



Submission to the House of Representatives Standing Committee on Health, Aged Care and Sport Inquiry into Diabetes

Introduction

Background - Miwatj Aboriginal Health Corporation; organisational and service overview

Miwatj Health Aboriginal Corporation (Miwatj) is an Aboriginal community-controlled healthcare organisation which provides acute and comprehensive primary healthcare services to 6,000 remote Aboriginal and Torres Strait Islander residents, the Yolŋu people across the EA Land (EA), Northern Territory. The Miwatj mission is "to provide resources and support to Yolŋu to enable them to assume control over their health." Since opening its first clinic in 1997 Miwatj Aboriginal Health Service has continued to maintain this vision and currently operates seven clinics and one well-being centre, with two hundred and forty staff, of whom at least 55% are Yolŋu. The entire EA Region is vast, covering approximately 33 596 square kilometers (see appendix 1- Miwatj Service Area and Health Centre locations) (MHAC, 2022). Miwatj provides NDIS services; application and intake support and support coordination across communities where primary health services are also provided. Primary health service delivery extends across six remote communities, homelands and one regional town in EAArnhem Land, with headquarters in Nhulunbuy and a business hub in Darwin. Additionally, in conjunction with Western Desert Nganampa Palyantjakuu Tjutaku Aboriginal Corporation (Purple House) dialysis services are provided at three communities; Yirrkala, Galiwin'ku and Groote Island, while Miwatj supports the delivery of renal services on Groote Island, primary health care is provided by the Northern Territory Government. As a result, the scope of this submission discussion pertains to Ramingining, Galiwin'ku, Milingimbi, Gapuwiyak, Yirrkala, Gunyangara, Nhulunbuy, and the homelands of these communities where primary healthcare service delivery is provided by Miwatj.

Primary health services are provided in health centres and in community by integrated teams of Aboriginal Health Practitioners (AHP), Remote area nurses (RAN), General practitioners (GP), Public Health community-based workers (CBW) and Maternal Early Childhood Sustained Home-visiting (MECSH) staff. Key Public Health programs include Tackling Indigenous Smoking (TIS) Program (Yaka N̄rali) and the Rheumatic Fever and Environmental Health Programs. Community teams are further supported by Miwatj staff employed outreach teams in the areas of Child Health, Maternal Health, Chronic Disease, a focused renal program, Dietetics and Public Health Nutrition, Diabetic Eye Health, Sexual Health, Social and Emotional Well-being services (SEWB), and a Yolŋu family support program (Raypirri Rom). Program teams strive to collaborate and provide services in conjunction with complementary service providers operating within communities. All Miwatj programs are underpinned by a CQI approach supported by the clinical governance and senior leadership team.

Regular tertiary specialist clinics are held on country for major specialties such as cardiology (adult and paediatric), renal, general paediatrics, respiratory, general medicine and hepatic health screening and monitoring (hepatitis B). Waitlists for major services can have 200 plus people outstanding across the

service region at any one time. Additionally, for subspecialties reviews and access to specialised procedures patients may be required to travel to Nhulunbuy, Darwin, Adelaide, or Melbourne.

Additional allied health service provision to Miwatj communities includes physiotherapy, dietetics, diabetes education, cardiac education, and podiatry through the NT Primary Health Network (NTPHN) Medical Outreach Indigenous Chronic Disease Program (MOICD). Miwatj Aboriginal Health Service has the discretion in a confirmed budget to plan and provide a mixture of allied health services. Within the allocated budget Miwatj Aboriginal Health service is able to provide 3-4 visits of 3-5 days at a time per year for major communities and 3-4 visits of 2-3 days at a time for key diabetes services such as podiatry and diabetes education. In remote communities where the number of known diabetics ranges between 200-500 in large communities this precludes accessing services, continuity of care and intense / supported management for many people living with diabetes. Dietetic services are housed internally providing MOICD funded services and a small amount of fee-for-service (NDIS). Most communities receive 1-2 dietitian service days every 2-4 months depending on size.

Northern Territory service provision context

The DIABETES across the LIFECOURSE – Northern Australia Partnership is led by a team at Menzies School of Health Research (Menzies) made up of researchers, policy makers and health service providers and aims to improve systems of care and services for people with diabetes and their families in rural and remote Australia (NT, FNQ & Kimberley) (Menzies, 2019). Miwatj Aboriginal Health Corporation is a partner in a number of projects in the partnership. The DIABETES across the LIFECOURSE – Northern Australia Partnership has provided a clear summary of evidence of the impact on diabetes, specifically type 2 diabetes, for Aboriginal and Torres Strait Islander Australians:

- Diabetes is the leading cause of death for Aboriginal and Torres Strait Islander females nationally and for all Aboriginal people in the NT.
- The Northern Territory population is three times more likely than the general population to have type 2 diabetes.
- Aboriginal and Torres Strait Islander people have the highest rates of youth-onset type 2 diabetes worldwide. The high prevalence of youth-onset type 2 diabetes among female individuals has contributed to very high prevalence of pre-existing diabetes in pregnant women.
- Children born to mothers with type 2 diabetes or gestational diabetes have increased risk of youth onset obesity and type 2 diabetes, contributing to the intergenerational cycle.
- In addition, Aboriginal and Torres Strait Islander people in the NT experience the highest reported rates of chronic kidney disease and lower limb amputations.
- Diabetes research highlights that structural racism and social inequity are contributing to these higher rates of diabetes and poorer health outcomes amongst marginalised populations around the world. These inequities are consequences of colonisation and specifically poverty, food insecurity, the food industry's promotion of unhealthy products, poor living conditions (overcrowding and lack of functioning hardware needed for healthy living practices such as cooking, storing fresh food and hygiene) and intergenerational trauma. These factors are beyond the control of individuals and require systemic, inter-sectoral responses.

