



Review of programs and services to improve Aboriginal and Torres Strait Islander nutrition and food security

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Introduction

Improving diets, food supply and food security to better prevent and manage poor nutrition and diet-related disease is vital to the current and future health of Aboriginal and Torres Strait Islander people [1-3].

Effective action requires a whole-of-life approach, across the whole health continuum, including: preventive community interventions; public health nutrition policy actions; nutrition promotion; and quality clinical nutrition and dietetic services [4-7].

Previous reviews of Aboriginal and Torres Strait Islander food and nutrition programs have consistently noted the lack of availability of rigorously-evaluated interventions, especially with respect to long term evaluations [8-10]. Quality evaluations with practical recommendations are critical to helping the workforce build on what has been learnt. Evaluation reports and recommendations need to be publically available for policy makers and practitioners to learn from, apply and build on [2; 11].

Other reviews have found that most nutrition interventions have focused on remote settings [9; 10] despite most Aboriginal and Torres Strait Islander people living in urban and regional areas [12]. Most of these employed a comprehensive, whole-of-population approach - combining provision and promotion of healthier options in community food stores with nutrition education - which was found to be effective [10; 13-15].

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As with all health programs, nutrition programs should be developed with the target communities, be delivered according to cultural protocols, be tailored to community needs, and not be forced, or perceived to be forced, upon communities (see Box 1). A major success factor is community involvement in (and, ideally, control of) decisions relating to all stages of program initiation, development, implementation and evaluation [9; 10; 14]. Program implementation methods that build confidence among collaborating Aboriginal and Torres Strait Islander and non-Indigenous health agencies are fundamental to building capacity to enhance Aboriginal and Torres Strait Islander nutrition and health [15].

The typical short-term funding cycles experienced in this area are at odds with the time required for community stakeholders to develop capacity to mobilise and build momentum for specific interventions. An effective ecological approach to chronic disease prevention also requires inter-organisational collaboration in planning and implementation [16].

While many programs targeting nutritional issues are implemented as healthy lifestyle programs to address obesity, it must be remembered that diet is more than a 'lifestyle' choice - it is determined by the availability of and access to healthy food, and by having the infrastructure, knowledge and skills to prepare healthy food [2; 17; 18].

To improve diet-related health sustainably it will be necessary to take a food systems approach [3]. The underlying factors influencing nutrition and food security in Aboriginal and Torres Strait Islander communities include socioeconomic factors such as income and employment opportunities, housing, over-crowding, transport, food costs, cultural food values, education, food and nutrition literacy, knowledge, skills and community strengths [19; 20].

About this review

The purpose of this review is to provide a comprehensive synthesis of information on programs and services that aim to improve the nutritional status and the food security of Aboriginal and Torres Strait Islander people. This review is a companion document to the recent *Review of nutrition among Aboriginal and Torres Strait Islander people* that provides detailed information on food, diet, and nutrition, socio-economic determinants, and relationships with health outcomes [3]. It 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. It concludes by discussing future directions for combatting the growing epidemic of diet-related ill health among Aboriginal and Torres Strait Islander people. This review builds on the broad discussion presented in that narrative review by capturing a wider sample of evaluated programs and services and providing more detail about successful projects. A discussion on the policy landscape is beyond the scope of this review but is captured in the companion review [3].

The information in this paper has been drawn from the literature on evaluated programs and services that include a focus on improving diet and nutrition in Aboriginal and Torres Strait Islander people. The literature search was conducted between January and March 2017 and included peer reviewed systematic and narrative reviews, journal articles and grey literature (such as government and other reports). In addition, papers were hand-searched for evaluations and snowball sampling was used to identify and contact key authors who had conducted novel programs within the last 10 years. Publications that met the search criteria include:

- several older reviews (prior to 2012) [1; 21-24]
- an issues brief prepared for the Deeble Institute [10]
- evaluations and reviews of programs targeting:
 - relevant environmental determinants [25]
 - maternal and child health initiatives [26-28]
 - interventions to prevent growth faltering [29]
 - food supplementation programs [30]
 - nutrition education programs [9; 31]
 - nutrition programs generally [2; 32]
- individual evaluations of interventions in the above areas.

The Australian Indigenous HealthInfoNet prefers to use the term 'Aboriginal and Torres Strait Islander' rather than 'Indigenous Australian' for its publications. This includes publications authored by our own staff and external authors. However, when referencing information from other sources, our authors are ethically bound to use the terms from the original source unless they can obtain clarification from the report authors/copyright holders. As a result, readers may see these terms used interchangeably with the term 'Indigenous' in some instances. If they have any concerns they are advised to contact the HealthInfoNet for further information.

Limitations

This review should be considered as providing a summary of community-based nutrition and food-security programs for Aboriginal and Torres Strait Islander people in Australia. Research on this topic was conducted between January and March 2017. Although the literature search was comprehensive, the authors acknowledge that this review may not have captured all publically-available, peer-reviewed or grey literature and therefore may not include all relevant information about all relevant programs. Any materials published after March 2017 are not included in this discussion. Further, there has been no attempt to draw conclusions on the effectiveness of specific projects beyond what has been reported in the literature, as this review did not aim to conduct an assessment of quality of the program evaluations.

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Key points

- Nutrition, public health and Indigenous health experts are calling for a nationwide, comprehensive, sustained effort to address Aboriginal and Torres Strait Islander nutrition.

Primary prevention of diet-related disease and conditions

- The most effective community-based programs tend to adopt a multi-strategy approach, addressing both food supply (availability, affordability, accessibility and acceptability of foods), and demand for healthy foods.
- Supply of micronutrient supplements rather than food does not address the underlying issues of food insecurity, poor dietary patterns or high rates of obesity.
- The population health intervention of folate fortification of bread flour has had the desired effect of increasing folate status in the Australian Aboriginal population.
- Analysis of remote store sales data during the Northern Territory Emergency Response found that income management provided no beneficial impact in relation to purchasing of tobacco, soft drink or fruit and vegetables.
- Nutrition programs implemented at the community level mainly focus on improving food supply and/or increasing demand for healthy food.
- As with all health programs, all nutrition programs should be developed with communities, be delivered according to cultural protocols, be tailored to community needs, and be directed by the communities.

Primary health care and clinical nutrition and dietetic services

- Primary health care services for Aboriginal and Torres Strait Islander people need to deliver both competent and culturally appropriate dietetic and chronic disease care.
- Health services run by Aboriginal and Torres Strait Islander communities provide holistic care that is relevant to the local community and addresses the physical, social, spiritual and emotional health of the clients.
- The involvement of Aboriginal and Torres Strait Islander Health Workers has been identified by health professionals and patients as an important factor in the delivery of effective clinical care to Aboriginal and Torres Strait Islander people, including in dietetics and nutrition education.

Aboriginal and Torres Strait Islander nutrition workforce

- A trained, well-supported and resourced Aboriginal and Torres Strait Islander nutrition workforce is essential to deliver effective interventions.
- It is estimated that less than 20 Aboriginal and Torres Strait Islander people have ever trained as nutritionists and/or dietitians in Australian universities.

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

Governance, staff and resources

- Establish high levels of community participation and control of project design.
- Include employment and training of specific Aboriginal and/or Torres Strait Islander nutrition workers.
- Ensure use of peer-education, support and role modeling.
- Build the capacity of Aboriginal and/or Torres Strait Islander workers and organisations.
- Involve partnerships between nutritionists (for nutrition content expertise) and Aboriginal and/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 for short-term projects.

