Optimising diabetes care

for Aboriginal and Torres Strait Islander communities

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Aboriginal and Torres Strait Islander Australians have a significantly higher prevalence of type 2 diabetes than the overall Australian population. Issues such as social determinants of health, medication adherence, food security and medical comorbidities are important to consider when managing diabetes in these peoples.

Case scenario

A 62-year-old Aboriginal woman from the Tiwi Islands was seen by an endocrinologist on an outreach visit because she had a high glycated haemoglobin (HbA_{1c}) level. Her HbA_{1c} was 119 mmol/mol (13%); she did not monitor her blood glucose levels. Her body mass index was 27 kg/m^2 and her blood pressure 150/95 mmHg. Her feet appeared healthy.

She was reported to be taking all her medication, which included metformin extended release 2000 mg daily, gliclazide modified release 120 mg daily, insulin glargine 42 units twice daily, perindopril 8 mg daily, amlodipine 5 mg daily and atorvastatin 40 mg daily.

Key points

- **Simple medication regimens with once-daily dosing are preferred for Aboriginal and Torres Strait Islander Australians with diabetes.**
- **Check at every visit whether the individual is taking all their diabetes medications (poor HbA_{1c} may be due to not taking all prescribed medications).**
- **Enquire about food supply and reliability of food intake.**
- **Resolve concerns with safekeeping of insulin in homes with small children.**
- **Show flexibility and arrive at mutually acceptable goals and means to achieve these goals.**
- **Understand the social determinants of health impacting on the person's home and life situation.**
- **High staff turnover in remote primary health care is a challenge and strong interpersonal relationships between members of the primary health care team and between the team and the patient are crucial.**

Type 2 diabetes in Aboriginal and Torres Strait Islander communities

Compared with the overall Australian population, Aboriginal and Torres Strait Islander Australians have a significantly higher prevalence of type 2 diabetes. The differences are most marked in young adults, with rates of type 2 diabetes 10 times higher in Indigenous Australians than in the general population in the 20 to 50 years age group.[1] Prevalence rates of type 2 diabetes in Aboriginal and Torres Strait Islander Australians range from 10% in a central Australian homelands population to 26% in Torres Strait Islanders.[2-4] However, because of the early age of onset of type 2 diabetes and the younger age profile of Aboriginal and Torres Strait Islander populations, crude prevalence rates underestimate the magnitude of the problem.

The high prevalence rates and early age of onset of obesity, diabetes and related chronic diseases in Aboriginal and Torres Strait Islander Australians are similar to the 20th century experience of other Indigenous populations that have experienced dramatic lifestyle changes and urbanisation.[5,6]

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Diagnosis

Screening (often opportunistic on presentation for health care) is frequently how diabetes is identified. In high-risk populations such as Aboriginal and Torres Strait Islander Australians, all adults and children older than 10 years of age with risk factors for type 2 diabetes may be considered for screening for the condition. Routine screening is recommended for all Aboriginal and Torres Strait Islander adults aged 18 years and over. Individuals with central obesity, acanthosis nigricans, skin tags, family history of type 2 diabetes or exposure to diabetes in utero and women with hirsutism, polycystic ovary syndrome or previous gestational diabetes should be screened regularly.

A variety of tools can be used for screening and confirmation, depending on the feasibility, the perceived risk for the individual and their likelihood of being able to return to the clinic. The oral glucose tolerance test (OGTT, 75 g), fasting or random blood glucose level measurement or HbA_{1c} measurement may be used, depending on when and how the person presents to the clinic and the perceived risk. In the absence of symptoms, tests other than the OGTT will need confirmation by repeating the fasting glucose measurement or performing an OGTT and/or measuring HbA_{1c}. In remote communities, point of care HbA_{1c} testing has facilitated screening for type 2 diabetes as performing a complete OGTT or obtaining a reliable fasting blood sample is challenging in remote settings.

Management

The main goals of managing diabetes are the following (treatment targets are listed in Table 1):[7]

- reducing the risk of microvascular complications – by adequate glycaemic management
- reducing the risk of macrovascular complications – by multifactorial intervention (blood pressure, lipid and weight management)
- reducing other cardiovascular risks – by addressing smoking, physical activity and alcohol use and also the use of antiplatelet therapy where appropriate.