Summary

This submission will focus on type 2 diabetes and gestational diabetes. The region of EA, Northern Territory is a vast geographic area in which Miwatj Health provides acute and comprehensive primary health care services for Yolŋu Aboriginal Australians. Research unequivocally demonstrates the impact on health outcomes of type 2 diabetes and gestational diabetes for Aboriginal and Torres Strait Islanders, and this is true for Yolŋu. In the context of type 2 diabetes management and prevention, it is crucial to understand the unique healthcare challenges and disparities confronting Yolŋu people. This complex interplay (including social, cultural, and environmental determinants of health) impacts the development, progression, and management of this condition. As many of our recommendations were relevant to multiple inquiry Terms of Reference, they have been summarised under key themes below rather than linked to specific TOR.

Recommendations

- 1. Engage in structural changes that will reduce rates of type 2 diabetes and related chronic conditions through the improvement of Social determinants of Health**
 - Guarantee and fund housing for Aboriginal and Torres Strait Islander populations that is constructed and maintained to facilitate healthy lifestyle practice.
 - Introduce a subsidy program for nutritious food in remote regions and establish a nationwide sugar tax at a rate of 20%.
 - Fund transport subsidies for food supply to remote communities similar to the recent announcement by QLD Government to provide a \$64 million remote freight subsidy in Far North QLD.
 - Enhance social security benefits, with a specific focus on elevating the remote Centrelink allowance, to account for the added expenses associated with residing in remote areas.
 - Invest in training, recruitment, and retention of the Aboriginal and Torres Strait Islander healthcare workforce in remote communities by supporting employment and career development opportunities with flexible training pathways and entry points for students.
 - Fund initiatives that increase access to traditional foods such as the ranger's program and their efforts to reduce pests, local traditional food production initiatives, and provide funding for existing initiatives to increase instances of access to traditional hunting grounds.
 - Ongoing funding for physical activity programs that provide a diverse range of sports and improvements in infrastructure that are conducive to promoting physical activity with consideration of local social and environmental barriers.

- 2. Implement equitable health service funding models that meet the ongoing needs of remote health services**
 - Long term funding to support the development of Aboriginal workforces.
 - Implement holistic comprehensive primary care models.
 - Develop culturally appropriate and locally relevant resources and health promotion messaging.

- 3. Government bodies work with the Coalition for Healthy Remote Stores (CHRS) and accept the proposed recommendations to the Remote Stores Licensing Scheme as detailed in the joint policy statement [Appendix 2]**
 - NT Government continues to work with the CHRS to implement key policy asks under the new stores licencing scheme.

- NIAA works with CRHS to implement key policy asks into the National Strategy for Food Security in Remote Indigenous Communities.
- Government bodies consider the benefits of implementing CRHS policy asks at a national level.

4. Increased funding and support for remote Maternity and Child Health Continuity of Care models

- Access to funds supporting the development and sustainability of a culturally appropriate Midwifery and Child Health workforce .
- Develop organisational/health service region wide strategies to improve early pregnancy diagnosis and maternity care access to ensure timely sharing of critical information and testing for enhanced embryonic and foetal development.

5. Reduce food insecurity and improve dietary intake of children

- Fund early child education spaces based on socio-economic status and cost of food within regions to provide nutritious food to children.
- Increase funding to School Nutrition Programs (breakfast and lunch) in the NT.

6. Support access to best practice primary health care

- Fund the implementation and evaluation of service delivery models developed in collaboration with Aboriginal and Torres Strait Islander people and communities that are co-designed and community-centered. Ongoing funding should be available to extend successful program trials.
- Fund national and local based programs that support best practice and culturally safe screening, support, and management of type 2 diabetes in Youth.
- Create equity and population health evidence based regulatory frameworks and enablers to access for best practice medications that guarantee access to best practice medication for all Australians including Aboriginal and Torres Strait Islander people.
- Broaden accessibility of subsidies on Flash Glucose Monitoring/Continuous Glucose Monitoring to include access for people with type 2 diabetes with additional subsidies for low-income earners and people living in remote Aboriginal communities.

TOR 1 - The causes of diabetes (type 1, type 2 and gestational) in Australia, including risk factors such as genetics, family history, age, physical inactivity, other medical conditions and medications used.

1.1 Social determinants of Health

Determinants of health are a range of social, ecological, cultural, and commercial factors that influence health status (Public Health Association Australia, 2018). Social determinants of health (SDOH) are the non-medical factors that influence health outcomes. The World Health Organisation (WHO) defines social determinants of health as the conditions in which people are born, grow, work, live and age, and the wider set of forces and systems shaping the conditions of daily life (WHO, 2023). SDOH include factors such as income, socioeconomic position, education, unemployment, food insecurity, housing, physical environment, early childhood development, social inclusion, and access to health services. Key health determinants for Aboriginal and Torres Strait Islander people additionally include factors such as family, kinship, cultural identity, access to traditional lands and language (AIHW, 2022). SDOH can strengthen or undermine the health of individuals and communities (AIHW, 2022).