Intervention strategies

- Apply multiple strategies in multiple settings.
- Address food security issues (availability, affordability, accessibility and acceptability of healthy food) as well as providing nutrition education.
- Include policy, regulatory and structural changes to make health choices easier.
- Link screening/health assessments with health promotion programs.
- Use a participatory action research approach.

Evaluation

- 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 and/or health outcome?) levels.
- Ensure results are fed back to the community.
- Ensure results are disseminated widely.

Source: Lee A, Ride K, 2018 [3]

Primary prevention of diet-related conditions

Population level approaches

Nutrition strategies implemented at the broad whole-of-population level (such as at national or at a state and territory level) generally focus on primary prevention of disease. They may include social marketing programs (that employ media buys on television, radio and/or print and social media strategies, supported by broader health promotion approaches, such as point of sale promotions) or may involve a population-wide intervention (such as food fortification or labelling). Some of these whole-of-population strategies in Australia have included components targeted specifically to Aboriginal and Torres Strait Islander groups.

However, despite government investment in programs such as the Aboriginal and Torres Strait Islander component of Go for 2 & 5 fruit and vegetable promotion, and Indigenous specific initiatives such as Closing the Gap, disproportionately poor diets, poor nutrition and high levels of diet-related conditions persist in Aboriginal and Torres Strait Islander communities [12; 33-37]. Nutrition, public health and Indigenous health experts are calling for a nationwide, large scale, sustained effort to address Aboriginal and Torres Strait Islander nutrition [4; 38-40]. In the absence of such nation-wide effort, to help meet this need, local and regional food and nutrition strategies and programs have been developed in some areas, such as the Cape York Food and Nutrition Strategy 2012-2017 [41].

Food fortification and nutritional supplements

In 2009, Australia implemented mandatory folic acid fortification of wheat flour for bread-making to reduce the incidence of neural tube defects [42]. Baseline data [43] showed 10% of Aboriginal women and 26% of Aboriginal men participants had red blood cell (RBC) folate concentrations below 250 ng/mL, the cut-off associated with folate deficiency. In contrast, no non-Aboriginal women and 4% of the non-Aboriginal men surveyed had red blood cell folate concentrations below 250 ng/mL. All participants were vitamin B12 replete. The higher prevalence of folate deficiency in Aboriginal participants suggested they were more likely to benefit from a universal program of folate fortification. After fortification, no group was deficient in folate, suggesting that the population health intervention had the desired effect of increasing folate status in the Aboriginal population [44].

In 2009, Australia implemented mandatory iodine fortification of bread to reduce iodine deficiency in some areas of Australia [42]. Mild iodine deficiency in Aboriginal populations of the Northern Territory (NT) was described prior to iodine fortification and modelling determined that the mandatory bread fortification would not be sufficient to overcome this [45]. Evaluation of the national program showed increased intake of iodine in women of childbearing age and young children in the general population, but data for Aboriginal and Torres Strait Islander populations are not yet available [42].

The Fred Hollows Foundation trialed the use of 'Sprinkles' micronutrient supplements to address anaemia in children between six months and two years of age in six remote Indigenous communities in northern Australia [46]. There was a high participation rate, and an increased understanding of the extent of anaemia in participating communities was reported. However, adequate distribution of 'Sprinkles' was not achieved for widespread effect, although the researchers concluded that the program was promising [46].

Previously, supplementation with vitamins and/or minerals rather than food has been attempted among the most vulnerable in Aboriginal and Torres Strait Islander communities, including infants and pregnant women [1; 47]. While micronutrient supplements may help to address specific nutrient deficiencies, supply of micronutrient supplements does not address the underlying issues of food insecurity or poor dietary patterns [1].

Income management programs

The Northern Territory Emergency Response (NTER) was implemented to improve the wellbeing of Aboriginal people in the NT and to enable certain measures to be taken to reduce alcohol-related harms [48]. Another aspect of the NTER included income management - the quarantining of 50% of Aboriginal people's social security payments through a cashless 'basics card' in attempt to increase spending on food and groceries and reduce spending on alcohol, tobacco, illicit drugs and gambling. An evaluation of the impact on food spending of the (NTER) has been conducted [49]. Analysis of remote store sales data early in the implementation of income management found that this policy provided no beneficial impact in relation to purchasing of tobacco, soft drink or fruit and vegetables [49]. This finding has been considered significant given that an expansion of the cashless debit card trial was announced in the 2016-17 federal budget [10; 50].

Community programs

A range of nutrition programs have been implemented at community level. Some have focused on improving food supply (availability, affordability, accessibility and acceptability of healthy food), many have focused on increasing demand for healthy food, and a few multi-strategy programs have targeted both areas [4; 9; 10; 51].

Multi-strategy programs

A long-term multi-strategy community program that demonstrated considerable success is the Looma Healthy Lifestyle Project. This project began in a remote Western Australian (WA) community in 1993 and was still in operation 18 years after inception [14; 31; 52]. The community-directed project aimed to decrease the incidence of obesity, diabetes and coronary heart disease. Interventions and activities offered included: cooking classes and store tours; promotion of traditional cooking methods; hunting trips; sports and walking groups; and informal education sessions about diabetes and chronic diseases. By 2000, evaluation showed improvements in a range of coronary heart disease risk factors related to diet, but no significant changes in the prevalence of obesity or diabetes in the community [14]. A subsequent health assessment in 2009 found that the prevalence of diabetes in the community had not increased since 2003 [31]. Children and young people in the community were found to be relatively healthy, with 84% of those under 18 years of age being of normal weight, compared with 77% nationally. Unfortunately, the study design did not include a control community.

The Minjilang Health and Nutrition Survival Tucker Project was a community program that employed multiple strategies [13]. The project began in Minjilang on Croker Island in the NT in 1989 and ran intensively for 12 months. The evaluation involved store turnover data (validated as a measure of community dietary intake), objective biomedical data, and comparison of store turnover with a control community for nine years. Specific strategies included: individual health assessments with clinical feedback including practical advice and support; store interventions including point-of-sale promotions, shelf-talkers, cooking demonstrations, cross-subsidisation to decrease the price of fruit and vegetables and freight subsidisation of fresh foods; development of infrastructure to promote physical activity (such as provision of fencing for the football field, night-lights for the basketball courts), a 'bush tucker' vehicle and a grocery delivery service; and provision of affordable, healthy meals through the women's centre [53].

Dietary changes recorded included: a doubling of fruit and vegetable intake; a dramatic reduction of sugar intake; an increase in consumption of wholegrain foods; a decrease in the intake of saturated fats; and an increase in nutrient intakes. By comparison there was little change observed at the control community. Improvements in biomarkers collected quarterly reflected the dietary changes seen at the population level; marked reductions in triglycerides, cholesterol and blood pressure, and increases in red cell folate, vitamin C and carotenoids. There was also a small but significant decrease in the average body mass index of the screened adults. While there was no significant overall improvement in glucose tolerance in the community as a whole, there was some improvement among older women [31]. Most dietary changes persisted at Minjilang for the next three years, although sugar turnover at the community store rebounded slightly [13]. As a result of the project, the Arnhem Land Progress Association introduced a successful nutrition policy in all of its stores, transferring and increasing the sustainability of the project [54]. Subsequently, store managers were shown to be key 'gate-keepers' to community nutrition [55; 56].