As with other chronic conditions, the best outcomes are possible when people with diabetes are empowered with skills and knowledge for self-management. Education should be provided in a culturally appropriate way, preferably in the person's first language. The lifestyle and dietary changes suggested should be realistic in the person's community; for example, healthy foods are costly and their availability is limited in remote community stores. Healthcare providers should be familiar with the particular dietary and cultural practices of the communities where they work. Sales data from remote community food outlets have revealed high consumption of calorie-dense but nutrition-poor foods such as refined carbohydrates (sugar, flour, bread, milk powder) and soft drinks, compared with consumption of fresh vegetables, meat and fruit, which are more costly.[8] Traditional foods (e.g. turtle, dugong, fish, mangrove worms, snails and monitor lizards) are also consumed to variable extents. It is important to know that Aboriginal and Torres Strait Islander peoples with diabetes may eat very little carbohydrate at one meal and then a large amount of highly-refined carbohydrate at the next meal. It is particularly challenging, but very important, to discuss the relationship between the dose of glucose-lowering medications and the carbohydrate content of meals, and the need to keep the carbohydrate amounts in meals relatively consistent.

Food security is a major concern in Indigenous populations and is a common factor complicating diabetes management in general and adherence to medication in particular. People who are dependent on Centrelink payments may often go without food for several days prior to the next payday. During this period of starvation, they may experience hypoglycaemia and understandably become reluctant to

Table 1. Treatment goals in type 2 diabetes[7]

Clinical parameter	Treatment target
Glycaemic goals: individualise	
General, i.e. for most people with type 2 diabetes	HbA_{1c} ≤53 mmol/mol (≤7.0%)
Specific situations • Diabetes of short duration, with low CV risk • Women planning pregnancy • Recurrent severe hypoglycaemia, hypoglycaemia unawareness • Major comorbidities (limited life span)	 • HbA_{1c} ≤48 mmol/mol (≤6.5%) • HbA_{1c} ≤42 mmol/mol (≤6.0%) • HbA_{1c} ≤64 mmol/mol (≤8.0%) • Treat to avoid symptomatic hyperglycaemia
Nonglycaemic goals	
Blood pressure • Normoalbuminuria or microalbuminuria • Proteinuria of 1 g/day or more	 • <130/80 mmHg • <125/75 mmHg
Lipids • No clinical macrovascular disease • Clinical macrovascular disease	 • LDL-cholesterol <2.5 mmol/L • LDL-cholesterol <1.8 mmol/L
Weight	Loss/control
Other CV risk factors • Smoking • Alcohol intake	 • Cessation • Stop/limit
Exercise	Regular participation
Antiplatelet therapy, known CV disease	Use low dose aspirin

Adapted from the Australian Diabetes Society's Position Statement on glycated haemoglobin targets, 2009.[7]
Abbreviations: CV = cardiovascular; HbA_{1c} = glycated haemoglobin; LDL = low-density lipoprotein.

Table 2. Glucose-lowering medications available in Australia*

Class of drug	Available preparations	Advantages	Disadvantages	PBS restrictions
Biguanides	Metformin	Good efficacy Safe, weight neutral, durable, extensive experience, low hypoglycaemia risk	Gastrointestinal side effects, lactic acidosis, vitamin B_{12} deficiency	Mono, dual, triple therapy and in combination with insulin
Sulfonylureas	Glibenclamide Gliclazide Glimepiride Glipizide	Efficacy, extensive experience, lower microvascular complications	Weight gain, hypoglycaemia risk, low durability	Mono, dual, triple therapy and in combination with insulin
Thiazolidinediones	Pioglitazone Rosiglitazone	Durability, no hypoglycaemia, favourable lipid changes	Weight gain, fluid retention, fractures, heart failure	Dual and triple oral therapy with insulin
DPP-4 inhibitors	Alogliptin Linagliptin Saxagliptin Sitagliptin Vildagliptin	Low hypoglycaemia risk, weight neutral, well tolerated, safe in chronic kidney disease with dose modification	Modest HbA_{1c} reduction, rhinitis, nausea, pancreatitis, urticaria	Dual and triple oral therapy
GLP-1 receptor agonists	Exenatide twice-daily injection Exenatide once-weekly injection† Liraglutide†	Weight loss, low hypoglycaemia risk	Injections, gastrointestinal side effects, pancreatitis	Exenatide twice-daily injection: dual or triple therapy (metformin +/- sulfonylurea, or metformin + insulin)
SGLT-2 inhibitors	Dapagliflozin Empagliflozin Canagliflozin†	Weight loss, lowering of blood pressure	Genitourinary infections, dehydration, postural symptoms, diabetic ketoacidosis	Dual and triple oral therapy and in combination with insulin
Alpha-glucosidase inhibitors	Acarbose	No hypoglycaemia, reduced postprandial glucose	Gastrointestinal side effects, dosing frequency, modest HbA_{1c} reduction	–
Insulins	Rapid-acting insulins Short-acting insulins Intermediate-acting insulins Long-acting insulins Premixed insulins	Very effective, reduced microvascular complications	Injections, hypoglycaemia, weight gain	–