Disparities in social determinants (particularly education, employment, and income) are largely responsible for the disparity in health outcomes between Indigenous Australians and non-Indigenous Australians (AIHW, 2020). Social determinants accounts for one third (34%) of the gap in life expectancy between Indigenous and non-Indigenous Australians (AIHW, 2022). Indigenous Australians living in the NT have lower levels of education, employment, and income in comparison to non-Indigenous Australians in the NT (AIHW, 2020).

A person's risk of diabetes and outcomes are largely influenced by SDOH. Lower levels of SDOH factors are associated with a higher prevalence of diabetes, poorer glycaemic control, and increased diabetes related mortality (Levy et al., 2022).

Yolngu people living in EA Land are negatively impacted by low socio-economic status, over-crowded housing, food insecurity, remoteness, and unemployment. Employment barriers identified include low literacy levels impacting training, level of education, culturally inappropriate and racial discriminatory workplaces and absence of day cares in some EA communities.

If the Closing the Gap targets are to be achieved, especially in remote areas such as EA, any action on diabetes needs to address SDOH to with community led ideas at the forefront of strategies.

1.2 Maternal Health

Within remote Northern Territory, the prevalence of type 2 diabetes is alarmingly rising, with increased rates of diagnosis within young women (Hare et al. 2023). Currently, statistics show that the incidence of gestational diabetes mellitus (GDM) and pre-existing type 2 diabetes prior to pregnancy, and type 2 diabetes post-pregnancy are growing rapidly, and are found during screening throughout pregnancy care (Hare et al. 2023).

GDM can be defined as a state of hyperglycaemia that is first detected within pregnancy and is currently one of the most prevalent medical complications within pregnancy (Modzelewski et al. 2022). Risk factors for developing GDM include, but are not limited to family history, obesity, smoking during pregnancy, cardiovascular disease, multiparous, pre-existing diabetes and unknown pre-existing diabetes prior to conception (Wood et al. 2021).

Pregnancy complications related to GDM include but are not limited to the following maternal risk factors: pre-eclampsia, high rates of induction of labour, caesarean section, shoulder dystocia and pelvic floor related trauma, ongoing multiorgan involvement such as kidney injury (Ye et al. 2022). Where

GDM is uncontrolled, women also have a higher risk of developing chronic kidney disease (CKD) or end-stage kidney disease (ESKD), future heart disease and a heightened risk of increased blood pressure following a pregnancy that has been complicated by GDM or pre-existing diabetes prior to conception (Hare, et al. 2023).

1.3 Nutrition

Diet is related to many of the risk factors associated with the development of type 2 diabetes. Sustained dietary imbalance with an overall excess in energy, saturated fat and sugar contributes to growing rates of obesity and type 2 diabetes. In Yolŋu communities of EA, many factors have shaped and continue to influence the current population-level diet that reflects this imbalance. The traditional diet of Yolŋu was high in lean meat, seafood, and complex carbohydrates. There were few energy foods, and they were only available in small quantities and in certain seasons (e.g. turtle, honey bags). The seasonal nature of the traditional diet ensured variety, and the activity of hunting ensured physical activity. Food provided much more than just nutrition, offering a connection to the land, lore, and ancestry through ceremony and song lines (Brimblecombe, 2007). After the arrival of colonisers, access to these foods decreased. Rations that were high in simple carbohydrates and low in micronutrients, such as flour and sugar, were introduced and traded for manual labour. Populations were forced out of their traditional hunting grounds, many of which were decimated in pursuit of Western agriculture and grew increasingly reliant on these nutritionally poor rations (Lee & Ride, 2018).

This shift from traditional to Western diets is reflected in general dietary habits seen across remote communities today, where there is a general over-reliance on flour and sugar, and a low intake of complex carbohydrate sources and vegetables (ABS 2018-19). This trend contradicts current evidence-based dietary recommendations for diabetes prevention such as a high intake of vegetables, wholegrains, legumes, healthy (unsaturated) fats, and minimal simple carbohydrates and saturated fat (Uusitupa et al 2019). Though traditional foods are still a core part of many peoples diets in EA, this is declining. Reasons for this include a lack of transport (cars) to take people to hunting areas, and destruction of traditional hunting grounds by introduced pests such as pigs and buffalo (MHAC, 2020). Increasing access to traditional food and hunting practises has enormous potential to improve nutrition related outcomes.

1.4 Food security

Underpinning many nutrition related health outcomes is food insecurity. A complex combination of post-colonial social determinants has resulted in high levels of food insecurity within remote communities, reported to be 76%, and potentially higher (Ferguson et al., 2017). In EA, food insecurity often results in an excessive intake of simple carbohydrates, and a low intake of wholegrains, vegetables, and overall fibre. This is partly because cheap and bulky shop foods that are relied upon to feed families in times of financial distress are often high in simple carbohydrates or fat and low in other nutrients (e.g., flour, sugar, noodles, corned beef).

