

Summary of nutrition among Aboriginal and Torres Strait Islander people



Australian Indigenous HealthInfoNet

The Australian Indigenous HealthInfoNet's mission is to contribute to improvements in Aboriginal and Torres Strait Islander health by making relevant, high quality knowledge and information easily accessible to policy makers, health service providers, program managers, clinicians and other health professionals (including Aboriginal and Torres Strait Islander health workers) and researchers. The HealthInfoNet also provides easy-to-read and summarised material for students and the general community.

The HealthInfoNet achieves its mission by undertaking research into various aspects of Aboriginal and Torres Strait Islander health and disseminating the results (and other relevant knowledge and information) mainly via its website (healthinfonet.ecu.edu.au). The research involves analysis and synthesis of data and other information obtained from academic, professional, government and other sources. The HealthInfoNet's work in knowledge exchange aims to facilitate the transfer of pure and applied research into policy and practice to address the needs of a wide range of users.

Recognition statement

The Australian Indigenous HealthInfoNet recognises and acknowledges the sovereignty of Aboriginal and Torres Strait Islander people as the original custodians of the country. Aboriginal and Torres Strait cultures are persistent and enduring, continuing unbroken from the past to the present, characterised by resilience and a strong sense of purpose and identity despite the undeniably negative impacts of colonisation and dispossession. Aboriginal and Torres Strait Islander people throughout the country represent a diverse range of people, communities and groups each with unique identity, cultural practices and spiritualities. We recognise that the current health status of Aboriginal and Torres Strait Islander people has been significantly impacted by past and present practices and policies.

We acknowledge and pay our deepest respects to Elders past and present throughout the country. In particular, we pay our respects to the Whadjuk Nyoongar peoples of Western Australia on whose country our offices are located.

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Summary of nutrition among Aboriginal and Torres Strait Islander people

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Further information

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Lee A, Ride K (2018) Review of programs and services to improve Aboriginal and Torres Strait Islander nutrition and food security. *Australian Indigenous HealthBulletin* 18(4).

The summary, reviews and more information about Aboriginal and Torres Strait Islander nutrition can be viewed at: <https://healthinfonet.ecu.edu.au/nutrition>

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Featured artwork:

Untitled by Billy Missi

Why do a Summary?

This plain language and visual summary provides key information about nutrition among Aboriginal and Torres Strait Islander people in Australia in a style that is easy to engage with and does not require our readers to have an academic or medical background.

This summary draws mostly on journal publications, government reports, national data collections and national surveys accessed through the HealthInfoNet's Bibliography. Please note that statistics presented do not always include all states and territories, see sources for details.

Introduction

Good nutrition is the major underlying factor that can help prevent overweight and obesity, malnutrition, cardiovascular disease (CVD), type 2 diabetes, and tooth decay [1, 2].

This Summary provides an overview of key information on nutrition among Aboriginal and Torres Strait Islander people in Australia. It also provides an overview of the historical factors relating to the nutrition of Aboriginal and Torres Strait Islander people, and the social and economic, geographical and environmental factors that contribute to poor diet and nutrition.

The importance of good nutrition throughout the life stages is discussed, along with information on levels of consumption of the major food groups by Aboriginal and Torres Strait Islander people. This summary highlights the importance of nutrition promotion and the prevention of diet-related disease, and provides information on relevant programs, services, policies and strategies that help improve food supply, diet and nutritional health among Aboriginal and Torres Strait Islander people. Finally, it discusses possible future directions for managing the growing problem of diet-related ill health among Aboriginal and Torres Strait Islander people in Australia.

This summary is based on the *Review of nutrition among Aboriginal and Torres Strait Islander people* and the *Review of programs and services to improve Aboriginal and Torres Strait Islander nutrition and food security*.

When referring to Australia's Indigenous people, the HealthInfoNet prefers to use the terms Aboriginal, Torres Strait Islander, or Aboriginal and Torres Strait Islander. However, if we are providing information from a publication that uses the word 'Indigenous' we may use that term. If you have any concerns, you can contact the HealthInfoNet for further information.

Setting the scene of Aboriginal and Torres Strait Islander nutrition



Traditional diet and health

Aboriginal and Torres Strait Islander people are not one homogenous group – they are a diverse group of hundreds of nations (or cultural groups) and clans within those nations and have very different and distinctive cultures, beliefs and languages. Aboriginal people first arrived in Australia at least 50,000 years ago [3] and were mostly hunter-gatherers, although several groups were involved in some plant production [4]. Aboriginal people were omnivorous (they ate plants and animals); their diets could change greatly from day-to-day and season-to-season and varied greatly throughout Australia. In many parts of the country, people would collect only as much as they needed and rarely stored food for later use. The ability to eat large quantities of food when it was available was an important survival strategy; excess energy was stored as body fat to help people survive during times when food was scarce [1, 5, 6].

In the Torres Strait Islands, traditional diets varied from island to island. Seafood such as fish and shellfish were important foods, and turtle and dugong were included in feasts. Gardens provided food and several plant foods were stored and preserved [1, 5].

Both men and women were involved in food collection. Women generally provided the basic foods: a wide range of plant items (such as tubers, fruits, seeds and legumes), honey, eggs, small mammals, reptiles, fish, shellfish, crustaceans and insects [1]. They usually obtained foods in groups with their children, passing on knowledge and skills through songlines and storylines to the next generation, while the men tended to hunt for larger game (such as kangaroo, wallaby, emu, turtle, crocodile and dugong). Many plant foods, such as fruits, flowers

and nectars were eaten fresh and raw as they were collected, meaning that there was not much loss of nutrients. Some foods were processed to help make them more digestible or to taste better, for example, baking starchy tubers, grinding and roasting seeds and cooking meat. The most highly prized foods were those that were high in fat or sugar [1, 6].

Children were usually breastfed until they were about three to four years old with soft foods introduced around six months of age. The age of weaning (stopping breastmilk) was often triggered by the birth of a younger child [1, 7].

Traditional foods were good for physical health, but also promoted cultural, spiritual and emotional health. Aboriginal and Torres Strait Islander people were extremely lean, physically fit and strong before Europeans arrived [4, 8-11].

Diet after settlement

After European settlement in 1788, many Aboriginal people were prevented from collecting and eating traditional foods, which led to them becoming dependent on introduced 'European' foods [1, 10-12]. These included rations of flour, sugar, tea, jam, and, less often, meat (fresh, tinned or salted). Most of these foods are easy to transport and store, and are cheap and simple to cook, which makes them still popular today in some regional and remote areas.

Up until 1969, many Aboriginal and Torres Strait Islander people working on cattle stations were given food, tobacco and housing instead of payment. In early missions and government settlements communal dining rooms were often the only place to get food [1]. This was a major factor leading to a loss of traditional knowledge and skills in food preparation, cooking methods, food management and feeding children, among Aboriginal and Torres Strait Islander people.

