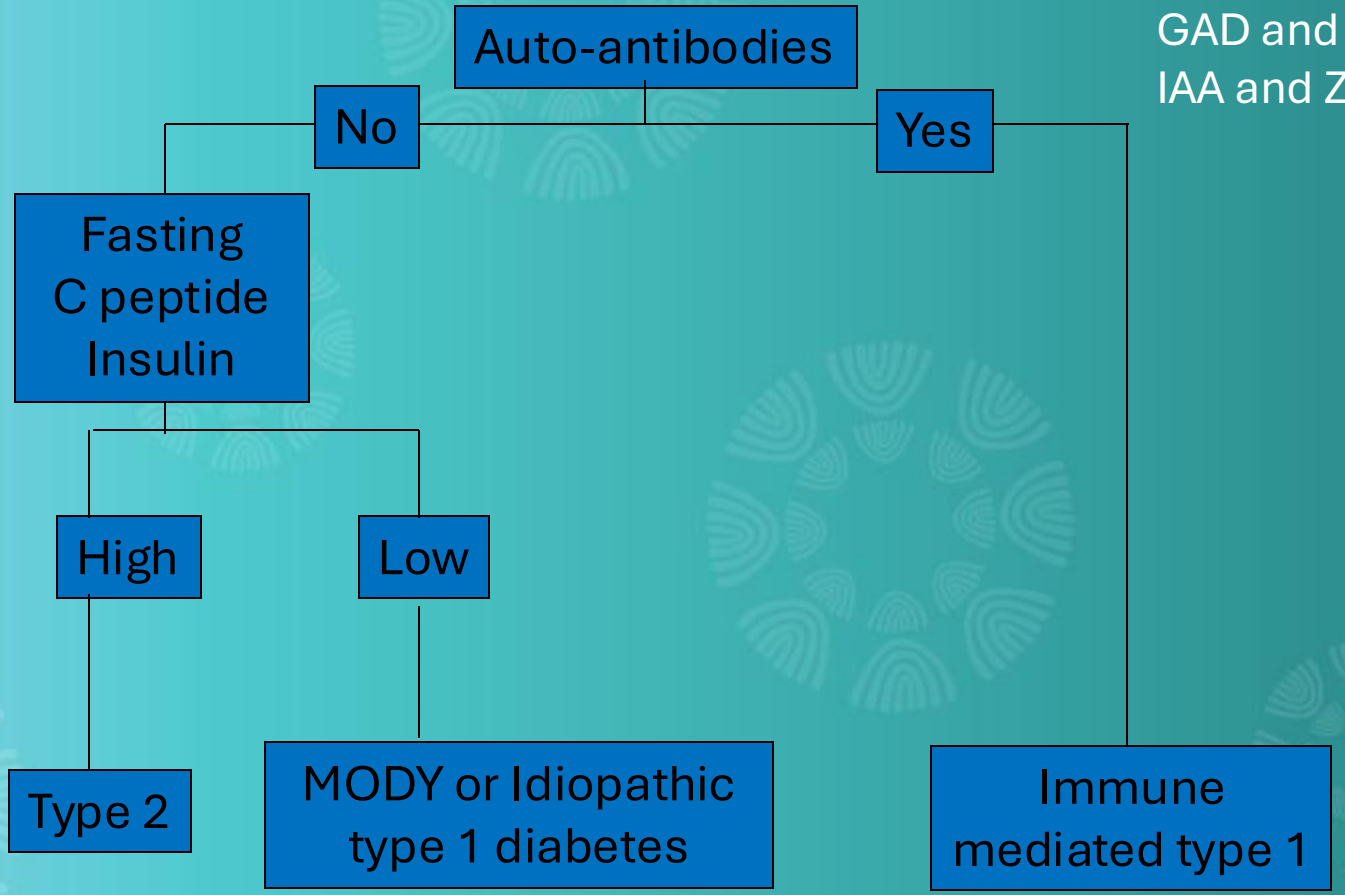
- Does she have type 2 diabetes?
- What is the best service delivery model?
- We know that transition to adult care is challenging
  - Requires both diabetes and renal follow up
  - Complications screening
  - Who is best to co-ordinate care?
- CGM for type 2 diabetes
  - Will it be approved and will it be used?

Does she have type 2 diabetes?

Or monogenic diabetes?



Distinguishing diabetes types



GAD and IA-2
IAA and ZnT8 ?