Following the success of this program, other community-based programs were implemented in four remote WA Aboriginal communities. Although dietary changes and other details were not reported, biomedical results have been reported for one of the communities involved; 49% of the participants had lost weight and over half had lower cholesterol (59%) and lower blood glucose levels (54%) after several months [57]. The small sample size and short time frame did not allow for statistical significance to be determined.

The Many Rivers Diabetes Prevention Project commenced in 2007 with the aim to prevent diabetes in Aboriginal and Torres Strait Islander children in the Kempsey, Taree and the Lower Hunter regions of New South Wales (NSW). This was to be achieved through the promotion of healthy eating and physical activity. Evaluation in 2011-12 demonstrated positive governance and social outcomes, increased knowledge and awareness among participants and families, and further identification of the barriers and enablers of successful intervention programs [58]. The project increased community capacity by supporting formal and informal training of Aboriginal and Torres Strait Islander people in nutrition and health promotion. However, reported dietary impacts were mixed and tended to be more pronounced in non-Indigenous children and among Aboriginal and Torres Strait Islander girls. These included stabilisation of intake of energy-dense nutrient-poor foods (held at 2007-08 levels), stabilisation of proportion of children of unhealthy weight and decreased proportion of children consuming high intakes of sugary drinks. While no change in the proportion of children meeting recommendations for intake of fruit was reported, intake of vegetables decreased and there was little change in the overall high consumption of sugary drinks or hot chips among Aboriginal and Torres Strait Islander children [58].

The impact of efforts to improve nutrition in several communities on the Anangu Pitjantjatjara Yankunytjatjara (APY) Lands over 30 years was evaluated using multiple methods in 2015 [59]. At the request of the communities, various interventions were conducted including: the development and implementation of the Mai Wiru (good food) store nutrition policy; community nutrition education (including cooking sessions); and clinical nutrition services. Despite considerable achievements, including decreased intake of sugar, increased availability and affordability of healthy foods (particularly fruit and vegetables) and consequent improvement in some nutrient intakes (measured via store turnover), the overall effect has been a decrease in total diet quality since 1986. This is characterised by an increase in the dietary contribution of discretionary foods - from 35% of energy intake to 41% of energy intake. Sugar sweetened beverages, convenience meals and take-away foods accounted for most of the increase in discretionary foods. The evaluation highlighted that residing in remote communities can help Aboriginal residents exert control over key aspects of their food supply. However, lack of control over broader issues such as the price differential between healthy and unhealthy food items and the limited availability of perishable items, highlight the challenges faced by remote communities. The overall findings reflect a need for broader changes to the general Australian food supply, and reinforce the notion that, in the absence of supportive regulation and market intervention, adequate and sustained resources are required to improve nutrition and prevent diet-related chronic disease [59].

The Shop@RiC randomised controlled trial (RCT) compared the impact and cost effectiveness of a 20% price discount on fruit and vegetables, diet drinks and water with and without in-store nutrition education on purchasing in 20 remote Aboriginal communities over six months using a novel stepped wedge design [60; 61]. Increased purchasing of fruit, vegetables and water resulted, consistent with that reported by similar price discount studies in Australia and NZ. Health benefits were mixed and potentially undermined by an increase in total food purchases (and hence sodium and energy). The low mean per capita baseline intake of fruit and vegetables (37 g for fruit and 53 g for vegetables) increased by 13% (12 g) during the intervention and 20% (18 g) after the price intervention, equaling less than a quarter of a piece of fruit per day. In-store consumer education increased vegetable intake by a further 8% while the price discount was in place. Per capita turnover of bottled water increased by 18% with the price discount (from a baseline of 44 ml per day) and that of diet soft drinks increased by 5% (from a baseline of 63 ml per day); however per capita intake of sugar-sweetened beverage also increased by 6% (from a high baseline of 365 ml per day). These results were not statistically significant. However, there were statistically significant increases in energy intake (baseline 8.532 MJ per person per day) and sodium intake (baseline 2624 mg per person per day) during the intervention: energy intake rose by 8% and sodium intake by 7% during the intervention; and these rose by 14% and 14% respectively after the intervention [61]. The authors proposed more positive results may have been achieved using bigger subsidies and with the implementation of additional intervention strategies.

Programs to improve food supply

The term 'food supply' describes those aspects which affect the 'availability' of food in a community. The quality of the food supply can ultimately affect the food security of individuals, households or the entire population. While food supply is affected by national and even global forces, the focus for this review is the availability, variety, quality and access to foods for local population groups. There are a range of upstream factors which can have significant impacts on local food supply, including urban planning, land use regulation, agricultural policy and food processing regulations. While analysis of these factors which have whole of population impact is beyond the scope of this paper, advocacy is required to help ensure the rights of Aboriginal and Torres Strait Islander people are considered within broad policy and regulatory decision making.

Interventions to influence the food supply have been categorised here as: local food production; food retail outlets; workplaces and institutions; and food aid and food supplementation.

Local food production

At the local level, strategies to increase food production can include growing fruit and vegetables in the form of community gardens, community allotments, home gardens and school gardens. Supporting small scale, local farmers is another way of providing a relatively secure, more locally controlled source of fresh food.

Community gardens are frequently proposed as a solution to addressing food security in Aboriginal and Torres Strait Islander communities [22; 62; 63]. Community gardens can increase access to fresh fruit and vegetables, and provide opportunities for physical activity and social interaction through gardening. A community garden approach does however require a great deal of organisation to manage the shared responsibility for maintaining the garden, and substantial capital. The sustainability of a community garden is often dependent on individuals having the capacity to coordinate activities of other gardeners, as well as to access ongoing funding for infrastructure costs associated with vehicles, fuel costs and repair of equipment [22; 64].

Home gardens may be more effective in Torres Strait Islander island communities than on the mainland [62; 65]. This is due to the relatively infertile soils, the documented effect of insects and other pests, and the premise that conventional agriculture was inconsistent with mobility associated with mainland Aboriginal cultural life [1].

School gardens can be a popular alternative to community gardens in Aboriginal and Torres Strait Islander communities, as they are easier to coordinate and have the backup of staff and students to work in the garden on a daily basis, although school holidays do need to be considered [63; 64; 66]. The value of school-based gardens is that learning about gardening, composting, healthy eating and cooking can be integrated into the school curriculum in a positive and practical way. The Stephanie Alexander Kitchen Gardens Foundation [67] has developed a model which engages children from year 3 to year 6 in the design, construction and maintenance of a vegetable garden on the school grounds. This is combined with a kitchen classroom where each week students prepare and share a variety of meals created from their local produce. Evaluations of the program [68; 69] found that, although there were many positive social and learning outcomes of the program, there was little evidence that it improved children's dietary intake of fruit and vegetables. Several schools, including those with a high proportion of Aboriginal and Torres Strait Islander students, commenced the Stephanie Alexander Kitchen Garden Program with grants provided through the Australian Government [67]. A recent pilot study found that it was feasible for remote schools to undertake gardening and nutrition activities for a lower cost than existing models without on-the-ground horticultural support [70].

The integration of bush tucker within gardens has often been cited as a desirable goal for remote communities [63; 64]. While not all wild foods will be suitable for cultivation, or produce significant volume to feed large communities, they can hold significant cultural value and may be important to engender community ownership and acceptance. No quality evaluations of such approaches are available.