* These medications are not specific to Indigenous health.

† Not PBS listed (i.e. exenatide once-weekly injection, liraglutide and canagliflozin).

Abbreviations: DPP-4 = dipeptidyl peptidase-4; GLP-1 = glucagon-like peptide-1; HbA_{1c} = glycated haemoglobin; SGLT-2 = sodium–glucose cotransporter-2.

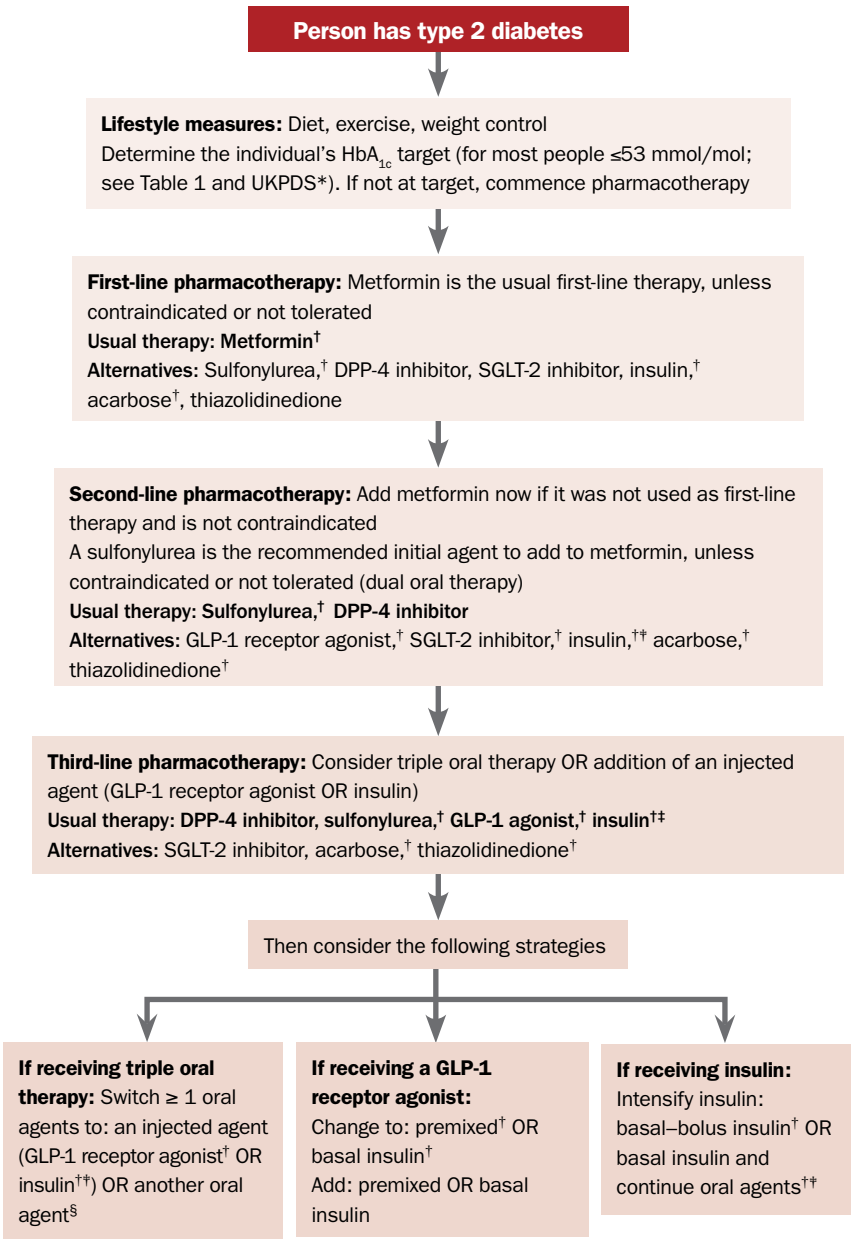
take regular diabetes medication. Poverty tends to influence the choice of foods consumed, with nutrition-poor calorie-dense foods more likely as they are less costly. Overcrowding, alcohol dependence, smoking, gambling and use of illicit drugs add to the challenges of food insecurity. It is thus important to be aware of the possibility of starvation in people who can be obese and have diabetes. Advise individuals to reduce their dose of basal insulin and avoid the use of bolus or premixed insulin and sulfonylureas if they are not eating any food on a particular day or over several days.