Diagnosis of T2D in youth

- Classic symptoms of hyperglycaemia and (FPG) ≥7mmol/L
  - or random plasma glucose ≥11.1mmol/L, or
  - HbA1c ≥48mmol/mol (6.5%)
- If asymptomatic
  - HbA1c ≥48mmol/mol (6.5%)
  - FPG ≥7mmol/L
  - 2 hr glucose ≥11.1mmol/L on OGTT (is it needed?)
- Consider factors that may help with diagnosis
  - Clinical signs, age, family history, co-morbidities, ethnicity
- Consultation with paediatric diabetes services
  - Availability of multidisciplinary team support

Type 2 diabetes burden is predominantly in high risk populations

	Indigenous ($n = 180\,481$)*		Non-Indigenous ($n = 4\,902\,872$)*		
	Cases	Incidence	Cases	Incidence	IRR†
Type 2	23	12.7 (8.1–19.1)	98	2.1 (1.7–2.5)	6.1 (3.9–9.7)
Type 1	28	15.1 (10.3–22.4)	1009	21.4 (20.1–22.7)	0.7 (0.5–1.1)

* Population at risk. † Incidence rate ratio (Indigenous v non-Indigenous). ◆

Craig et al, *MJA* 2007

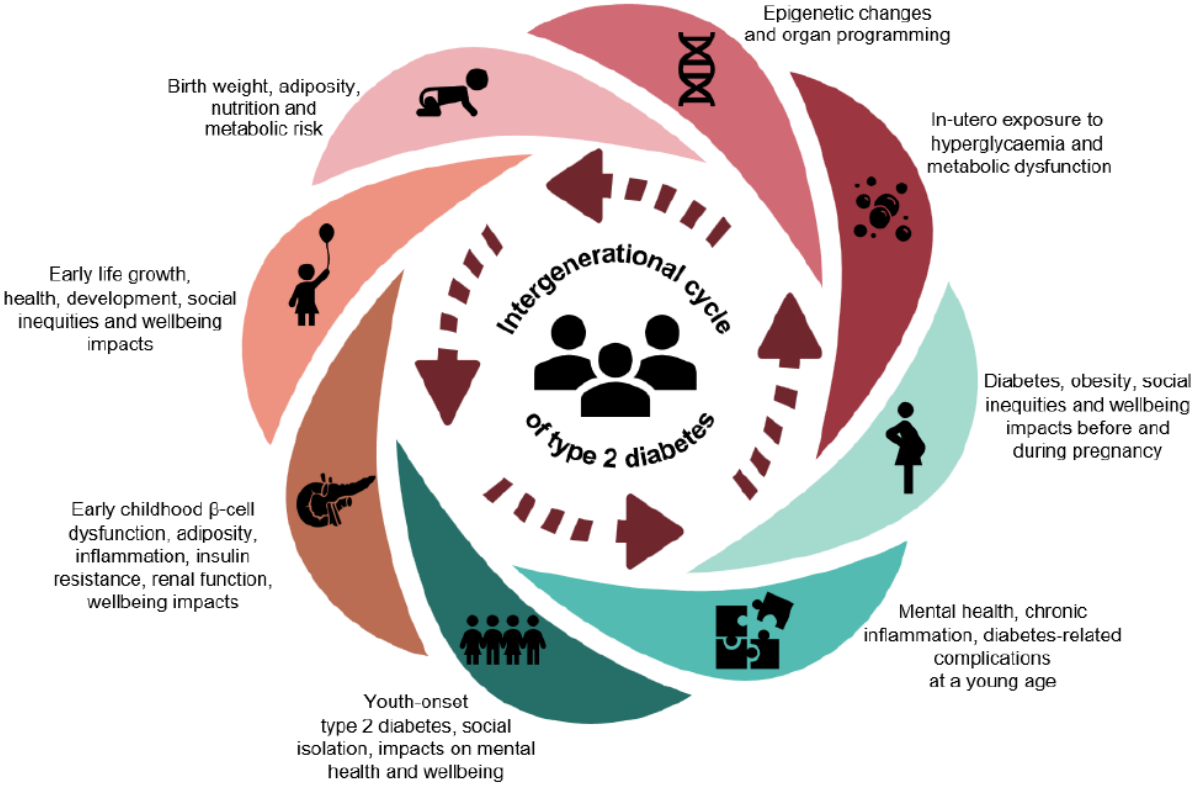
Diagnostic pitfalls

- The presentation T2D in youth may be indistinguishable from T1D
  - ~33% are asymptomatic, detected on screening/random testing
  - ~ 25% of youth with T1D are obese at presentation
  - ~ 33% of youth with T2D have ketosis at diagnosis
  - ~ up to 25% present in DKA
- Diabetes associated autoantibody testing
  - Issues of assay availability, precision and cost
    - GAD and IA-2 most reliable, insulin & ZnT8 problematic
  - Ab+ youth with T2D have severe insulin deficiency & β-cell failure
    - = Type 1 with insulin resistance
- Detailed family history may help point to diabetes type
  - History of early onset diabetes, other autoimmune diseases