Food retail outlets

Efforts to influence local food supply through changes in food retail practices have most commonly been applied in remote communities that rely on a single community store. Store nutrition policies [54] and store managers alone [55] have been shown to be important influences on the food supply and dietary intake in remote Aboriginal and Torres Strait Islander communities. A study of four communities in western NSW found that factors such as the extent and type of advertising, food prices, and the availability of takeaway food influenced the dietary habits of residents [71]. In this regard, community stores should be seen as essential services, like health and education, rather than simply viewed as small businesses [59; 72; 73].

The removal of the most popular brand of sugary drinks (Coca Cola) from one community store on the APY Lands in 2009 resulted in a reduction in the sale of sugary drinks [59]. Although the removal was made at the request of the community, an assessment in 2012 determined that the dietary intake of community members in 2012 was no lower in sugar than comparable communities. Although total store turnover was not measured in 2009, this result is believed to be caused by increased sales of other sugary products such as cordial and sweet biscuits. This highlights the need to consider possible unintended consequences when planning an intervention. It is also important to assess full store turnover when evaluating interventions in remote community stores.

Mapping of community food outlets in urban or regional areas has been a feature of some recent programs trying to improve access to healthy food supplies in low socioeconomic neighbourhoods [74]. This strategy has also been integrated in several Aboriginal and Torres Strait Islander nutrition programs including the Many Rivers Research Project [58].

Workplaces and institutions

There is potential to improve food provided in Aboriginal and Torres Strait Islander organisations, by implementation of nutrition and healthy catering policies [75]. Examples where such policies would apply include at meetings, community barbecues, group programs and other community events. Food services also play a major role in other Aboriginal and Torres Strait Islander settings or facilities such as the Multifunctional Aboriginal Children's Services (MACS) (including child-care centres), Aboriginal hostels, sports clubs, and Aboriginal and Torres Strait Islander community Elders' services (including aged-care facilities). Aboriginal and Torres Strait Islander Health Workers are frequently seen as role models in their community and also have potential to be advocates for the supply of healthy food. However, such opportunities to influence food supply and food culture have been rarely studied [75].

One example of the successful introduction of a healthy catering policy in an Aboriginal organisation is the Hungry for Victory youth nutrition program at the Rumbalara Football Netball Club in regional Victoria. The club management improved the nutritional quality of food sold at the sports club canteen, and also provided fruit and match day breakfasts [76]. The program was successful in improving the food environment and in engaging Aboriginal teenagers in nutrition promotion activities. Another example is the provision of healthy food at a school holiday program [77].

Food aid and food supplementation

Food aid typically refers to food parcels or meals that are either provided for free or highly subsidised to the most vulnerable members of the community to prevent or relieve food insecurity. Subsidised food may be perceived more as a service rather than a charity. Broad food subsidy programs, such as the national program involving the provision of food vouchers through the Women's Infant and Children program (WIC) in the United States, can help improve food security in disadvantaged families [78]. Programs may be more acceptable if they are integrated within broader health and welfare systems, perceived as a service rather than a charity, preserve personal dignity (rather than being a source of 'shame'), or if there is opportunity for recipients to be involved, for example, by contributing time to assist program delivery to others [10; 79]. An example in Australia is the program at the Mullum Mullum Indigenous Gathering Place [80] where participating families who can't afford to buy a box of fruit and vegetables can volunteer in other programs held at the centre and receive produce as 'payment'; this principle of giving and receiving ensures the fresh produce is highly valued and families feel they are contributing to a service, rather than being passive recipients of charity.

Among Aboriginal and Torres Strait Islander groups, subsidised food has most commonly been provided at the local level for breakfast or lunch, particularly in children's settings such as schools or pre-schools [57; 81-88].

A recent Cochrane Review found that food supplementation programs can improve growth and development in vulnerable children [30]. However, the review identified that few studies had been conducted in high income countries. In the 1970s, the provision of hot meals and nutritious snacks to Aboriginal and Torres Strait Islander children in pre-school demonstrated some positive impacts [81]. However, recent studies in Aboriginal and Torres Strait Islander communities suggest that feeding programs should only be implemented when food insecurity is a major issue and when the local community supports such programs [29; 84]. 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 effective [82].

Not-for-profit organisations such as FoodBank (<https://www.foodbank.org.au>), Second Bite (<http://secondbite.org>) and OzHarvest (<http://www.ozharvest.org>) source food that would otherwise go to waste and redistribute to other food relief agencies and community food programs supporting people in need. Unfortunately, the food and drinks provided are not always healthy options [1]. These programs have not been evaluated at the level of health impacts or outcomes for specific population groups.

The Victorian Aboriginal Community Controlled Health Organisation (VACCHO) recently partnered with Second Bite to develop Sharing the Tracks to Good Tucker: Aboriginal Community Food Program Success Stories [89] which highlights several examples of local projects demonstrating positive processes and social impacts.

Several community-based food-supplementation programs have aimed to specifically increase the fruit and vegetable intake of Aboriginal and Torres Strait Islanders; many of these have targeted children. In Grafton, NSW, a small program providing children with fresh fruit at school claimed to have improved hearing in nearly half of the children and decreased rates of antibiotic prescription [90]. A similar study in another community by the same group observed reductions in skin infection and ear infections [28; 91].

Among more recent work, the Bulgarr Fruit and Vegetable Program provided a weekly box of subsidised fruit and vegetables to families whose children were attending any one of three local Aboriginal Medical Services for health assessments. Families made a co-payment of \$5 for the fruit and vegetable box, which was worth \$40 to \$60 depending on the number of children. After 12 months, involvement in the subsidy program was associated with improvements in plasma levels of vitamin biomarkers of fruit and vegetable intake in children. However, there was no significant change in self-reported fruit/vegetable intake or measured weight status (which could be expected to take longer to change) [92]. There were also some broader health benefits, including a significant decrease in oral antibiotic prescriptions [93].

The Crunch and Sip program (in South Australia (SA), WA and NSW) involves formal breaks in school classrooms for children to consume water, fruit and vegetables supplied by parents. It is not specifically an Aboriginal and Torres Strait Islander program, but has been implemented in areas of high Aboriginal and Torres Strait Islander population. High level of satisfaction, and perceived improvements in water and fruit/vegetable consumption have been reported, but not specific health outcomes [94].

Nutrition education programs

While nutrition education alone will not improve food security or dietary intake [1], it can be effective when combined with a range of other strategies to help people access healthy food [1]. Nutrition education programs in Aboriginal and Torres Strait Islander communities have aimed to increase food and nutrition knowledge, skills and/or abilities and have ranged from structured workshops [95-97] to less formal

information sessions [82; 83; 85; 98-100]. However, few education programs have been evaluated. While, many education programs report high levels of satisfaction, most lack any evaluation of changes to eating habits or biomedical indicators [8-10].

At the time of writing, many other current high profile programs have not been evaluated at impact or outcome level. These include:

- the Aboriginal and Torres Strait Islander component of Go for Fun <https://go4fun.com.au/>
- the Jimmy Little Foundation's Uncle Jimmy Thumbs Up! nutrition program <http://thumbsup.org.au/>

A recently published systematic review investigated the effectiveness of nutrition education in improving nutrition-related health outcomes in Aboriginal and Torres Strait Islander people [9]. The review included three programs from urban settings and three from remote settings [13; 14; 52; 99; 101-105]. Most of the programs also included a physical activity component (advice or an intervention) or access to health checks and diabetes advice.