Factors contributing to nutrition

The main factors that contribute to a person's nutrition are:

- social and economic disadvantage (such as lack of opportunities for education, low income and poor housing)
- geographical location
- environmental conditions [1, 2].

Social and economic factors

Between one-third and one-half of the health gap between Aboriginal and Torres Strait Islanders and non-Indigenous Australians are related to the interaction between social and economic situations [13]. In general, Aboriginal and Torres Strait Islander people may be more disadvantaged than non-Indigenous people across a range of social and economic factors that can lead to poor nutrition [1, 2, 14]. These include:

- lack of control over their circumstances
- poverty
- low income and high unemployment
- low levels of education
- disrupted family and community structure
- social marginalisation (being left out)
- stress
- substance abuse
- inadequate and overcrowded housing
- inadequate sanitation, water supplies and hygiene
- limited access to transport
- imprisonment, discrimination and racism.

People with reliable employment and higher incomes generally have better access to goods and services that provide health benefits, such as better food and housing, health care options and preventative health activities [15]. In the 2016 Census, for weekly household income¹, more than half of Aboriginal and Torres Strait Islander people reported an income of between \$150 and \$799 compared with about half of non-Indigenous people who reported an income of between \$400 and \$1,249 [16].

Weekly household income for 50% of the Australian population:



Aboriginal and Torres Strait Islanders who are unemployed are more at risk of poor health due to poor diet, higher rates of smoking and substance use compared with Aboriginal and Torres Strait Islanders who are employed [17].

Geographical factors



In remote Aboriginal and Torres Strait Islander communities, a basket of healthy foods can cost up to 50% more (half as much again) than in the nearest capital cities [18]. There are also fewer ‘specials’ or discounted prices in remote areas [19].

Factors contributing to the higher costs of foods in rural and remote areas are:

- high cost of transporting food to the communities
- high store overheads (such as the costs of building and maintaining long-term storage facilities)
- more food wastage when it goes ‘off’ [20]
- some store management practices [21, 22]
- fewer cost benefits for small businesses in remote communities because they can’t buy in bulk like larger companies can [23-26].

In remote Aboriginal communities, high calorie foods with lower nutritional value (such as oil and flour) tend to be cheaper than nutrient dense foods (such as most fruit and vegetables) [27]. Healthy food items are often less available in remote stores, particularly fresh fruit and vegetables, whole grain cereals, lean meats and low fat dairy products [20, 23, 28-30]. Communities in remote areas may also be without food for lengthy periods due to weather or road conditions, such as during the wet season, although a Northern Territory (NT) Market Basket survey in 2014 suggested that this may be improving [30].

Environmental factors

A person’s physical environment, can have a big impact on their nutritional status [1]; the ability to prepare healthy food requires having access to equipment to store and prepare food, and water for drinking and washing [19, 31]. Many Aboriginal and Torres Strait Islander people live in sub-standard or overcrowded housing.

¹ Equivalised household income adjusts the actual incomes of households so that households of different sizes and compositions can be compared [16].

- in 2014-15, 15% of Aboriginal and Torres Strait Islander households reported living in a dwelling that was lacking at least one working facility such as a fridge or cooking facilities, toilet, bath or shower [32]. Those living in remote areas were more likely (28%) than those in non-remote areas (11%) to have experienced problems with household facilities
- in 2016, around one fifth (18%) of Aboriginal and Torres Strait Islander people were living in an overcrowded house [33]. In non-urban areas, overcrowding was worse (28%) than in urban areas (16%).

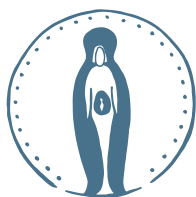
Australian Dietary Guidelines



The Australian Dietary Guidelines provide recommendations for healthy eating for all Australians [2] (see Appendix 1). They also include specific recommendations for Aboriginal and Torres Strait Islander people. These include:

- to enjoy traditional foods whenever possible
- when choosing store foods, to choose those most like traditional bush foods, such as fresh plant foods, wholegrain (cereal) foods, seafood, and lean meats and poultry.

Nutrition in pregnancy and the early years



Research has shown that good health in childhood is important for maintaining good health throughout life. Furthermore, adult health may be partly determined by how healthy a person's mother is when pregnant, as well as a person's health in infancy and early childhood [34-36].

Aboriginal and Torres Strait Islander mothers and their babies have often had poorer outcomes than those of non-Indigenous mothers in areas including [1, 37-40]:

- | | |
|--|---|
| <ul style="list-style-type: none"> • infant mortality (death) rate • infant malnutrition (poor nutrition) • low birthweight • failure to thrive (not putting on enough weight as the child gets older) • poor growth in childhood • iron deficiency anaemia. | <p>Some of the risk factors include:</p> <ul style="list-style-type: none"> • young maternal (mother's) age • remoteness • socioeconomic disadvantage. |
|--|---|

Nutrition in pregnancy

Good nutrition both before and during pregnancy is crucial for both the mother's health and that of her baby.

Factors that can have a negative influence on the health of the mother and baby include:

- being overweight or obese during pregnancy – leads to an increased risk of complications (particularly for the mother) during pregnancy and delivery, including increased morbidity (illness) and mortality for both mother and baby [40]

- low calorie intake, malnutrition, not enough weight gained during pregnancy, and low weight prior to getting pregnant – leading to low birthweight babies (birthweights below 2,500 grams) [34].

Drinking alcohol in pregnancy can affect the unborn baby leading to fetal alcohol spectrum disorder (FASD), a term that describes a range of conditions that affect the brain and spinal cord, poor growth, distinctive facial features and learning problems [41, 42]. In 2014-15, 9.8% of mothers of Aboriginal and Torres Strait Islander children reported that they drank alcohol through pregnancy [32].

Birthweights



In 2017, the average birthweight of babies born to Aboriginal and Torres Strait Islander mothers was 3,202 grams [40]. A baby that is born with a low birthweight (LBW) (less than 2,500 grams) has an increased risk of death in infancy and other health problems [15]. In 2017, around 12.5% of babies born to Aboriginal and Torres Strait Islander mothers were of LBW, compared with 6.3% of babies of all mothers [40].

Breastfeeding



The benefits of breastfeeding for babies [1, 2, 43]:

- good nutrition - provides all the energy and nutrients that an infant needs for the first six months of life
- protection from some diseases
- promotes physical and mental development
- convenience and does not require special equipment
- hygienic
- cheaper than bottle-feeding.

Benefits of breastfeeding for mothers [2, 43]:

- reduces the risk of ovarian and breast cancers
- reduces the risk of weight gain in later life.