Type 2 diabetes in youth vs adults

- T2D rarely presents < age 10 years
- Beta cell decline is faster (3-4 times)
- Insulin resistance is worse (by 50%)
- Associated metabolic comorbidities
  - dyslipidaemia, MAFLD, hypertension, PMOS, neurodivergent, psychosocial
- Complications begin earlier
- Mortality is earlier
- Socioeconomic issues
- Clinic attendance challenging

The intergenerational cycle of T2D



Evidence based management of T2D in youth

- Education from experienced diabetes educators and dietitians in tertiary settings where available
- Shared care model desirable to support culturally safe and holistic approach for education and support – should be tailored
- Telehealth for regional and remote participants
- Evidence based therapy that aligns with PBS criteria
- Acceptable and feasible

Considerations for enhancing engagement



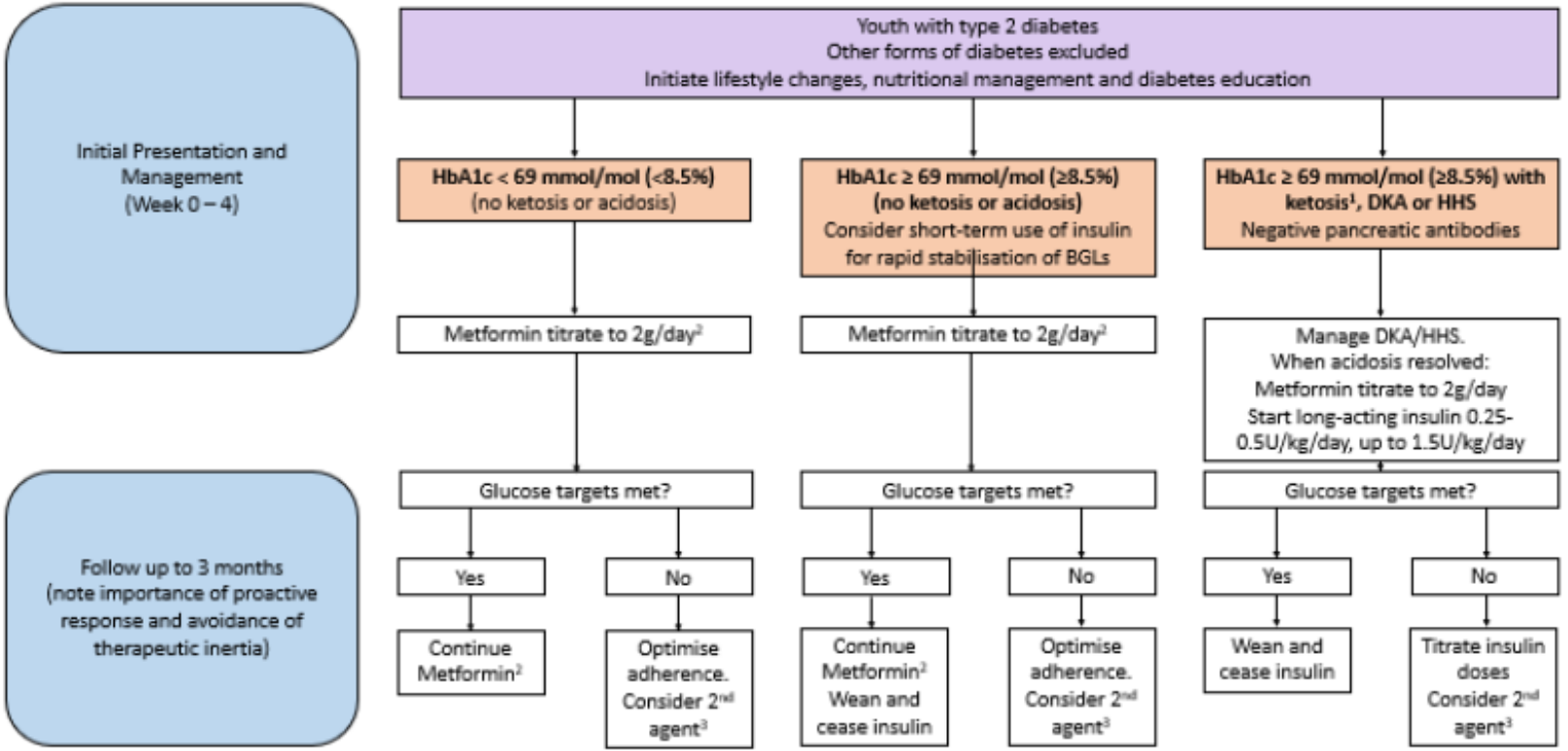
Monitoring

- Individualise frequency and method of BGL monitoring
  - Target blood glucose levels are 4–6 mmol/L (fasting) and 4–8 mmol/L (2 hours postprandial)
  - HbA1c target ≤ 6.5%.
- CGM is recommended for
  - Treatment changes
  - Insulin therapy
  - HbA1c > target
  - Safety concerns
  - ** most CGM devices require a phone

Therapeutic algorithm

- First line: Metformin
  - Except if known renal insufficiency (GFR <50ml/min)
  - Start at 250 mg (if < 40kg) to 500 mg, grade up gradually to 2000 mg