Typical dietary advice provided to people in times of financial distress is to purchase cheap lines of products (frozen and tinned vegetables, rice, dry or tinned legumes), cook in bulk and store leftovers safely, and reduce the amount of takeaway purchased. This advice is not always suitable for Yolŋu households. Appliances are frequently out of action meaning food cannot be cooked in bulk and stored.

Homes do not always have the equipment required to cook, and cheap shop foods such as dried lentils and frozen vegetables are not familiar within Yolŋu food literacy, nor are most foods affordable.

Complex and logistical factors involved in getting food to remote community stores further impacts food insecurity by increasing prices, these are covered extensively in the recent Inquiry into Food Security in Australia (MHAC 2022). All recommendations and factors that contribute to food insecurity need to be addressed for a sustainable reduction in rates of type 2 diabetes to be possible in remote communities.

1.5 Physical activity

Physical inactivity is a risk factor for developing type 2 diabetes (Yaribeygi et al., 2021). Aboriginal and Torres Strait Islander people, particularly those living in remote communities experience many challenges to participating in physical activity, including physical environment, lack of transport, competing work, family or cultural commitments. Barriers experienced in rural and remote settings similar to EA include lack of diversity in sporting programs, opportunities, pathway/footpath interruptions, fear of dogs, individuals feeling “shame” to participate, climate and limited capacity building opportunities of local people to operate sustainable programs (Allen et al., 2021). To address physical inactivity in remote communities barriers need to be addressed with consideration to local context, with programs being funded on an ongoing basis.

TOR 2 - New evidence-based advances in the prevention, diagnosis and management of diabetes, in Australia and internationally

2.1 Healthy Stores Policy

The Healthy Stores 2020 study (Brimblecombe et al. 2020) clearly identifies practical and impactful steps that can be taken by stores to drastically reduce sugar sales and consumption in remote communities. Using the principles of marketing (Product, placement, price, and promotion), this policy action series encourages healthy choices by manipulating the placement, price, promotion, and products available (Ferguson & Brimblecombe, 2020). This evidence-based strategy has been proven to decrease sugar sales in remote communities (mostly from sugary drinks) and results in no loss of profit for the store (Brimblecombe et al., 2020).

Arnhem Land Progress Association (ALPA) stores have been integral to the implementation of this research. There are five ALPA stores within the most remote Miwatj Health communities. The five non-ALPA stores within the Miwatj Health communities show suboptimal trends of limited, expensive, and poor-quality produce, obvious availability of sugary foods and full sugar drinks, deep fried take-away, and very little use of marketing strategies to encourage healthy choices. In Galiwin'ku, the ALPA stores cannot implement the full Health and Nutrition Policy due to the competition of two private stores (ALPA, 2020). While the Miwatj Nutrition Team is building relationships and working towards improved nutrition policy within these stores, there is significant room for improvement which could be supported by policy actions discussed in TOR 5.

2.2 Youth Diabetes screening, management and support

There is an urgent need to enhance the current model of care for the management of type 2 diabetes across all areas of primary care to address both the increasing incidence of type 2 diabetes in youth and young adults. The current RACGP guidelines for “Management of type 2 diabetes: a handbook for general practice” does not yet identify youth and young adults as a separate cohort requiring special consideration. The position statement from the Australian Diabetes Society Expert Consensus Development Group (also endorsed by Australian Paediatric Endocrine Group and Australian Diabetes Educators Association) titled “Management of type 2 diabetes in young adults aged 18-30”, highlights the increasing incidence in young adults as well as its more aggressive nature in this age group, and also highlights the need for special consideration to be given to Aboriginal and Torres Strait Islander Australians. This is also articulated in the work of The DIABETES across the LIFECOURSE – Northern Australia Partnership (Menzies). Recommendations include increased screening and at a younger age in this youth demographic.

The standard model of diabetes management in primary health, which is based on an annual cycle of care with three monthly reviews, is not adequate to provide the more intensive clinical interventions which are required if we are to provide effective intervention for youth and young adult Aboriginal and Torres Strait Islanders who have been diagnosed with type 2 diabetes. A model of care for the management of type 2 diabetes in young adults will require significantly increased resources than those which are currently available in most primary health care settings and are certainly not currently available in the remote Indigenous clinical environment. Additional work will be required in the remote Indigenous primary health context to ensure a culturally safe and relevant model of care. Additionally, an integrated model of care for the management of type 2 diabetes in youth and young adults requires the combined expertise of primary health care providers AND specialist tertiary health care service providers supported by research to effect the changes in outcomes that are urgently required.

2.3 Self-management technology

The evidence supporting the use of flash glucose monitors (FGM) in type 2 diabetes is currently developing, however a systematic review and meta-analysis conducted by Liang et al. (2022) showed that while the use of FGM did not directly improve HbA1c, improvements were shown through increased time in appropriate BLG range and decreased episodes of hypoglycaemia. Additional research showed improved patient quality of life, self-efficacy of diabetes management, patient satisfaction, reduced diabetes stress (Young & Grobelna, 2021), enhanced patient compliance (Eshen et al., 2020), reductions in acute diabetes events and all-cause hospitalisations and reductions in hospitalised ketoacidosis episodes (except comas) (Krakauer et al., 2021). As FGM are not on the pharmaceutical benefits scheme (PBS) or subsidised through NDSS for type 2 diabetes, they are not accessible to patients with type 2 diabetes in EA. Impacts of this are discussed further in TOR 5.