In 2014-15 [32, 44]:



of Aboriginal and Torres Strait Islander children aged 0-3 years had been breastfed



of Aboriginal and Torres Strait Islander children aged 0-3 years had never been breastfed



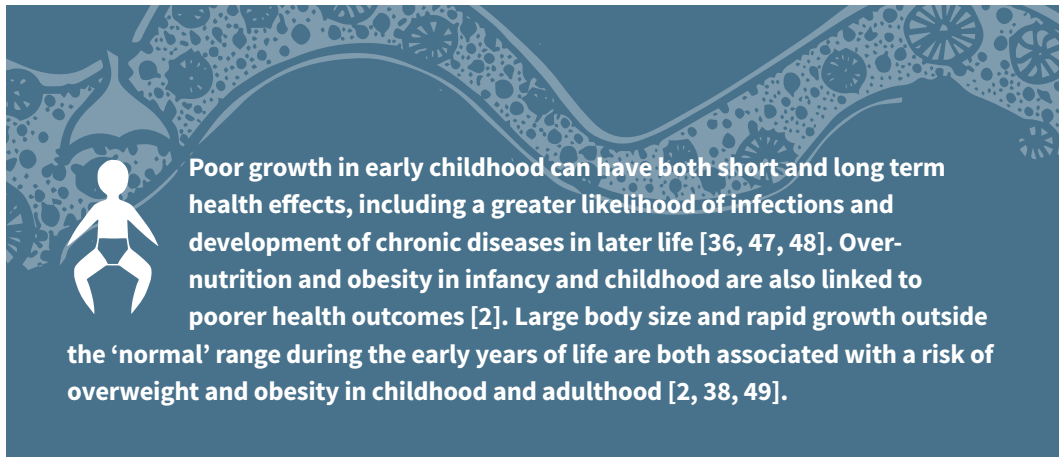
of Aboriginal and Torres Strait Islander infants had been breastfed for 12 months or more

There are a number of reasons why a mother may not breastfeed their babies including personal and social factors such as unsuccessful experiences and sharing feeding responsibilities with a partner using infant formula milk [46].

Growth of infants and children

Measuring the growth of infants and children is a good way of measuring their health and development; troubles in health and nutrition almost always affect growth [2]. Factors that contribute to normal growth include good maternal health during pregnancy and healthy weaning and feeding practices [1, 2]. Factors that can lead to poor growth include:

- under-nutrition (not enough food and energy intake)
- malnutrition (poor quality of food)
- specific nutritional deficiencies such as anaemia
- infections and parasitic infestations.



Adult and community nutrition

Aboriginal and Torres Strait Islander adults suffer from both over-nutrition (eating too many calories particularly from unhealthy discretionary foods) and under-nutrition (not eating enough healthy foods) [2, 50-53].

Burden of disease

The 'Burden of Disease' analysis measures the effects of diseases and injuries on a population [54]. It estimates the number of years of life that have been lost due to death from a disease or injury, or the years of life lost due to disability or ill health caused by a disease or injury. In 2011, 13 dietary factors were identified as being risk factors that contribute to the burden of disease for the Australian population (out of 29 risk factors). The joint effect of all dietary risks combined contributed 9.7% to the burden of disease for Aboriginal and Torres Strait Islander people.



51% of the health gap

between Aboriginal and Torres Strait Islander people and non-Indigenous people is attributable to risk factors



27.4% of the risk

of the risk is due to combined dietary factors (the greatest proportion of risk) [54].

Dietary intake of Aboriginal and Torres Strait Islander groups

Key dietary data from the 2018-19 National Aboriginal and Torres Strait Islander Survey and the 2012-13 National Aboriginal and Torres Strait Islander Nutrition and Physical Activity Survey (NATSINPAS) are included below [51, 55].



Consumption of vegetables and legumes/beans

In 2018-19 [56]:

- 4% (6% of females and 2% of males) of Aboriginal and Torres Strait Islander people aged 15 years and over met the recommended daily serves of vegetables
- the proportions were the same for those living in non-remote and remote areas, both 4%
- 7% of children aged 2- 14 years met the 2013 dietary guidelines for the recommended number of serves of vegetables per day.



Consumption of fruit

In 2018-19 [56]:

- 39% (44% of females and 35% of males) of Aboriginal and Torres Strait Islander people over the age of 15 years met the recommendations for the usual daily serves of fruit
- there were similar proportions for those people living in non-remote areas (39%) and remote areas (42%)
- 69% of children aged 2- 14 years met the 2013 dietary guidelines recommendations for serves of fruit per day.



Consumption of grain (cereal) foods

In 2012-13 [55]:

- Aboriginal and Torres Strait Islander people aged two years and over reported consuming an average of around 4.1 serves of healthy grain foods per day
- Aboriginal and Torres Strait Islander people in remote areas consumed 4.6 serves of grain (cereal) compared with 4.0 serves for those in non-remote areas
- one-quarter (25%) of grain foods consumed were from wholegrain and/or high fibre varieties, which is less than the recommended amount (50%).



Consumption of milk, yoghurt, cheese and alternatives

In 2012-13 [55]:

- Aboriginal and Torres Strait Islander people aged two years and over reported consuming an average of 1.2 serves of milk, yoghurt, cheese and alternatives per day
- dairy milk was the most frequently consumed product (65%) followed by cheese (30%)
- the average daily consumption of milk, yoghurt, cheese and alternatives was considerably lower than the respective recommend number of serves, except for children aged 2-3 years and girls 4-8 years.



Consumption of lean meats and poultry, fish, eggs, tofu, nuts and seeds, and legumes/beans

In 2012-13 [55]:

- Aboriginal and Torres Strait Islander people aged two years and over reported consuming an average of around 1.6 serves per day of healthy lean meats and poultry, fish, eggs, tofu, nuts and seeds and legumes/beans
- Aboriginal and Torres Strait Islander people living in remote areas consumed 2.0 serves of this food group compared with 1.4 serves for those living in non-remote areas
- the average daily consumption of lean meats and poultry, fish, eggs, tofu, nuts and seeds and legumes/beans was considerably less than the respective recommendations except for girls 2-3 years.



Water intake

In 2012-13 [55]:

- Aboriginal and Torres Strait Islander people reported drinking an average of around one litre per day (997 ml) of plain water, including both bottled and tap water
- an additional 262 ml of water (approximately one cup) was drunk in the form of tea and coffee.



Consumption of 'healthy fats' allowance

The healthy fats allowance is derived from unsaturated spreads and oils and/or the foods they are derived from, such as nuts and seeds [2].

- in 2012-13, Aboriginal and Torres Strait Islander people aged two years and over consumed an average 1.4 serves from the 'healthy fats' allowance, which is consistent with recommendations [2, 55].



Consumption of discretionary² food and drinks

The Australian Dietary Guidelines recommend that discretionary foods and drinks should only be consumed sometimes and in small amounts [2]. However, in 2012-13 [55]:

- Aboriginal and Torres Strait Islander people reported consuming more than two-fifths (41%) of their total daily energy from foods and beverages classified as discretionary
- Aboriginal and Torres Strait Islander people reported consuming an average of 6.1 serves of discretionary foods per day
- the discretionary foods consumed were mostly alcoholic beverages (10%), soft drinks (9.1%), potato products such as chips and fries (8.2%), pastries (7.1%), cakes and muffins (6.4%) and confectionary (6.3%).