- Insulin if HbA1c > 8.5%
  - In combination with metformin
  - Basal vs MDI
- Second line: if targets not met within 3 months of diagnosis
  - GLP-1RA
  - SGLT2i
  - Renoprotective effect, glycaemia and BMI

Treatment algorithm for T2D in youth



Ongoing review

Ongoing review Hba1c, blood glucose records, growth, lifestyle, comorbidities and annual complications screening.
Ensure adequate resourcing of follow-up and specialist multidisciplinary review occurs to reinforce target blood glucose levels, Hba1c and healthy BMI targets are achieved.

Long-term Follow-up
(minimum 3 monthly visits)

HbA1c ≤ 48mmol/L (6.5%):
Continue current therapy.
If on insulin, wean insulin if possible
If unable to wean insulin, consider starting 2nd agent[3]

HbA1c > 48-75mmol/L (6.5-9%):
If on Metformin only – considering starting 2nd agent[3] (consider using GLP1RA for obesity indication if Hba1c < 7%)
If on Metformin/2nd agent, maximise both medications and consider adding basal insulin
If on basal insulin – consider adding prandial insulin
If adherence issues, review strategies to improve adherences
Check understanding of diabetes self-management/reinforce healthy lifestyle management
Increase frequency of reviews and continuous glucose monitoring if available/affordable

If HbA1c ≥75mmol/L (9%):
Consider elective admission
Start insulin if not on insulin