Exercise as a means of improving health can be a difficult concept to explain to members of remote Aboriginal and Torres Strait Islander communities. Some practical strategies are to explain exercise in the context of hunting for traditional food, caring for the country and cultural practices such as ceremonies that involve dance. Physical activity advice should be relevant to cultural identity and promote self-esteem.[9]

Pharmacotherapy

The uncontested first-choice medication for people with type 2 diabetes is metformin because of its efficacy, safety, durability of

An approach to selecting pharmacotherapy for people with type 2 diabetes (based on the Australian Diabetes Society's glucose-lowering therapeutic algorithm[10])



Compliance should be assessed before changing or adding new therapies, and therapies that do not improve glycaemic control should be ceased.

Abbreviations: HbA_{1c} = glycated haemoglobin; DPP-4 = dipeptidyl peptidase-4; GLP-1 = glucagon-like peptide-1; SGLT-2 = sodium–glucose cotransporter-2.

* United Kingdom Prospective Diabetes Study 33. Lancet 1998; 352: 837-853.

† Therapies potentially subsidised by the PBS.

‡ Unless metformin is contraindicated or not tolerated, it is often therapeutically useful to continue it in combination with insulin in people with type 2 diabetes.

§ Switching to another oral agent is likely to have the smallest impact on glycaemia.

Adapted from the Australian Diabetes Society's blood glucose management algorithm for type 2 diabetes, published in Med J Aust 2014; 201: 650-653.[10]

glucose-lowering effect and no or low risk of hypoglycaemia. The choice of second and subsequent agents used for glucose lowering should take into consideration the needs of the individual, including issues such as food security discussed above, according to clinical guidelines (Table 2 and the flowchart).[10]

The medical practitioner should individualise the glycaemic and nonglycaemic goals of treatment in consultation with the person with diabetes (Table 1). The coexistence of significant medical comorbidities such as chronic kidney disease and ischaemic heart disease adds complexity to medication choice and the regimen needs to be modified accordingly. The frequency of follow up and intensity of management should be acceptable for the person, and understanding each individual personal circumstance and showing flexibility is essential for achieving and maintaining treatment targets. Gaining the trust of the person with diabetes is essential for adherence with medication.

Using metformin in combination with dipeptidyl peptidase (DPP-4) inhibitors, glucagon-like peptide-1 (GLP-1) receptor agonists or sodium–glucose cotransporter-2 (SGLT-2) inhibitors instead of with sulfonylureas should be considered when food intake is not regular or assured. The once-weekly GLP-1 receptor agonist exenatide (not PBS-listed) has potential use in remote communities where it could perhaps be administered at the health centre weekly.

What is the role of the GP?

A multidisciplinary team is crucial in the management of people with type 2 diabetes and the GP plays the central role in this team. Evidence supports the use of a systems-based approach to the management of type 2 diabetes in Aboriginal primary health care, with the GP being key to this approach.[11,12] The GP liaises with other members of the multidisciplinary team, particularly diabetes educators and dietitians, and assesses and manages blood glucose control, diabetes complications and cardiovascular risk. The GP refers people with diabetes to specialists as required, including referral to an endocrinologist in the following situations:

- type 1 diabetes

- uncertainty whether type 1 or type diabetes
- youth-onset type 2 diabetes
- uncertainty about which next step after dual or triple oral agents
- lack of response to insulin
- dose of more than 100 units/day of insulin
- preconception planning in people with type 1 or type 2 diabetes.