Aboriginal and Torres Strait Islander people living in remote areas obtained less energy from discretionary foods compared with those living in non-remote areas (35% and 42% respectively) [55].

² Discretionary foods and drinks are those not necessary for health, but high in saturated fat, added sugar, salt and/or alcohol; commonly called 'junk' foods and drinks



Consumption of free sugars

In 2012-13:

- Aboriginal and Torres Strait Islander people two years and over reported consuming an average of 75 g (18 teaspoons) of free sugars per day (14% of their dietary energy), which is nearly 50% more than WHO recommendations [57, 58]
- two-thirds (67%) of all free sugars came from sugary drinks
- free sugar intake in Aboriginal and Torres Strait Islander groups was highest among older children and young adults
- free sugar intake was higher in males than in females
- teenage boys aged 14-18 years derived 18% of their dietary energy from free sugars [58]
- free sugar intake was 12 g higher per day (3 teaspoons) among those living in non-remote areas than in remote areas.

Sugar sweetened drinks

In 2018-19:

- 24% of Aboriginal and Torres Strait Islander people (aged 15 years and over) reported that they usually consumed sugar sweetened drinks every day and 5.5% consumed diet drinks 71% (75% of males and 67% of females) usually consumed sugar sweetened drinks or diet drinks at least once per week [56]
- of children aged 2-14 years, 20% usually consumed sugar sweetened drinks daily and 1.5% consumed diet drinks daily; 63% usually consumed sugar sweetened drinks or diet drinks at least once a week
- the proportion of people who usually consumed sugar sweetened or diet drinks was higher for people living in remote areas (77%) than for non-remote areas (69%)
- the proportion was lowest for those aged 45-54 years (63%) and 55 years and over (49%), compared with 80% for people aged less than 45 years.



Consumption of traditional bush foods

To estimate the consumption of bush foods, participants in the 2012-2013 NATSINPAS were asked about their consumption of foods that were naturally harvested or wild-caught, such as fish and seafood, wild harvested fruit and vegetables, reptiles and insects [51]:

- 7.8% of people in remote areas ate fin fish compared with 1.8% of people in non-remote areas
- 1.2% of people in remote areas ate non-commercially caught crustaceans and molluscs compared with 0.3% of people in non-remote areas
- 7.7% of people in remote areas ate wild harvested meat compared with 0% of people in non-remote areas
- 3.9% of people in remote areas ate reptiles compared with 0.1% of people in non-remote areas
- Aboriginal people living in remote NT communities report frequent consumption of traditional foods [59].



Bodyweight³

Results from the 2018-19 NATSIHS indicated [56]:

- 71% of Aboriginal and Torres Strait Islander people aged 15 years and over were either overweight or obese (almost 29% were overweight and 43% were obese)
- 25% of people were in the normal weight range and 3.9% were underweight
- the proportion of people who were obese, was higher for females 45% than for males 40%. For overweight, 31% for males compared with 27% for females, normal weight, 26% for males and 24% for females, and underweight (3.2% for males and 4.5% for females)
- overweight and obesity increased with age: 15-17 years age-group: 42%, 18-24 years age-group: 59%, 25-34 years age-group: 73%, 35-44 years age-group: 80%, 45-54 years age-group: 81% and 82% for those over 55 years of age
- the proportion of Aboriginal and Torres Strait Islander people, aged 15 years and over, who were overweight/obese was highest in Tas (76%) followed by NSW (74%) and Vic and WA (both 73%)
- the NT reported the highest proportion of people who were underweight/normal weight (41%) with the remaining states and territories between 26% and 30%
- Aboriginal and Torres Strait Islander people aged over 18 years living in major cities had a higher BMI than those living in very remote areas, (77% and 66% respectively)
- 80% of people living in inner regional areas were overweight or obese
- for people aged 15 years and over, those living in outer regional areas had the highest BMI (76%) followed by major cities (73%), with the overall proportion for non-remote areas (73%) compared with remote areas (64%)
- people living in remote areas were more likely to be underweight or have a normal BMI (36%) compared with non-remote residents (27%).

Between 2012-13 and 2018-19 the proportion of people who were overweight or obese increased for Aboriginal and Torres Strait Islander people aged 15 years and over (from 66% to 73%). According to the 2018-19 NATSIHS, based on BMI information reported for children aged 2-17 years [56]:

- 38% were overweight or obese (overweight 24%, obese 14%); 53% were normal weight and 8.8% were underweight
- for males, the highest BMI (overweight/obese) was reported in the 12-13 years age-group (54%) and the lowest in the 2-3 years age-group (22%)
- for females, the highest proportion was reported in the 2-3 years age-groups (44%) and the lowest in the 4-8 years age-group (35%)
- for normal weight, the highest proportions were reported for males in the 2-3 years age-group (68%) and for females in the 4-8 years age-group (57%)
- for the underweight category, the highest proportions for males was in the 4-8 years age-group (14%) and for females in the 14-17 years age-group (11%).

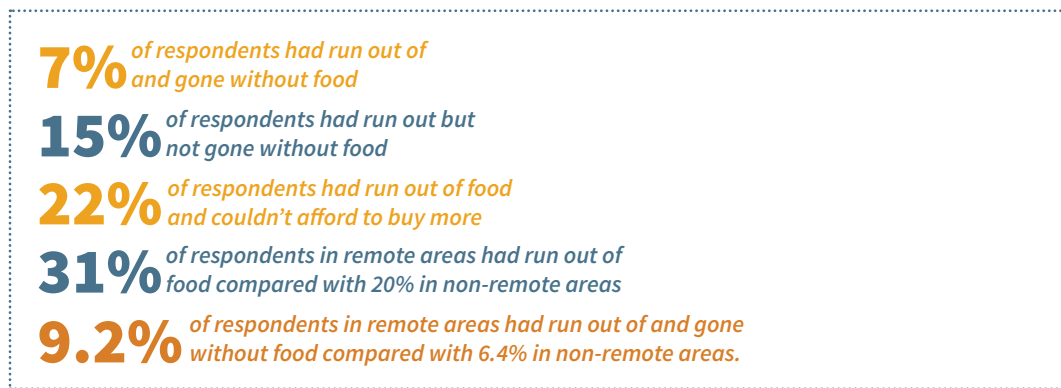
Measuring around a person's waist (waist circumference or WC) was done in the 2018-19 NATSIHS to help measure levels of risk for developing certain chronic diseases, such as diabetes and heart disease [56]. Based on WC, 71% of Aboriginal and Torres Strait Islander people aged 18 years or older were at an increased risk of developing chronic diseases, a higher proportion of females (81%) than males (60%) were at risk. This risk was highest in the 55 years and over age-group for both males and females (86%).

³ Poor nutritional health can increase the risk of developing overweight or obesity. Obesity and abdominal obesity, as measured by BMI and waist circumference (WC), have been shown to be risk factors for type 2 diabetes and hypertension in Aboriginal and Torres Strait Islander people.

Food security

Food security exists ‘when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life’ [60]. Factors that influence a person’s level of food security include: availability, accessibility, affordability and acceptability (appropriateness) of food.