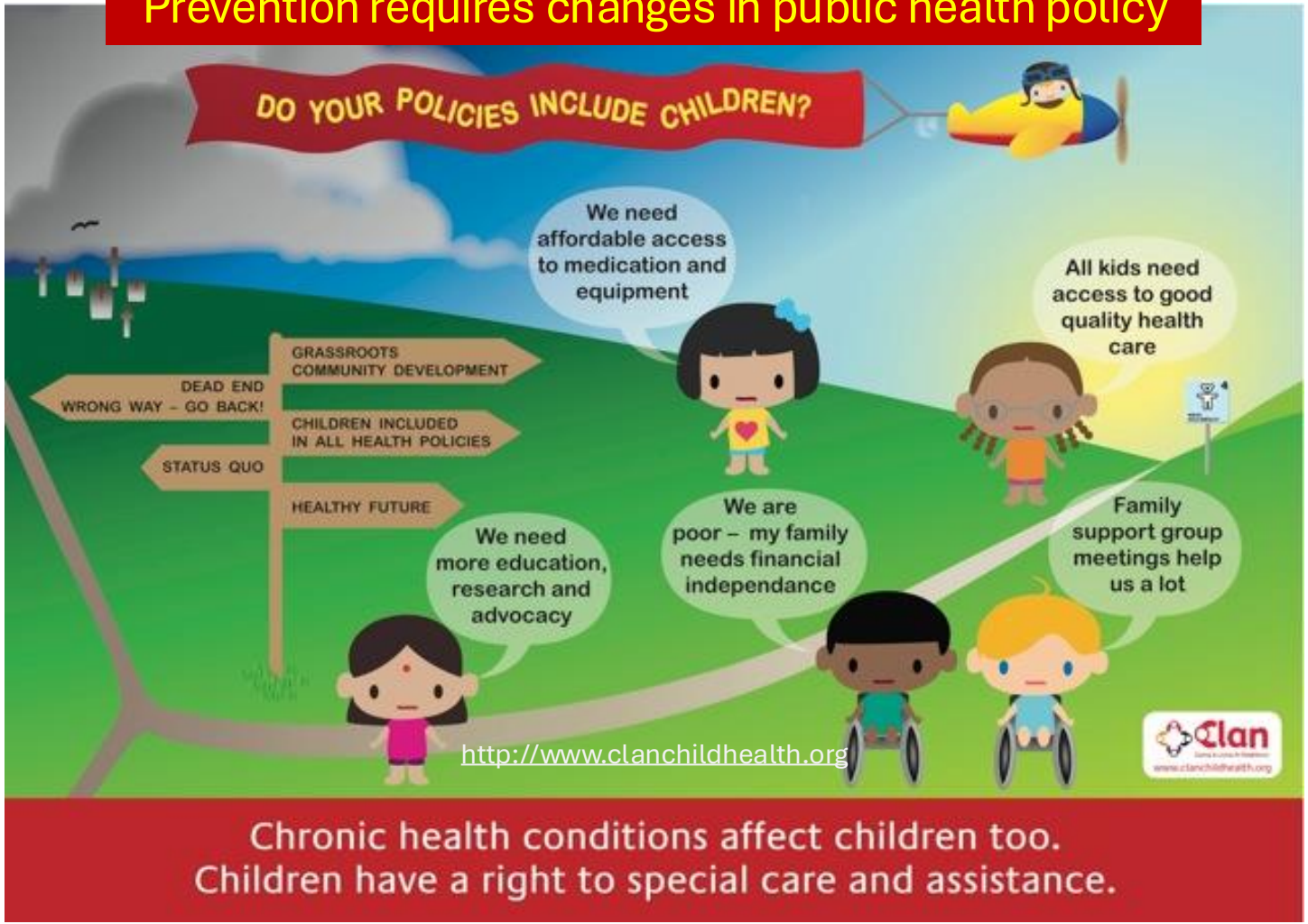
Complications and comorbidity screening

- Retinopathy
- Nephropathy
- Autonomic and peripheral neuropathy
- Hypertension
- Dyslipidaemia
- MAFLD
- OSA – an often unrecognised comorbidity
- Psychosocial
  - Mental health, eating disorders, substance abuse, family situation
- Reproductive health
  - POMS, hyperandrogenism
  - Contraception

Screening and Prevention of T2D in youth

- Identification of high-risk youth
  - Height, weight, BMI, clinical signs and family history at any clinical encounter, where possible
  - Recognition that BMI should be interpreted in the context of activity levels
- Public health initiatives
  - School policies regarding healthy eating
  - Sugar tax?
  - HbA1c screening – at GP, ED, other
  - Screen time vs activity policies – is this a lost cause?

Prevention requires changes in public health policy



Targeted screening

- Targeted screening should occur in youth aged ≥ 10 years (≥8 years in First Nations youth) and in those with risk factors
  - *in-utero* exposure to maternal diabetes, GDM
  - first degree relative with type 2 diabetes
  - signs of insulin resistance (acanthosis nigricans)
  - other conditions associated with obesity and metabolic syndrome (hypertension, dyslipidaemia, fatty liver disease, PMOS, SGA)
  - use of anti-psychotic medications;
  - high risk ethnicity: First nations, Southeast Asian, Subcontinent, Middle Eastern

PMOS

- The diagnosis of PMOS s in adolescents requires stricter criteria vs adults because cycle irregularity is normal in the first 3 years post-menarche
- Diagnostic criteria:
  - not before 3 years post-menarche
  - persistent cycle irregularity (cycles >90 days or <9 per year) plus clinical or biochemical hyperandrogenism
  - ultrasound should NOT be used as a criterion in adolescents within 8 years of menarche (polycystic ovarian morphology is common in healthy teens)
- Management:
  - Lifestyle, family based approach
  - Avoid using OCP within 3 years post menarche
  - Metformin for insulin resistance
  - Mental health screening

Conclusions

- Characterising the diabetes type in youth is important for acute and long term therapy and monitoring
- Most youth with T2D diabetes require combination therapy or insulin
  - within a few years after diagnosis
- Trends in diabetes complications indicate high risk in youth onset T2D
  - Paucity of longitudinal data
- PMOS diagnostic criteria differ between adolescents and adults
  - Lifestyle factors > medical intervention within 3 years of menarche
- Screening and prevention of T2D in youth must involve public health policy and targeting risk factors

What does the future look like?



A world without diabetes?

This is not an unrealistic goal