2.4 Access to best practice medications(Long acting GLP-1 receptor agonists)

There is currently a Long acting GLP-1 receptor agonists which is causing a significant impact in the health outcomes for Aboriginal and Torres Strait Islander peoples living with Type 2 diabetes in Australia. Ozempic is along acting GLP-1 receptor agonists (semitglutide) medication available in Australia which can be taken as once-weekly injection to manage blood glucose levels and HbA1c in people with type 2 diabetes. This medication increases the levels the hormone incretins to help the body by enhancing insulin secretion, supressing glucagon release by the liver, slowing gastric emptying and influencing appetite control. A worldwide shortage of semaglutide has affected Australia since early 2022 when Novo Nordisk was not able to supply Ozempic for PBS used due to an unexpected increase in demand due to off label prescribing for weight loss. The shortage of Ozempic has in turn created a shortage of another Long acting GLP-1 receptor agonists Trulicity (dulaglutide). Trulicity is only approved by the TGA for lowering blood sugar in adults with type 2 diabetes and to reduce the risk of major cardiovascular disease in adults with type 2 diabetes.

The management and regulatory issues surround these shortages are outlined by the Therapeutic Goods Administration:

[About the Ozempic \(semaglutide\) shortage 2022 and 2023 | Therapeutic Goods Administration \(TGA\)](#)

[About the Trulicity \(dulaglutide\) shortage 2022 and 2023 | Therapeutic Goods Administration \(TGA\)](#)

The shortages of these medications have had a significant adverse effect on medication adherence and diabetic control and people living with type 2 diabetes in remote Indigenous communities. In a living context with overcrowding, food security issues, home storage of medication the ability to utilise these medications has created a supportive environment to access and utilise and increase adherence medications. The current situation has undermined these advances in adherence and results has been return to and inability for individuals to achieve optimal diabetic control. There needs to be a regulatory method to ensure access and availability to best practice medication for maximise population health outcome nationally.

TOR 3 - The broader impacts of diabetes on Australia's health system and economy

3.1 Impacts on other chronic conditions – Renal disease

Diabetes is considered the most common cause of chronic kidney disease (CKD) globally (AIHW, 2020). In the NT, the prevalence of Diabetes and CKD is highest in First Nation adults (AIHW, 2020). People living with diabetes and CKD are more vulnerable to diabetic retinopathy and foot complications requiring close monitoring and comprehensive care plans (AIHW, 2020). People living with diabetes and CKD are also more prone to anaemia, metabolic bone disease and infections resulting in acute complications and hospitalisations (AIHW, 2020). Aboriginal and Torres Strait Islander people experience disproportionately high rate of end stage kidney disease (ESKD) in the NT with estimates of 1.8% of Aboriginal people with ESKD in the NT compared to 0.1% of the non-Indigenous population (Li et al. 2018).

3.2 Eye Health

Aboriginal and Torres Strait Islander adults are three times more likely than other Australians to go blind, twelve times more likely to have blinding cataract than other Australians and four times more likely to wait for more than one year for eye surgery than other Australians (The Fred Hollows Foundation, 2020). Ninety-four percent of vision loss for Indigenous Australians is preventable and ninety-eight percent of blindness from diabetes is preventable. Risk of diabetes related vision damage increases the longer someone has diabetes and by how well BLG is controlled meaning that early diagnosis of diabetes and vision loss and appropriate management is crucial in reducing the impact of diabetes related vision damage. Current eye health service provision does not meet the needs of EA communities. With increasing rates of type 2 diabetes particularly in youth, without adequate prevention and management services we are likely to see increases in diabetes related vision damage. Diabetes and eye health programs that complement each other are needed to mitigate this risk.

TOR 4 - Any interrelated health issues between diabetes and obesity in Australia, including the relationship between type 2 and gestational diabetes and obesity, the causes of obesity and the evidence-base in the prevention, diagnosis and management of obesity

4.1 Gestational diabetes in EA, Northern Territory, prevalence and management

With the incidence of GDM continuing to rise, there has been a noted increase in the number of maternal, foetal and neonatal complications, predisposing further health risk to infants and extending into childhood development (Ye et al. 2022). Poor outcomes linked with diabetes within pregnancy include (but are not limited to):

- Maternal: pre-eclampsia, post-partum haemorrhage, shoulder dystocia and the increased risk of induction with potential instrumental or caesarean delivery (Ye et al. 2022).
- Foetal: increased risk of foetal death in utero, poor lung development, macrocosmic growth, congenital malformations during development (Ye et al. 2022).
- Neonate: neonatal hypoglycaemia once born, planned preterm birth linked to induction of labour due to maternal hyperglycaemia, still birth and large for gestational, or small for gestational age (Ye et al. 2022).

Most newborns with a mother who has had any type of uncontrolled diabetes within pregnancy will most likely have an admission to Special Care Nursery or Neonatal Intensive Care for further evaluation and monitoring. Depending on the health status of the newborn, their length of stay can be hours to weeks, placing increased strain on medical services within this area and increasing separation from birth parents.