The 2012-2013 NATSINPAS attempted to measure food security by asking respondents if they had run out of food and couldn’t afford to buy more in the last 12 months [61]:



Lack of food security causes hunger and anxiety in the short term, and serious illnesses related to malnutrition in the medium to long term, including conditions caused by both under-nutrition and obesity [62]. While it may seem contradictory that food insecurity is linked to obesity, it happens because ‘filling up’ on high calorie, relatively nutrient-poor foods (such as flour and sugar) can cost less than ‘filling up’ on nutritious whole foods, such as lean meats, fresh vegetables and fruits [63, 64].

Nutrition programs and services

Community approach

Nutrition programs implemented at the community level generally focus on improving the food supply (availability, affordability, accessibility and acceptability of healthy food) and/or increasing demand for healthy food [65-68].

Multi-strategy community programs

Multi-strategy programs are those which use several different activities or interventions, such as cooking classes, physical activity sessions, nutrition education classes, and/or health assessments. Some examples of multi-strategy community programs include:

- *Looma Healthy Lifestyle Project [69, 70]*
- *Minjilang Health and Nutrition Survival Tucker Project [71]*
- *The Many Rivers Diabetes Prevention Project [72]*
- *Anangu Pitjantjatjara Yankunytjatjara (APY) Lands nutrition strategy [12].*

Food supply programs



One strategy for changing the food supply is by changing conditions in the food store, which in remote communities is a single community store. Programs of this type have identified that store nutrition policies [19, 73, 74] and store managers [21, 22] are important influences on the food supply.

The main factors relating to food supply that have been shown to influence community diets are [12, 71, 75-81]:

- if specific healthy foods (fruit and vegetables) are available
- if specific unhealthy foods (fatty take-away and convenience foods) are available
- if sugary drinks are available
- the price of foods
- advertising of healthy and unhealthy foods.

To remove possible negative influences of the food supply, community stores should be seen as essential services, like health and education, rather than simply viewed as small businesses [12, 20, 23].

Local food production



There are three main types of local food production:

- community gardens – these are frequently identified as a solution to reducing food security in Aboriginal and Torres Strait Islander communities [82-84].
- home gardens - appear to be more successful in Torres Strait Islander communities than on the mainland [5, 82].
- school gardens - are relatively easy to coordinate and have the backup of staff and students to work in the garden on a daily basis [85-87].

However, these gardens are demanding on time and money, and there are no known examples of gardens that have continued long term and had any measured effects on the diets or health of people in the communities, particularly on the mainland [5, 82-89].

Food aid



Food aid programs often provide families with healthy foods, such as vegetables and fruit, or food vouchers [90-94]. Among Aboriginal and Torres Strait Islander groups, food donations are mostly provided at the local level for breakfast or lunch, particularly in children's settings such as schools or pre-schools [79, 95-101]. An evaluation of Aboriginal nutrition projects in WA found that provision of school meals at low or no cost, combined with

classroom nutrition education delivered by a respected community elder, were the most effective forms of food aid [95].

Nutrition education and food literacy programs

Nutrition education combined with a range of other strategies to help people access healthy food can improve food security or dietary intake [1]. Cooking programs in Aboriginal and Torres Strait Islander communities are very popular [98, 102-106], such as cooking demonstrations and classes [104, 107-111] and the development of community kitchens [104, 112-114].

The community kitchens model may be particularly suitable for Aboriginal and Torres Strait Islander communities as it is about people coming together on a regular basis to plan, cook and share healthy affordable meals. Benefits include improving participants' food security through developing cooking, shopping and budgeting skills as well as giving them opportunities to interact socially [66, 115].

Individual approach

The individual approach targets people on a one-to-one basis. Primary health care services, both mainstream and community controlled, can play a major role in providing nutrition and dietetic services to Aboriginal and Torres Strait Islander clients especially for those with chronic diseases. It is important that advice is culturally appropriate [116, 117] and this is more likely to occur if Aboriginal and Torres Strait Islander Health Workers are employed to work in these businesses [116, 118].

Peer educator programs

A very effective strategy for providing education to individuals or small groups is through training Aboriginal and Torres Strait Islander workers to deliver nutrition activities for their own communities [71, 107, 108, 113, 119-124]. Providing opportunities for Aboriginal and Torres Strait Islander people to train and be employed in dedicated nutrition positions is essential for improving nutrition and food security in the longer term [125, 126].

The *Community Foodies* program in SA and the *Deadly Choices* program in Queensland (Qld), are examples of programs that aim to empower Aboriginal and Torres Strait Islander people to support others in their communities, or to make healthy choices for themselves and their families [113, 127].

Aboriginal and Torres Strait Islander nutrition workforce

It was estimated in 2017, that less than 20 Aboriginal and Torres Strait Islanders have ever trained as nutritionists and/or dietitians in Australian universities [128, 129]. But there are only 14 identified Aboriginal and Torres Strait Islander dietitians and/or nutritionists believed to be working in Australia. It is unknown whether they are employed in mainstream or specific Aboriginal and Torres Strait Islander health services [128, 129]. There is also no record of how many non-Indigenous dietitians/nutritionists provide nutrition and dietetic services in mainstream or Aboriginal and Torres Strait Islander-specific health services.

Nutrition professionals working in Aboriginal and Torres Strait Islander health are employed mainly in the government public sector and in Aboriginal and Torres Strait Islander Community Controlled Health Care services [130, 131].

Policies and strategies

Since the National Aboriginal and Torres Strait Islander Nutrition Strategy and Action Plan (NATSINSAP) expired in 2010, there has been no specific food and nutrition policy or strategy that specifically targets Aboriginal and Torres Strait Islander nutrition issues.

The National Aboriginal and Torres Strait Islander Nutrition Strategy and Action Plan (2000-2010)

The National Aboriginal and Torres Strait Islander Nutrition Strategy and Action Plan (NATSINSAP) [132] provided a framework for joint action across all levels of government, in partnership with industry, the non-government sector, and Aboriginal and Torres Strait Islander organisations and people. The aim of NATSINSAP was to make opportunities for dietary changes to improve the nutritional status of Aboriginal and Torres Strait Islander peoples [132].

An evaluation of NATSINAP found that:

- there were some specific achievements [133]:
 - improved food supply in remote and rural communities
 - development of the Aboriginal and Torres Strait Islander nutrition workforce
 - disseminating and communicating good practice
 - advocacy for improving Aboriginal and Torres Strait Islander nutritional status
- some areas where there was not much achieved [66, 133]:
 - household food security
 - nutrition issues in urban areas.

Close the Gap

In response to the *Close the Gap* Aboriginal and Torres Strait Islander health campaign, in 2007 the Council of Australian Governments (COAG) agreed to a policy goal of closing the gap in Aboriginal and Torres Strait Islander disadvantage. Among the proposed targets was that by 2018, 90% of Aboriginal and Torres Strait Islander families could access a healthy food basket for under 25% of their income [134]. This target was not achieved, and the *Close the Gap Progress and Priorities Report 2017* states that there needs to be greater attention to nutrition and food security [135].