Overall, the reviewers concluded that nutrition education programs conducted in group education sessions, such as cooking skills workshops and store interventions, combined with community involvement in their development, were more effective than those conducted in individual education settings [9].

This highlights the requirement to conduct needs assessments before conducting nutrition education programs [106]. A recent qualitative study in a remote Aboriginal community [107] found that people identified more closely with dietary qualities or patterns than with nutrients, possessed basic knowledge of 'good' store foods and valued a balanced, fresh diet that made them feel 'light'. People expressed interest in practical food and social skills, especially cooking. Freedom of choice was considered a deeply held value.

Cooking programs

Cooking programs are very popular among participants [83; 97; 108-110]; different models applied include cooking demonstrations [95; 111; 112], cooking classes [97; 109; 113; 114] and the development of community kitchens [97; 100; 112; 115]. While programs run in Aboriginal and Torres Strait Islander communities are usually tailored to the needs of the participants, several whole-of-population programs, such as the school-based Need for Feed program [116] also include targeted Aboriginal and Torres Strait Islander sessions. Jamie Oliver's Ministry of Food mobile vans have taken the cooking program to Aboriginal and Torres Strait Islander communities in Queensland (Qld) and WA [117]. Among food literacy and cooking programs, the community kitchens model may be particularly relevant for Aboriginal and Torres Strait Islander communities as it is based on community development principles and supports empowerment and self-efficacy. Local [10; 118] and international [119] evidence suggests that these programs can improve participants' food security through developing cooking, shopping and budgeting skills as well as reducing social isolation. However, it has been suggested that some cook books developed for such programs, reinforce western values and disregard traditional food ways [120].

Peer educator programs

The effectiveness of education type strategies can be enhanced when a 'train the trainer' or peer education model is used to deliver education to individual or small groups [121]. Of the programs reviewed many used a peer education approach, training Aboriginal workers to deliver nutrition activities for their own communities [13; 85; 95; 100; 104; 111; 112; 122-124]. A person who is familiar with the language, culture and family context is well placed to deliver education that is appropriate and relevant for their local community. The sustainability of a peer education approach strategy is likely to be greater when educators are paid for their time, rather than relying upon volunteers. Several programs have engaged elders to build on traditional knowledge and stories [125]. Providing opportunities for Aboriginal and Torres Strait Islander people to train and be employed in dedicated nutrition positions is critical to advancing nutrition and food security in the longer term [126; 127].

The Community Foodies program in SA is a nutrition program that aims to build the capacity of communities to make healthier food choices by training and supporting volunteer community members (Foodies) to act as agents for change. The Aboriginal and Torres Strait Islander Community Foodies, also known as Outback Community Foodies, has developed culturally appropriate resources, but has only been evaluated at the process level [100].

The Deadly Choices program in Qld aims to empower Aboriginal and Torres Strait Islander people to make healthy choices for themselves and their families. One evaluated component has been the school-based chronic disease education initiative for young Aboriginal and Torres Strait Islander students (years 7 to 12) in Brisbane [128]. The program provided health and nutrition education, opportunities for participation in physical activity, and made arrangements for health checks. A recent evaluation of the program found that participants demonstrated significant improvements over time in knowledge, attitudes and self-efficacy associated with types of chronic disease, chronic disease risk factors, prevention and health checks. The evaluation also found significant increases in breakfast frequency and

physical activity per week, fruit and vegetable consumption per day, and the uptake of health checks among students who participated in the program. The students who took part in the program showed a significant improvement in their knowledge of chronic disease and associated risk factors, and a significant increase in their breakfast frequency compared with a control group [128].

Another successful program that uses a peer education model is Living Strong in Qld (described below under group-based programs).

Budgeting and nutrition programs

FOODcents is an education program that helps families to achieve a healthy diet and save money on their grocery shop (<http://www.foodcentsprogram.com.au/about-foodcents/>). The program was funded by the WA Department of Health and ran from 1992 until 2016. An evaluation of the program concluded that perceptions of the usefulness of FOODcents [95; 129] were very high and comparable between Aboriginal and non-Aboriginal participants. Significantly larger improvements in confidence, nutrition knowledge, and reported dietary behaviours were more evident among Aboriginal participants than their non-Aboriginal counterparts [130]. The researchers concluded that adult nutrition education programs that address specific knowledge and skill deficits that are common among disadvantaged groups can be effective for multiple target groups, and may also assist in reducing nutrition-related inequalities [130].

Group-based lifestyle modification programs

Internationally, intensive lifestyle programs have reduced the incidence of diet-related chronic diseases such as diabetes among overweight people to an extent that is comparable to the use of medication [31]. Such programs provide participants with the life skills, knowledge and support needed to make sustainable lifestyle changes to prevent the onset of chronic diseases [131].

A recent review of healthy lifestyle programs addressing physical activity and nutrition among Aboriginal and Torres Strait Islander people found that programs can have positive health effects for up to two years, and are more likely to be effective if they are initiated by the community [31]. However, without adequate long term funding, sustaining healthy lifestyle programs in communities where multiple social and economic problems exist is particularly challenging, and very few healthy lifestyle programs have to date continued to operate beyond five years [31; 131].

The Living Strong program - previously called the Healthy Weight program - was initiated in Qld in 1997 in response to high levels of type 2 diabetes and other chronic diseases among Aboriginal and Torres Strait Islander adults [96; 111; 132]. The statewide program offered health screenings and workshops were conducted promoting healthy weight, good nutrition and physical activity. Although no longer in operation, a limited evaluation of the program in 2005 documented weight loss, increased fruit and vegetable intake, and modest gains in physical activity among some participants [96].

A similar program, the Healthy Lifestyle Programme (HELP), involved Aboriginal and Torres Strait Islander participants who were either diabetic or at risk of developing diabetes, in Brisbane. Participants self-monitored their blood glucose levels and physical activity with pedometers. At the six month follow-up there were significant reductions in waist circumference and diastolic blood pressure, based on the measurements from 80 participants; however longer-term data or data from a control group are not available [98].

The 'waist loss' program Gutbusters, originally created for non-Indigenous men, was adapted for use in the Torres Strait Islands in the 1990s following extensive consultation with four communities [122]. The program targeted Torres Strait Islander men and promoted both healthy diets and physical activity (mainly through regular walking and participation in rugby). Consultation, modification of the program and the provision of training to male Indigenous health workers, community representatives and Elders occurred over a period of four years, with an intensive year of implementation. A total of 135 men were involved at some level with the program. Anthropometric data were collected on approximately a third of participants. At the end of the year the average waist circumference reduction was 4 cm and the average percentage decrease in fat mass was almost 11%. The initial intention was for local communities to develop ownership and ongoing running of the program, however this was only partially successful [122].

A lifestyle modification program designed to help people reduce their risk of developing diabetes and cardiovascular disease is currently funded by the Victorian Government and managed by Diabetes Australia - Victoria [133]. The Life! program offers a course specifically for Aboriginal people and their families called the Road to Good Health [133]. Run by Aboriginal Health Workers and other health professionals, this course supports participants to make long term, sustainable lifestyle changes, such as adopting a healthier diet and becoming more physically active [131]. A working group that includes Aboriginal and Torres Strait Islander members, has ensured that Indigenous values and health promotion practices are embedded in the course. Results suggest the course is culturally relevant and valuable to users. Published evaluations are not yet available [133].