Not all diabetes in pregnancy (DIP) cases have direct cause to poor maternal or perinatal outcomes across the lifespan, however it is thought that epigenetics influences the increased risk that newborns of mothers with DIP will develop a future risk of obesity and type 2 diabetes themselves (Elliot et al. 2019). The pathway between DIP and offspring with type 2 diabetes risk and development of obesity is known to be mediated by multifactorial exposures including, poor maternal health during pregnancy, pre-conception obesity, socio-economic lifestyle risk such as smoking, and also genetic predisposition (Elliot et al. 2019). It is recommended that further epigenetic epidemiology is required to comprehend the direct cause of exposure to hyperglycaemia in utero and estimated risk predictions of poor health in childhood such as obesity.

Current limitations in funding and shortages of appropriately skilled workforce in the child and maternal health space result in inadequate service provision and poor continuity of care. The gold standard of care is for all GDM clients to be included in an all risk, culturally safe, continuity model of maternity care to enable and ensure clear information exchange and wrap around support for closer monitoring both antenatally and postnatally to improve understandability and compliance with pregnancy diabetic management. This includes improved and sustained funding for Maternal & Early Childhood sustained home visiting which improve contact episodes for high need clients to services. A strong, adequately funded Yolngu workforce is central to the deliver continuity of culturally appropriate services.

4.2 Childhood nutrition – childhood obesity / malnutrition and development of type 2 diabetes

There are strong links between childhood obesity and the development of type 2 diabetes later in life (Sherrif et al. 2019). However, in EA Land and other remote communities, rates of childhood obesity are generally lower than in urban centres, whereas rates of low birth weight and malnutrition in childhood are higher (AIHW 2020). Evidence links low birth weight, malnutrition in childhood, and periods of ‘catch-up growth’ with a higher risk of developing type 2 diabetes later in life (Marcovecchio et al 2020). In EA and many remote communities, the causes of this are complex and relate back to the SDOH and issues around food security discussed in TOR 1. Many families run out of food to give their children, and children are often given sugary food and drinks with in place of the balanced meals required to grow well (MHAC, 2022). These high rates of nutritional disadvantage in children of remote communities may contribute to the high rates of type 2 diabetes that are observed across remote communities today. Child nutrition is a crucial factor in the pathophysiology of diabetes later in life and programs to ensure children are well nourished should be co-designed with community and included in future policy and action to reduce the burden of type 2 diabetes.

4.3 Social Determinants of Health, Nutrition and Food Security

As discussed in sections TOR 1,2 and 5, SDOH, nutrition and food security play a significant role in the development of obesity and type 2 diabetes. Further discussion around the evidence base for prevention and the need to address these topics in order to improve diabetes related health outcomes is discussed in these sections

TOR 5 - The effectiveness of current Australian Government policies and programs to prevent, diagnose and manage diabetes.

5.1 Culturally appropriate information and care

Community consultation conducted by the Miwatj Nutrition Team identified that type 2 diabetes was of significant concern to Yolngu, however, it was felt that adequate information was not easily accessible to the general community and that the messaging that did exist was not detailed enough (MHAC 2022). This is reflected in the literature identifying that simple health messaging around chronic disease is poorly understood by many Aboriginal and Torres Strait Islander people (Lowell et al. 2012) and it does not often consider Indigenous perspectives and world views (Wood et al. 2021). Community members identified that 'sugar was bad' but lacked understanding of why. Participants desired more community-based health promotion outside of the clinics and accessible to all. Though there are extensive diabetes resources available, few are appropriate for remote Aboriginal communities and require significant adaptation or need to be created from scratch. This requires a significant amount of work from an already underfunded and overworked workforce.

At the core of delivering culturally appropriate services is a Yolngu workforce who provide culturally appropriate care and work alongside our non-Yolngu workforce in the development, provision and evaluation of culturally appropriate service delivery.

5.2 Access to high quality care

Access to high quality care is a basic human right. High quality care improves health outcomes for diabetes and other chronic health conditions (Agarwal et al. 2023). Indigenous people living in remote communities, including EA, have the highest need for high quality yet the greatest challenges in accessing it. As discussed in 5.1, Yolngu workforce is key to delivering high quality, culturally appropriate care, as is adequate funding for holistic and comprehensive service delivery models and an appropriately trained workforce.

Access to traveling specialists is one key area impacting the delivering of quality care. Specialist visits are limited and EA residents are often required to travel to Nhulunbuy or Darwin to receive higher level care resulting in time away from family, cultural and work commitments and increased challenges in self-managing chronic health conditions including diabetes.

Allied health practitioners have a key role to play in the prevention and management of diabetes, though many barriers exist for these services to be impactful in remote communities. As an example, at Miwatj Health there is currently only funding for 1.5 FTE dietitians to deliver a community dietetic service across the 7 communities, and 1.5 FTE to deliver a Public Health Nutrition service. These positions are Darwin based as staff housing in EA Land is exhausted. The costs associated with running this service solely through outreach restricts the number of visits, with some communities having only four visits per year. For context, flights to most communities are approximately \$1300 return where internal accommodation is unavailable, basic accommodation (ensuite donga) ranges from \$200-\$320 per night.

A further barrier to the impact of visiting services in EA Land is the lack of on ground support. There are very few resources to support visiting services during outreach visits (e.g., Aboriginal Health Practitioners, cultural liaison officers, interpreters, drivers and transport), as they are often being stretched to cover day to day clinic functions. There is need and community identified want for regular group programs that focus on diabetes prevention and management, though this cannot be effectively

implemented with the current workforce capacity. Establishing a workforce of diabetes focussed community-based workers within each community has the potential to vastly increase the impact and quality of the dietetic service by assisting when service providers are in community, and by providing culturally safe diabetes education and health promotion activities in language.