The main aims of '*Closing the Gap*' were to:

- close the life expectancy gap within a generation
- halve the gap in mortality rates between Aboriginal and Torres Strait Islander and non-Indigenous children under 5 years of age within 10 years [136].

One of the ways this would be measured was a reduction in the prevalence of overweight and obesity.

In 2018, a *Closing the Gap Refresh* was announced as several targets were not met [137]. In 2020, the results of the *Closing the Gap* campaign were again generally disappointing [138], but a new National Agreement on the *Closing the Gap* has been created. The Coalition of Peaks held meetings with Aboriginal and Torres Strait Islander people, communities and organisations in all states and territories to talk about what is needed to improve lives and provide an opportunity for input into the agreement [139]. The Prime Minister, Scott Morrison, has stated that a '...new process has begun. A process that is truthful, strengths based, community led, and that puts Aboriginal and Torres Strait islander people at the centre' (p.3) [138].

COAG National Strategy for Food Security in Remote Indigenous Communities (part of the National Indigenous Reform Agreement) (2009-2012)

The COAG National Strategy for Food Security in Remote Indigenous Communities (the Strategy) [140] aimed to improve the food security of Aboriginal and Torres Strait Islander Australians living in remote communities through continuous, coordinated action to improve the food supply and nutritious food consumption in WA, SA, NT and Qld.

Under the strategy, national standards were developed for remote stores and takeaways and these standards were piloted in 10 locations. The National Healthy Eating Action Plan was developed but no funding was allocated to implement it. The strategy expired in 2012 and an audit found that there was not enough funding for the strategy and that few of the proposed outcomes had been achieved [141].

National Aboriginal and Torres Strait Islander Health Plan 2013-2023 and Implementation Plan (2015)

The National Aboriginal and Torres Strait Islander Health Plan (NATSIHP) 2013-2023, is the current national framework relating to Aboriginal and Torres Strait Islander peoples' health [142]. Improving food access and nutrition was identified as a key strategy in the 10-year plan. NATSIHP aims to reduce risk factors and improve health outcomes across all age groups, with priority areas including maternal health and parenting; childhood health and development; adolescent and youth health; healthy adults and healthy ageing. Nutrition has an important role to play at each of these life stages.

The Implementation Plan [143] also identifies nutrition as a priority, particularly for pregnant women, infants and children. However, it does not include any specific nutrition strategies.

Stronger Futures Policy, Northern Territory (2011)

Under the Northern Territory National Emergency Response Act 2007, now called the Stronger Futures Policy, all remote and community stores in Aboriginal communities in the NT must be licenced to the Australian Government [144, 145]. Under this scheme, stores are encouraged to write into their policies that nutritious food should be more accessible and affordable.

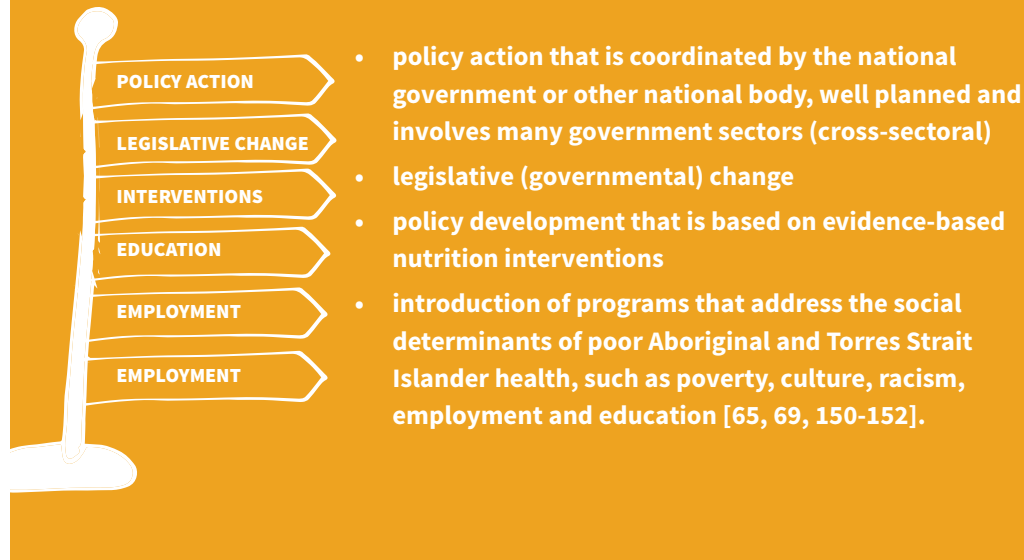
The Stronger Futures Policy [145] also includes the 'income management' of all Aboriginal people in the NT who receive welfare payments. Analysis of the income management scheme showed there was no apparent reduction in the sale of tobacco, cigarettes or soft drink, or an increase in the sale of fruit and vegetables [66].

Outback Stores (2006)

In 2006, the Commonwealth Government, through Indigenous Business Australia set up the Outback Stores enterprise [146]. The main purpose was to support remote community stores and ensure they continued to function. A nutrition policy was developed for these stores, however the impacts on their communities have not been assessed formally by independent inspectors [146]. In 2018-19, according to the Outback Stores annual report, 475 tonnes of fresh fruit and vegetables were sold and there were 4.2 tonnes less sugar consumed from sugary drinks compared with the previous year via store-based sugar reduction strategies [147].

Future directions

Primary prevention of poor health and illness caused by poor diet is likely to be the most cost-effective strategy for improving the health of Aboriginal and Torres Strait Islander people [133, 148]. This would require [66, 67, 148, 149]:



The development of a National Framework for Chronic Disease [153] and a National Nutrition Policy or Framework would also provide an opportunity to focus on issues and actions to improve the diet and nutrition of Aboriginal and Torres Strait Islander groups [143, 154]. Priority nutrition areas that would tie in with NATSIHP would be:

- maternal health and parenting
- childhood health and development
- adolescent and youth health
- healthy adults
- healthy ageing.

Key priorities to ensure the success of any interventions would require:

- community control
- an adequately trained workforce
- adequate and sustained resourcing
- intersectoral partnerships (between health and other sectors)
- a realistic plan for monitoring, research and evaluation
- effective and widespread sharing of monitoring and research outcomes.