Other community-based programs

Price discounting

Eighteen community stores and 54 informants in the NT and WA participated in a retrospective evaluation of price discounting that aimed to influence grocery, fruit, vegetable and soft drink sales. Four price discounts of 10% in the 18 community stores failed to detect improvement in percentage of grocery sales to total food and beverage sales, fruit and vegetable sales, or diet soft drink sales, based on data from interviews and store sales data [134]. While targeted price discounts were considered important to help improve health, inadequate design and communication of the discount promotion and 'probably' inadequate magnitude of the discount were thought to have contributed to the lack of effect seen in this natural experiment. This evaluation contributes evidence to inform policy making [134].

Primary health care and clinical nutrition and dietetic services

Primary health care services include nutrition and dietetic services in addition to medical and other allied health services [5; 118; 135]. To meet the needs of Aboriginal and Torres Strait Islander people, primary health care services need to deliver both competent and culturally appropriate chronic disease care [136; 137]. This care can be provided by Aboriginal and Torres Strait Islander community controlled primary health care services [138]. Health services run by Aboriginal and Torres Strait Islander communities provide holistic care that is relevant to the local community and addresses the physical, social, spiritual and emotional health of the clients [131]. Such services can deliver effective prevention and management programs that enable lifestyle changes that are maintained and supported by the community [139].

It is generally accepted that inadequate access to primary health care services contributes to the poor health status of Aboriginal and Torres Strait Islander people [139]. Some of the barriers to accessing primary health care services that are experienced by Aboriginal and Torres Strait Islander people, include [140]:

- costs associated with consultation fees, medicines, transport, lost wages and time taken to access care
- distance and poor availability of services in remote areas
- poorer access to community controlled health organisations in metropolitan and regional areas compared to remote areas
- poor collaboration between different parts of the health system
- lack of cultural safety in mainstream services
- cultural misunderstandings, poor communication and experiences of discrimination with mainstream practitioners.

The involvement of Aboriginal and Torres Strait Islander Health Workers has been identified by health professionals and patients as an important factor in the delivery of effective clinical care to Aboriginal and Torres Strait Islander people, including in nutrition education [136; 141]. Barriers to the involvement of Aboriginal and Torres Strait Islander Health Workers include:

- inadequate training
- lack of clear role divisions among health care professionals
- lack of stable relationships with non-Indigenous staff
- high demands for acute care [142].

The need for a greater number of Aboriginal and Torres Strait Islander Health Workers and better training in nutrition has been identified previously, with little response [11; 33; 39; 143].

Maternal and child health programs

Most of the studies identified in recent reviews of Aboriginal and Torres Strait Islander maternal and child health programs were based in Aboriginal Community Controlled Health Organisations (ACCHOs). Antenatal and postnatal services were the most common types of interventions; health promotion/education and advice/support, including nutrition and breastfeeding advice, were the most frequent components of these services. While improvements in increased antenatal attendance, birth weight, breastfeeding and nutrition status were reported in some intervention studies, the reviewers noted gaps in description and implementation of the studies and problems with the quality of assessment methods used [27; 28]. Identification of major gaps in service delivery for Aboriginal families with young children

in Victoria (Vic), pointed to the need for a coordinated, culturally responsive systems approach to providing support for breastfeeding and child nutrition advice and support for Aboriginal families, including capacity building for staff, and supportive systems and policy [144]. A PhD study in the NT identified similar needs for service improvements [145], as did a study in regional NSW [146].

Among promising intervention programs that include a nutrition component, are the Mums and Babies Program, initiated by Townsville Aboriginal and Islander Health Service [147], the Nganampa Health Council Child and Maternal Health Program [148] and the NSW Aboriginal Maternal and Infant Health Service delivered through local government health services [149]. Resources from positively evaluated maternal and child health programs, such as Growing Strong - Feeding You and Your Baby [150] are still used by many health services, such as Apunipima Cape York Health Council for their Mums and Bubs initiatives, including the promising Baby One program [151; 152].

Strong Women, Strong Babies, Strong Culture stands out as an exemplar maternal and child nutrition initiative [10]. This community-initiated program was developed in the late 1980s [153] and has been implemented in multiple communities in the NT and remote WA. The program uses a peer-education model, in which senior women in the community provided nutrition assessment, education and advice to younger pregnant women, along with cultural activities and health promotion messages about tobacco, alcohol and antenatal care. In the NT, the program produced significant improvements in mean birthweights [123; 154; 155], while in WA, the introduction of growth assessment and infant feeding advice resulted in improved infant growth after six months of age [154]. It has been noted that the program has been more successful in some communities than others, which highlights the importance of documenting how program components are implemented [26].

The New Directions: Mothers and Babies Services program, funded under the Commonwealth Better Start to Life initiative (<http://www.health.gov.au/internet/main/publishing.nsf/Content/indigenous-programme-lp>), provides Aboriginal and Torres Strait Islander children and their mothers with: access to antenatal care; standard information about baby care; practical advice and assistance with breastfeeding; nutrition and parenting; monitors developmental milestones, immunisation status and infections; and undertakes health checks for Indigenous children before starting school. The program is being implemented in 85 sites across Australia. There are 15 organisations funded in urban locations, 38 in regional locations and 32 in remote locations. These services will expand to 136 sites by 2018 [139]. No evaluation data are yet available.

A review by McDonald and colleagues [29] found that growth faltering in infants and young children may best be prevented by community-based nutrition education/counselling and multifaceted interventions involving carers, community health workers and community representatives. However, it found that other interventions, such as food distribution programs, micronutrient supplementation and deworming should only be considered in the context of broader primary health care programs and/or when there is an identified local need [29]. While the review recommended best practice approaches should be adopted, it did not identify any evidence for weight screening in schools or growth monitoring alone [156-158]; effective growth monitoring should be accompanied by appropriate follow up action as part of a comprehensive program [159].

Monitoring and surveillance of infant growth, through comprehensive programs such as Growth Assessment and Action is an important component of the most effective service delivery programs [156; 157]. However, Aboriginal and Torres Strait Islander children under the age of 5 years are not routinely weighed or measured, nor are anaemia treatment protocols well-adhered to in Australia [46; 160]. Furthermore, national benchmarks and evaluation data are unavailable, as national co-ordination around existing programs is lacking [11; 160].

Programs for older children

Consistent with the findings of recent reviews [10], no evaluated food and nutrition programs that specifically target Aboriginal and Torres Strait Islander youth were identified in the peer reviewed literature.

However, a school meals program was introduced in 2007 in Indigenous communities in the NT as part of the Northern Territory Emergency Response (NTER) - the School Nutrition Program (SNP) [161]. The stated aim of the SNP was to 'contribute to improved school attendance and engagement by providing breakfast and lunch to school-aged children attending schools in NTER communities'. By July 2008, the program had been established in 68 of the 73 NTER communities. \$44.9 million was provided over the first four years of the program. The available evaluations focus on school attendance and not on dietary health.

Programs targeting diet-related chronic disease in adults

Prevention of diet-related chronic diseases such as type 2 diabetes and cardiovascular disease in high risk individuals is a critical component of primary health care [162]. Best practice primary care services can prevent or delay the onset of diet-related chronic disease in high risk individuals by:

- identifying those at high risk through the use of risk assessment tools
- delivering nutrition education programs
- referring to a registered practicing dietitian
- promoting lifestyle modifications that focus on improved diet, together with increased physical activity and weight loss.