5.3 Health system financing

Current primary health system funding does not meet the needs of Miwatj Health or the population receiving our services. Current models of funding systemically disadvantage remote Aboriginal and Torres Strait Islander communities (Zhou et al. 2022) where the burden of chronic disease is significantly higher than other regions in Australia. Due to the remote location of Miwatj clinics and the associated costs of service delivery, fee-for-service and Medicare funding models do not provide adequate support for the services delivered through these streams. Additionally, short term funding models rarely allow for the development of ongoing sustainability of health programs. This is a significant barrier to long term sustainable programs and contributes to poor continuity of care, high staff turnover due to poor job security, loss of organisational knowledge and increased costs of ongoing staff onboarding. The funding required to support and expand this workforce also needs to cover increased resources on the ground including vehicles, office and clinical space and either increase worker housing or funding to cover high travel costs.

Improving access to primary care for the management of type 2 diabetes in remote communities improved patient outcomes and resulted in Government costs savings (Thomas et al, 2014). Needs based primary health care funding is a necessary step towards achieving equitable health outcomes and achieving Closing the Gap targets.

5.3 Access to Self-management technology

As discussed in section 2.1 FGM are likely to contribute to improved health outcomes for patients with type 2 diabetes however due to the lack of subsidisation for patients with type 2 diabetes they are inaccessible to patients with type 2 diabetes in EA. Diabetes Australia 2017 Position Statement on Glucose Self-monitoring recommends NDSS subsidies for FGM for people with type 2 diabetes on insulin therapy however this is currently only available to people with type 1 diabetes. This is a missed opportunity to significantly improve health outcomes for people living with type 2 diabetes Australia wide, but especially within EA where the burden of type 2 diabetes is so high. The potential increased use of FGM to reduce acute diabetes presentation and all cause hospitalisation is likely to reduce overall health care cost and strain on remote health services in managing the acute presentations. The broader financial impacts of these subsidies also needs consideration. For example, some type 1 diabetes patients have been required to purchase new phones as their current phones could not support the software required. Appropriate phones are often newer models and more expensive, making FGM even less accessible to the EA population.

5.4 Nutrition and food security policy

Implement a Sugar Tax

Implementing a sugar tax has the potential to encourage industry to reformulate their products to lower sugar versions, and to create a source of tax revenue that can be used for public health gain with an equitable focus on rural and remote areas (WHO, 2017). Modelling shows the WHO's recommendation to implement a 20% sugar tax has the potential to reduce sugar consumption by 20%. A study into the

dietary habits of Aboriginal and Torres Strait Islander Australians revealed an average consumption of eighteen teaspoons of free sugar each day (AIHW, 2020). That is almost double the WHO recommendation, and an estimated two thirds of this comes from sugary drinks.

Affordability of Healthy Food – Subsidies

A sugar tax should be implemented alongside healthy food subsidies in remote communities (Niebylski, 2015) which could be funded through a sugar tax. Brimblecombe et al. (2017) showed that a 20% reduction in fruit and vegetable prices in remote communities resulted in a 20% increase in fruit and vegetable sales. Food prices are up to 56% higher in EA compared to Darwin, the most expensive region in the NT (NTG, 2022). While published data does not yet exist, this is likely due to the increased transport costs from barges. The Queensland Government has recently committed \$64 million in funding to subsidise transport costs to remote communities in Far North QLD. It is predicted that this will improve food security and health and nutrition outcomes, thereby lowering pre-existing government fiscal costs through existing healthcare and preventative disease programs (TCICA, 2023)

Remote Stores Licencing

As discussed under TOR 2, the remote stores licencing scheme which previously sat under NIAA is currently in the process of transitioning to sit under NT Government. Within this transition, there is significant opportunity to increase the accountability of stores for the role they play in community health outcomes and embed specific standards and increase the take-up of actionable and evidence-based strategies to increase healthy choices in store as detailed in the Joint Policy Statement of the Coalition for Healthy Remote Stores (Appendix 2). This is a significant opportunity to improve health outcomes in remote communities in the NT through strengthening requirements towards improved food security, including placement, promotion and pricing incentives on healthy food and disincentives on unhealthy foods. This is likely to result in a significant reduction in sugar purchasing (mainly through sugary drinks) and in time is likely to reduce the burden of type 2 diabetes in remote communities. Miwatj Health sits on the Coalition for Remote Healthy stores and the joint policy asks (Appendix 2) are fully endorsed by our board comprised of twelve Yolŋu leaders from EA and three independent members. There is also opportunity for the benefits of stores licencing to extend beyond the NT by incorporation food security requirements into the National Strategy for Remote Food Security currently being developed by NIAA.

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Joint Policy Statement of The Coalition for Healthy Remote Stores on the NT Government's Community Stores Licensing program

The Coalition for Healthy Remote Stores comprises representatives from state/territory and national non-government retail, health and academic organisations. We recognise the critical role that food retail stores have in preventing and managing preventable chronic disease. We call for action to support storeowner and retailer efforts to improve the healthiness of food retail stores in remote Aboriginal and Torres Strait Islander communities across Australia. Immediate action is needed to reduce the health inequity experienced and improve health outcomes to support the strong future of communities.