Table 1. Summary of common success factors associated with successful Aboriginal and Torres Strait Islander food and nutrition programs

Governance, staff and resources	
<ul style="list-style-type: none"> • Establish high levels of community participation and control of project design. • Include employment and training of specific Aboriginal or Torres Strait Islander nutrition workers. • Ensure use of peer-education, support and role modelling. • Build the capacity of Aboriginal or Torres Strait Islander workers and organisations. 	<ul style="list-style-type: none"> • Involve partnerships between nutritionists (for nutrition content expertise) and Aboriginal or Torres Strait Islander Workers (for cultural expertise and acceptance). • Facilitate partnerships between organisations implementing programs and health and other sectors. • Secure sustainable funding to enable long-term interventions rather than short-term projects.
Intervention strategies	
<ul style="list-style-type: none"> • Apply multiple strategies in multiple settings. • Address food security issues (availability, affordability, accessibility and acceptability of healthy food) as well as providing nutrition education. 	<ul style="list-style-type: none"> • Include policy, regulatory and structural change to make health choices easier. • Link screening/health assessments with health promotion programs. • Use a participatory action research approach.
Evaluation	
<ul style="list-style-type: none"> • Evaluate at process (was the intervention conducted as intended?), impact (was there a change in knowledge, attitudes or determinants?) and outcome (was there a change in diet, risk factors or health outcome?) levels. 	<ul style="list-style-type: none"> • Ensure results are fed back to the community. • Ensure results are disseminated widely

Based on the issues and evidence presented in this review, potential interventions are highlighted in Table 2.

Table 2. Potential strategies to improve Aboriginal and Torres Strait Islander nutrition

Intervention area	Potential Strategies
<p>Improve food supply and availability of healthy foods</p>	<p>Stores</p> <ul style="list-style-type: none"> improve store management practices, transport and stocking of healthy food consider community stores as essential services, like health and education, rather than small businesses make the development, implementation and evaluation of store nutrition policies mandatory use available resources, such as the Remote Indigenous Stores and Takeaway (RIST) resources.
	<p>Community</p> <ul style="list-style-type: none"> Reinvigorate traditional food procurement projects and local food gardens Provide affordable, healthy community meals and takeaways through community kitchens, restaurants and/or cafes Provide affordable, healthy breakfasts and lunches in settings such as childcare centres, kindergartens, schools, sports clubs, Home and Community Care (HACC) programs Combine food supply interventions with culturally-appropriate nutrition education for maximum effect Improve the quality of the food provided by Aboriginal and Torres Strait Islander organisations through the development, implementation and evaluation of catering guidelines and food supply policies
<p>Increase accessibility to healthy foods</p>	<ul style="list-style-type: none"> Establish local programs, such as transport assistance (including shopper shuttles), food delivery and/or food aid programs in urban areas Improve housing, including food-storage, preparation and cooking facilities
<p>Increase relative affordability of healthy food</p>	<ul style="list-style-type: none"> Preserve and expand the current national differential taxation system (GST) to further favour competitive retail pricing of basic healthy foods
	<ul style="list-style-type: none"> Introduce a tax on sugar sweetened drinks
	<ul style="list-style-type: none"> Introduce or expand freight subsidies to transport basic healthy foods to remote areas
	<ul style="list-style-type: none"> Provide food supplementation/subsidisation for women, infants and children and other food insecure groups using different models, e.g. WIC-style program for pregnant and lactating women and their babies up to five years of age. This will require formal referral systems between health and welfare agencies to be effective
	<ul style="list-style-type: none"> Subsidise provision of fruit and vegetables in schools and other settings
	<ul style="list-style-type: none"> Expand in-store ‘cross-subsidisation’- increase ‘mark-up’ of less healthy items, and lower price margins on healthier foods Develop pre-programmed credit card to reward healthy purchases

Intervention area	Potential Strategies
Enhance primary care programs	<ul style="list-style-type: none"> Expand prenatal, antenatal and postnatal nutrition programs, and incorporate into holistic maternal and child health care services Ensure health services provide consistent, evidence-based food and nutrition messages and breastfeeding advice [2, 156]
	<ul style="list-style-type: none"> Expand brief nutrition interventions and early interventions in primary care, including ‘well persons’ health checks and follow-up action
	<ul style="list-style-type: none"> Establish formal referral systems between health and welfare agencies (involves food security assessment, referral, advice and follow-up) in: Aboriginal Medical Services/primary health services; nutrition and dietetics programs; social and welfare services; aged care and disability services; home visiting programs
	<ul style="list-style-type: none"> Conduct group-based behaviour modification programs for those at risk of diet-related chronic disease, based on effective primary care service delivery models. Link with community nutrition education, food and health literacy, budgeting and skill development (below)
Introduce community nutrition education, food and health literacy, budgeting and skill development programs	<ul style="list-style-type: none"> Implement school-based nutrition-promotion projects
	<ul style="list-style-type: none"> Implement community food literacy and budgeting programs - ensure culturally-appropriate approaches to development, implementation, evaluation and dissemination
Enhance workforce	<ul style="list-style-type: none"> Create more opportunities for Aboriginal and Torres Strait Islander people to undertake vocational education and training (VET) sector and tertiary level training in nutrition - essential for a sustainable profession with increasing nutrition expertise, e.g. Accredited Practising Dietitians Create opportunities for a dedicated Aboriginal and Torres Strait Islander nutrition workforce
	<ul style="list-style-type: none"> Enhance training opportunities and create job opportunities and dedicated positions for Aboriginal and Torres Strait Islander peer educators to be trained and supported to work in nutrition with their local communities, adopting ‘train the trainer’ models
	<ul style="list-style-type: none"> Enhance cultural competency training and core training of health professionals in nutrition, so as to equip non-Indigenous graduates with the knowledge and skills for working with Aboriginal and Torres Strait Islander people and communities
Include evaluation, monitoring and surveillance and dissemination	<ul style="list-style-type: none"> Develop a national, coordinated food and nutrition monitoring and surveillance system that includes an Aboriginal and Torres Strait Islander component - to assess and monitor dietary intake, nutritional status, availability, affordability, accessibility and acceptability of healthy food, and track progress
	<ul style="list-style-type: none"> Establish a national growth assessment and action system for Aboriginal and Torres Strait Islander infants and children
	<ul style="list-style-type: none"> Ensure all nutrition programs, policies and monitoring systems are evaluated and the findings are disseminated to inform decision making and achieve improvements in policy and practice

Concluding comments

Throughout their lives, many Aboriginal and Torres Strait Islander people suffer poorer health than non-Indigenous people, with poor nutrition being a major contributing factor. There are metabolic differences for Aboriginal and Torres Strait Islander people that can put them at higher risk of chronic diseases [156]. Social disadvantage is also one of the causes. A lack of food security and poor nutritional health can lead to high levels of both underweight and overweight and obesity in childhood, and high rates of chronic disease in adulthood.

Many Aboriginal and Torres Strait Islander people are born with a low birthweight and have low growth rates in childhood. This can affect a person's health in adulthood and contribute to the poor health of mothers, the health of the next generation and the development of chronic disease in later life.

The diets of Aboriginal and Torres Strait Islanders are typically low in vegetables, fruit, wholegrain cereals and other healthy foods, but higher in discretionary, or 'junk' foods and drinks than other Australians. This is partly because healthy foods are less available, less affordable and less accessible in Aboriginal and Torres Strait Islander communities throughout Australia.

The programs and other nutritional interventions at national, state and community levels that are the most successful are generally those that are developed with the communities, for those communities, that encourage farming and eating traditional foods and are culturally appropriate.