National initiatives to improve care of those with diet-related chronic health conditions in Aboriginal and Torres Strait Islander primary care settings include continuous quality improvement (CQI) programs such as the Audit and Best Practice for Chronic Disease project (ABCD) and the subsequent extension project [163]. The ABCD clinical audit tools include criteria for nutrition services to be provided in multiple contexts: maternal and child health; brief intervention; and chronic disease prevention, treatment and management.

Consistent with recent reviews [10], no evaluations of food and nutrition programs that specifically target Aboriginal and Torres Strait Islander older people were identified. However, some programs, mainly focused on self-management of chronic conditions, do exist. One example is Aunty Jean's Good Health Team - a health promotion and self-management program that has been operating in NSW since 2004 [88]. The program was designed by local Elders, and involves weekly group sessions which incorporate health checks, an exercise session, a healthy lunch and information sessions (including nutrition and cooking) delivered in a supportive, culturally safe environment. A participatory evaluation reported improvements in participants' self-management, exercise capacity and self-assessed health, physical function and quality of life [88].

Aboriginal and Torres Strait Islander nutrition workforce

The success of many nutrition interventions for Aboriginal and Torres Strait Islander people is due to the recruitment, training and support of Aboriginal and Torres Strait Islander workers in dedicated positions to promote nutrition [1; 33]. Many early successful nutrition and healthy lifestyle programs emphasised the importance of professional partnerships between non-Indigenous nutritionists and Aboriginal Health Workers, and demonstrated the effectiveness of providing culturally appropriate training programs and educational resources for Aboriginal Health Workers [1; 164]. A trained nutrition workforce, with excellent cross-cultural competency and communication skills, is needed to deliver effective interventions [4; 165; 166] and a trained, well-supported and resourced Aboriginal and Torres Strait Islander nutrition workforce is essential [11; 33; 143].

It is difficult to identify the number of health professionals delivering nutrition and dietetic services to Aboriginal and Torres Strait Islander people in Australia. Dietitians and nutritionists are not required to be registered in Australia, so data are not available from Indigenous Allied Health Australia (www.iaha.com.au) or the Australian Government's health workforce data website (<https://iaha.com.au/>). It is estimated that there are 14 identified Aboriginal and Torres Strait Islander dietitians and/or nutritionists working currently in Australia; however it is unknown whether they are employed in mainstream or specific Indigenous health services [135; 167]. Neither is it known how many non-Indigenous dietitians/nutritionists are employed to provide mainstream or Aboriginal and Torres Strait Islander specific health services. In 2013, there were 122 Indigenous Allied Health Practitioners and 48 Indigenous Health Promotion Practitioners in Australia, but of these very few worked in nutrition [135; 139]. Similarly, it is unknown how many of the 910 Aboriginal and Torres Strait Islander Health Workers (that is, those with Certificate Level III or Level IV) have trained in nutrition or are working in this area.

There is a lack of Aboriginal and Torres Strait Islander specific nutrition positions available at all levels nationally [11; 118]. Nutrition professionals working in Aboriginal and Torres Strait Islander Health are employed mainly in the government sector and Aboriginal and Torres Strait Islander Community Controlled Health care services [5; 166]. Private health insurance also supports access to private dietetic services, but relatively few Aboriginal and Torres Strait Islander people hold, or can afford, private health insurance compared to other Australians [118]. Qld and the NT have previously adopted a systematic approach to Aboriginal and Torres Strait Islander nutrition workforce development and capacity building [11; 118; 168]. However, the workforce was reduced dramatically after the change of government in Qld in 2011 [118]. Proportionally, more nutrition professionals are employed, and there are more Aboriginal and Torres Strait Islander nutrition programs in place, in the NT than in other jurisdictions [11; 118].

In the early part of the 21st century, until 2010, food and nutrition units were integrated into core Aboriginal Health Worker primary health care training. Effective, structured training of Aboriginal and Torres Strait Islander Health Workers in Certificate Level III or Level IV nutrition, in both clinical and preventive community health, was available through Technical and Further Education (TAFE) colleges in some Australian jurisdictions [33]. However, the current status of Aboriginal and Torres Strait Islander nutrition worker training, nationally, is unknown. It is estimated that less than 20 Aboriginal and Torres Strait Islander people have ever trained as nutritionists and/or dietitians in Australian universities [118; 135; 167].

Conclusion

This review demonstrates that many Aboriginal and Torres Strait Islander communities are motivated to tackle diet-related health issues and they recognise the importance of improving nutrition to prevent and manage growth faltering and chronic disease. All available evidence reviewed here confirms that the most important factor determining the success of Aboriginal and Torres Strait Islander food and nutrition programs is community involvement in (and, ideally, control of) program initiation, development and implementation, with community members working in partnership in all stages of development, implementation and evaluation [9; 10; 31]. The most effective programs tend to adopt a multi-strategy approach, addressing both food supply (availability, affordability, accessibility and acceptability of foods), and demand for healthy foods.

This review has highlighted several common factors associated with successful food and nutrition programs based on principles of good practice; these are summarised in Box 1.

It is difficult for nutrition programs to impact effectively on health outcomes without addressing broader structural issues, such as poverty and lack of access to a healthy food supply [30]. Community effort needs to be supported through the building of an Aboriginal and Torres Strait Islander nutrition workforce, and adequate government investment of funds and policy commitment to sustain improvement of nutrition and diet-related health.