Key policy positions

1. We commend the Northern Territory Government for developing the legislative structure within the Food Act 2004 (NT), for the continuation of the Remote Stores Licensing Program (Program) with the sunseting of The Stronger Futures in the NT Act 2012 on 16 July 2022.
2. We commend the Northern Territory Government for working to strengthen the Program, (which remains largely unchanged from its inception in 2007), in line with evidence, remote retail industry standards, and national and international best practice to improve food security and create healthy stores and communities.
3. We recommend that additional requirements of stores be added to the Program to restrict promotion and placement of unhealthy food and beverages. These are:
 - a. no promotional activity on unhealthy food and beverages, including no price promotions or discounts, no volume promotions (e.g., 2-for-1 deals), and no other display material (e.g., posters, shelf stripping),
 - b. no availability of unhealthy food and beverages* in high traffic areas, including store entrance, checkout area and counter, and front-, between- and end-of-aisle displays (except where infrastructure/situations prevent this),
 - c. no placement of sugary soft drinks of more than 600ml in refrigerators,
 - d. less than 40% of refrigerator facings made up of sugar sweetened beverages,
4. We also recommend:
 - a. supply a minimum of 10 fruit and 15 vegetable varieties, and
 - b. store pricing policy that promotes healthy food and beverages and disincentivises unhealthy food and beverages* through measures such as cross-subsidisation, a policy that has been implemented across many stores.
5. We recommend that the Program develop a monitoring and evaluation system that:
 - a. streamlines data collection including the use of tools such as the Market Basket Survey,
 - b. ensures continuous improvement in the Program and its operation,
 - c. routinely reports on the outcomes of the Program in achieving its aims,
 - d. establishes compliance, with mechanisms that support stores to achieve Program conditions, and
 - e. is flexible to incorporate future opportunities, such as participation in an annual benchmarking approach with a dashboard where non-identifiable Program data are publicly available to increase transparency and promote use of available data.

*Unhealthy (also known as discretionary) food and beverages are high in sugar, fat, and salt¹. These include sugary drinks (soft drinks, cordial, and fruit drink), confectionery, sugar, sweet biscuits, cake, ice cream, processed meat, pies and sausage rolls, crisps, deep fried foods (e.g., chips), salt¹.



1. Legislation is increasingly used to shape healthy food retail environments, such as the UK Governments Food (Promotion and Placement) (England) Regulations 2021 to restrict unhealthy food promotions in retail stores.¹
2. Evidence generated with remote community stores shows that for the promotion of healthy food to have a health cost-benefit, strategies need also to be applied that restrict the promotion and placement of unhealthy food and beverages.²
3. In 2018, evidence from the co-designed Healthy Stores 2020 study, showed that restricting price promotion (3a above) and removing the availability in high-traffic areas of unhealthy food and beverages (3b) and only displaying sugary soft drink >600ml on shelves rather than in refrigerators (3c), resulted in significant reductions in sugar purchased (i.e., a 2.8% reduction in free sugars; =1.8 tonnes less sugar from 10 stores in 12 weeks), while not impacting store profit.³ This strategy is now embedded in ALPA's organisational policy, though only partially adopted (3a, 3b) for stores where there is another store/s in close proximity.
4. Modelled data suggest that the reduction in free sugars achieved with the Healthy Stores 2020 strategy could result in a 10% risk reduction in mortality from cardiovascular disease.^{3,4} Chronic disease including diabetes and cardiovascular disease is responsible for over half of the burden of disease experienced by Aboriginal and Torres Strait Islander people whilst diet has been identified as a leading risk factor contributing to this burden.⁵
5. In 2019, the Healthy Stores 2020 Policy Action series was co-designed by 30 storeowners, retailers, government and non-government personnel and academics from the NT and North Queensland. The series outlines best practice actions to aim for, for healthy stores in remote communities in the following areas: 1. Product, Promotion and Placement of Healthy Foods and Drinks, 2. Product, Promotion and Placement of Unhealthy Foods and Drinks, and 3. Price and Price Promotion.⁶
6. The Store Scout App, developed by Menzies School of Health Research, is designed to assess best practice actions in remote stores and provide feedback to stores on areas of practice that could be strengthened.⁷ The use of this tool could be considered in the monitoring and evaluation of a store licensing program.
7. The NT Market Basket Survey reports remote stores consistently supplied on average >10 fruit and >15 vegetable varieties over the last decade,^{8,9} exceeding current licensing requirements.
8. The NT Market Basket Survey reports that a healthy diet costs 52% more in remote communities than supermarkets, with the gap increasing since 2008.¹⁰
9. To address healthy food affordability, many stores negotiate deals with suppliers or cross subsidise healthy food and beverages e.g., fruit and vegetables and bottled water, by increasing the price on discretionary food and beverages e.g., confectionery and soft drink.¹¹
10. Storeowners, retailers, and those who work to support their efforts are leaders in creating policy and developing evidence to create healthy food retail environments in remote communities.¹¹⁻¹⁴

Responsibility and current contacts

The Coalition for Healthy Remote NT Stores is represented by organisations who work in partnership with Aboriginal leaders and community residents to improve food security and healthy stores. Megan Ferguson is the primary contact for the Coalition.

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Version: 14 March 2023

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