It has been recommended that nutrition should be included as part of a holistic approach to health (which involves attention to all aspects of a person's life rather than treating separate conditions and problems) and building a shared voice by creating partnerships that have strong Aboriginal and Torres Strait Islander leadership [157]. It is vital that Australia continues to develop policies and political reforms (changes) to address the nutrition, food security and diet-related health of Aboriginal and Torres Strait Islander peoples. Reforms should be evidence-based and developed with Aboriginal and Torres Strait Islander people.

Appendix 1. The Australian Dietary Guidelines

Guideline 1	<p>To achieve and maintain a healthy weight, be physically active and choose amounts of nutritious food and drinks to meet your energy needs.</p> <ul style="list-style-type: none"> • Children and adolescents should eat sufficient nutritious foods to grow and develop normally. They should be physically active every day and their growth should be checked regularly. • Older people should eat nutritious foods and keep physically active to help maintain muscle strength and a healthy weight.
Guideline 2	<p>Enjoy a wide variety of nutritious foods from these five groups every day:</p> <ul style="list-style-type: none"> • plenty of vegetables, including different types and colours, and legumes/beans • fruit • grain (cereal) foods, mostly wholegrain and/or high cereal fibre varieties, such as breads, cereals, rice, pasta, noodles, polenta, couscous, oats, quinoa and barley • lean meats and poultry, fish, eggs, tofu, nuts and seeds, and legumes/beans • milk, yoghurt, cheese and/or their alternatives, mostly reduced fat (reduced fat milks are not suitable for children under the age of 2 years). <p>And drink plenty of water.</p>
Guideline 3	<p>Limit intake of foods containing saturated fat, added salt, added sugars and alcohol.</p> <ul style="list-style-type: none"> • Limit intake of foods high in saturated fat such as many biscuits, cakes, pastries, pies, processed meats, commercial burgers, pizza, fried foods, potato chips, crisps and other savoury snacks. <ul style="list-style-type: none"> • Replace high fat foods which contain predominantly saturated fats such as butter, cream, cooking margarine, coconut and palm oil with foods which contain predominantly polyunsaturated and monounsaturated fats such as oils, spreads, nut butters/pastes and avocado. • Low fat diets are not suitable for children under the age of 2 years. • Limit intake of foods and drinks containing added salt. <ul style="list-style-type: none"> • Read labels to choose lower sodium options among similar foods. • Do not add salt to foods in cooking or at the table. • Limit intake of foods and drinks containing added sugars such as confectionary, sugar-sweetened soft drinks and cordials, fruit drinks, vitamin waters, energy and sports drinks. • If you choose to drink alcohol, limit intake. For women who are pregnant, planning a pregnancy or breastfeeding, not drinking alcohol is the safest option.
Guideline 4	<p>Encourage, support and promote breastfeeding.</p>
Guideline 5	<p>Care for your food; prepare and store it safely.</p>

Source: National Health and Medical Research Council, 2013 [2]

Appendix 2. The Aboriginal and Torres Strait Islander Guide to Healthy Eating



Australian Government
National Health and Medical Research Council
Department of Health

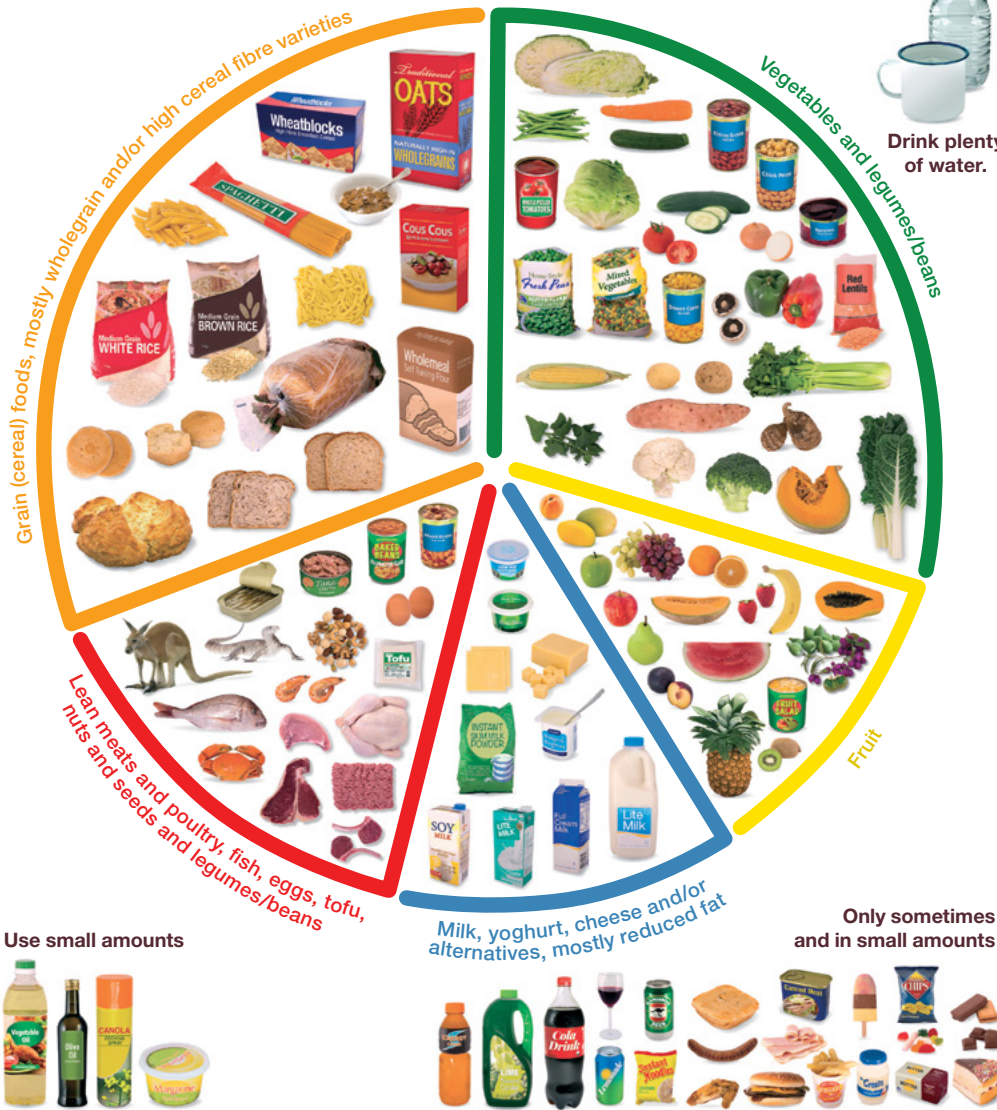
www.eatforhealth.gov.au

Aboriginal and Torres Strait Islander Guide to **Healthy** Eating

Eat different types of foods from the five food groups every day.



Drink plenty of water.



Source: National Health and Medical Research Council, 2015 [158]

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