GPs should review Aboriginal and Torres Strait Islander people with type 2 diabetes frequently because, with the young age of onset of type 2 diabetes in these peoples, the condition may progress more rapidly than in non-Indigenous populations, requiring more rapid revision of treatment and closer screening of micro- and macrovascular complications.

Strategies to address management challenges

Aboriginal health practitioners play an important role in the multidisciplinary team for managing type 2 diabetes in Aboriginal and Torres Strait Islander communities, including for diabetes education, support of self-management and diabetes care.[13] Diabetes nurse educators and practice nurses also play a key role in the team, supporting education, self-management and continuity of care. Keeping the messages clear, concise and simple for people with diabetes and for all members of the multidisciplinary team is important. Consistently using the same clinical guideline assists with this, and we support use of the CARPA Standard Treatment Manual, developed by the Central Australia Rural Practitioners Association (CARPA), in our region (the Northern Territory) and encourage health practitioners to adopt any one of the standard primary care guidelines for their region.[14]

Complex medication regimens can be a challenge in the disadvantaged and resource-poor setting of Aboriginal and Torres Strait Islander communities. However, with the current very high diabetes complication rates in Aboriginal and Torres Strait Islander communities, early aggressive treatment is required from a young age. Lack of resources and continuity of care, and low levels of education and socioeconomic status unfortunately limit this.

Strategies that we have developed to assist with these challenges include the involvement of Aboriginal health practitioners and the use of the CARPA Standard Treatment Manual as outlined above. In addition, primary healthcare workers are supported by diabetes educators in the introduction and use of insulin and other injectable agents in Aboriginal health settings, both remote and urban. Use of basal insulin is frequently required with increasing duration of type 2 diabetes, and this may be at a relatively young age for Aboriginal and Torres Strait Islander peoples with diabetes. Insulin can be used without a home refrigerator: an esky or ice pack is used for the current insulin pen and other insulin pens are stored at the clinic. Home blood glucose monitoring is preferred and recommended for people using basal insulin; if this is not feasible, testing of fasting capillary blood glucose levels in the clinic two to three times a week is adequate for insulin dose adjustment in many circumstances.

Youth-onset type 2 diabetes is a major challenge in Aboriginal and Torres Strait Islander communities, with involvement of a multidisciplinary team and specialist endocrinologist and/or paediatrician often necessary.[15] Strategies to address the emerging epidemic of type 2 diabetes among Aboriginal and Torres Strait Islander youth need to commence as early as possible in the life-course. Opportunities to address the intergenerational nature of type 2 diabetes in Aboriginal and Torres Strait Islander communities include the following:

- improving maternal health before conception and between pregnancies, particularly among young women with type 2 diabetes themselves
- optimising antenatal care
- supporting breastfeeding
- other early nutritional interventions.

Case scenario, continued

The woman's very high HbA_{1c} was clearly inconsistent with what appeared to be intensive therapy with the maximum dose of two oral agents and a reasonable dose of insulin. A quick check at the health centre revealed that it had been a while since she had taken any medication. She later reported not using any medication as she had hypoglycaemic symptoms when she ran out of food at home before payday.

Insulin was ceased and she was advised to take metformin daily and gliclazide modified release 120 mg only when she has food at home. The HbA_{1c} measurement three months later was 75 mmol/mol (9%). She was restarted on glargine insulin, to be taken only when she has food at home. Her HbA_{1c} further improved to 64 mmol/mol (8%). Her blood pressure and lipid levels were also optimised by involvement of the community chronic disease nurse in goal setting.

Conclusion

Diabetes care for Aboriginal and Torres Strait Islander people requires a multidisciplinary team approach and an individualised management plan. Simple medication regimens are preferred. Issues such as social determinants of health, medication goal setting, food security and medical comorbidities are important to consider and management goals should be individualised accordingly. Closing the Indigenous health gap requires co-ordinated policies in the government and nongovernment sectors to improve education, employment opportunities and access to health care for Aboriginal and Torres Strait Islander Australians. **ET**

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A list of references is included in the website version of this article (www.endocrinologytoday.com.au).

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