References

1. National Health and Medical Research Council. (2000). *Nutrition in Aboriginal and Torres Strait Islander peoples: an information paper*. Canberra: National Health and Medical Research Council.
2. National Health and Medical Research Council. (2013). *Australian Dietary Guidelines: providing the scientific evidence for healthier Australian diets*. Canberra: National Health and Medical Research Council.
3. Lee, A., & Ride, K. (2018). Review of nutrition among Aboriginal and Torres Strait Islander people. Perth, WA: Australian Indigenous HealthInfoNet.
4. Lee, A. J., Leonard, D., Moloney, A. A., & Minniecon, D. L. (2009). Improving Aboriginal and Torres Strait Islander nutrition and health: prevention and promotion - editorial. *Medical Journal of Australia*, 190(10), 547-548.
5. Foley, W., & Houston, A. (2014). Closing the gap by increasing access to clinical dietetic services for urban Aboriginal and Torres Strait Islander people. *Nutrition & Dietetics*, 71(4), 216-222.
6. Morris, N. F., Stewart, S., Riley, M. D., & Maguire, G. P. (2016). The Indigenous Australian Malnutrition Project: the burden and impact of malnutrition in Aboriginal Australian and Torres Strait Islander hospital inpatients, and validation of a malnutrition screening tool for use in hospitals - study rationale and protocol. *SpringerPlus*, 5. Retrieved from: <http://dx.doi.org/10.1186/s40064-016-2943-5>
7. Nguyen, H. D., Chitturi, S., & Maple-Brown, L. J. (2016). Management of diabetes in Indigenous communities: lessons from the Australian Aboriginal population. *Internal Medicine Journal*, 46(11), 1252-1259.
8. Clifford, A., Jackson Pulver, L., Richmond, R., Shakeshaft, A., & Ivers, R. (2011). Smoking, nutrition, alcohol and physical activity interventions targeting Indigenous Australians: rigorous evaluations and new directions needed. *Australian and New Zealand Journal of Public Health*, 35(1), 38-46.
9. Schembri, L., Curran, J., Collins, L., Pelinovskaia, M., Bell, H., Richardson, C., & Palermo, C. (2016). The effect of nutrition education on nutrition-related health outcomes of Aboriginal and Torres Strait Islander people: a systematic review. *Australian and New Zealand Journal of Public Health*, 40(S1), S42-S47.
10. Browne, J., Adams, K., & Atkinson, P. (2016). Food and nutrition programs for Aboriginal and Torres Strait Islander Australians: what works to keep people healthy and strong? Canberra: Deeble Institute for Health Policy Research.
11. Lee, A. J., Baker, P., Stanton, R., Friel, S., & Weightman, A. (2013). Scoping study to inform the development of the new national nutrition policy for Australia. Canberra: Australian Department of Health and Ageing.
12. Australian Institute of Health and Welfare. (2015). *The health and welfare of Australia's Aboriginal and Torres Strait Islander peoples 2015*. Canberra: Australian Institute of Health and Welfare.
13. Lee, A., Bonson, A., Yarmirr, D., O'Dea, K., & Mathews, J. (1995). Sustainability of a successful health and nutrition program in a remote Aboriginal community. *Medical Journal of Australia*, 162, 632-635.
14. Rowley, K. G., Daniel, M., Skinner, K., Skinner, M., White, G. A., & O'Dea, K. (2000). Effectiveness of a community-directed 'healthy lifestyle' program in a remote Australian Aboriginal community. *Australian and New Zealand Journal of Public Health*, 24(2), 136-144.
15. Genat, B., Browne, J., Thorpe, S., & MacDonald, C. (2016). Sectoral system capacity development in health promotion: evaluation of an Aboriginal nutrition program. *Health Promotion Journal of Australia*, 27(3), 236-242.
16. Cargo, M., Marks, E., Brimblecombe, J., Scarlett, M., Maypilama, E., Dhurrkay, J. G., & Daniel, M. (2011). Integrating an ecological approach into an Aboriginal community-based chronic disease prevention program: a longitudinal process evaluation. *BMC Public Health*, 11. Retrieved from: <http://www.biomedcentral.com/content/pdf/1471-2458-11-299.pdf>
17. World Health Organization. (2004). *Global strategy on diet, physical activity and health*. Geneva: World Health Organization.
18. Dietitians Association of Australia. (2016). Supporting document for the Joint Policy Statement on: Food Security for Aboriginal & Torres Strait Islander Peoples. Canberra: Dietitians Association of Australia.
19. Brimblecombe, J., van den Boogaard, C., Wood, B., Liberato, S. C., Brown, J., Barnes, A., Bailie, R. (2015). Development of the good food planning tool: a food system approach to food security in Indigenous Australian remote communities. *Health & Place*, 34, 54-62.
20. Rogers, A., Ferguson, M., Ritchie, J., Van Den Boogaard, C., & Brimblecombe, J. (2016). Strengthening food systems with remote Indigenous Australians: stakeholders' perspectives. *Health Promotion International*, 33(1), 38-48, <https://doi.org/10.1093/heapro/daw047>
21. Butlin, A., Cashel, K., Lee, A., Phyland, P., & Taylor, V. (1997). *Food and nutrition programs for Aboriginal and Torres Strait Islander peoples*. Canberra: Office for Aboriginal and Torres Strait Islander Health Services.
22. Rychetnik, L., Webb, K., Story, L., & Katz, T. (2003). *Food security options paper: a planning framework and menu of options for policy and practice interventions*. Sydney: NSW Centre for Public Health Nutrition.
23. Clifford, A., Jackson Pulver, L., Richmond, R., Shakeshaft, A., & Ivers, R. (2009). Disseminating best-evidence health-care to Indigenous health-care settings and programs in Australia: identifying the gaps. *Health Promotion International*, 24(4), 404-415.
24. NSW Centre for Overweight and Obesity. (2005). *A literature review of the evidence for interventions to address overweight and obesity in adults and older Australians (with special reference to people living in rural and remote Australia and Aboriginal and Torres Strait Islanders)*. Sydney: Australian Department of Health and Ageing.

25. Johnston, L., Doyle, J., Morgan, B., Atkinson-Briggs, S., Firebrace, B., Marika, M., Rowley, K. (2013). A review of programs that targeted environmental determinants of Aboriginal and Torres Strait Islander health. *International Journal of Environmental Research and Public Health*, 10(8), 3518-3542.
26. Herceg, A. (2005). Improving health in Aboriginal and Torres Strait Islander mothers, babies and young children: a literature review. Canberra: Department of Health and Ageing.
27. Jongen, C., McCalman, J., Bainbridge, R., & Tsey, K. (2014). Aboriginal and Torres Strait Islander maternal and child health and wellbeing: a systematic search of programs and services in Australian primary health care settings. *BMC Pregnancy and Childbirth*, 14. Retrieved from: <http://dx.doi.org/10.1186/1471-2393-14-251>
28. Bywood, P. T., Raven, M., & Erny-Albrecht, K. (2015). Improving health in Aboriginal and Torres Strait Islander mothers, babies and young children: a literature review. Adelaide: Primary Health Care Research and Information Service.
29. McDonald, E. L., Bailie, R. S., Rumbold, A. R., Morris, P. S., & Paterson, B. A. (2008). Preventing growth faltering among Australian Indigenous children: implications for policy and practice. *Medical Journal of Australia*, 188(Supplement 8), S84-S86.
30. Kristjansson, E., Francis, D. K., Liberato, S., Benkhalti Jandu, M., Welch, V., Batal, M., Petticrew, M. (2015). Food supplementation for improving the physical and psychosocial health of socio-economically disadvantaged children aged three months to five years. Queensland: Cochrane Database of Systematic Reviews.
31. Closing the Gap Clearinghouse. (2012). Healthy lifestyle programs for physical activity and nutrition. Canberra: Closing the Gap Clearinghouse.
32. Lee, A., & O'Dea, K. (2015). Aboriginal and Torres Strait Islander nutrition and health. In S. Croxford, C. Itsiopoulos, A. Forsyth, R. Belski, A. Thodis & S. Shepherd (Eds.), *Nutrition through the life stages: a comprehensive overview of food and nutrition in all stages of life* (pp. 261-276). Crows Nest, N.S.W.: Allen and Unwin.
33. URBIS. (2010). Review of the National Aboriginal and Torres Strait Islander Nutrition Strategy and Action Plan 2000-2010: final report. Sydney: URBIS.
34. Australian Institute of Health and Welfare. (2015). Aboriginal and Torres Strait Islander health performance framework 2014 report: detailed analyses. Canberra: Australian Institute of Health and Welfare.
35. Australian Health Ministers' Advisory Council. (2015). Aboriginal and Torres Strait Islander health performance framework 2014 report. Canberra: Department of the Prime Minister and Cabinet.
36. Australian Institute of Health and Welfare. (2016). Australia's health 2016. Canberra: Australian Institute of Health and Welfare.
37. Woolcott Research. (2007). Evaluation of the National Go for 2&5 Campaign. Canberra: Australian Department of Health and Ageing.
38. Gracey, M. (2014). Why closing the Aboriginal health gap is so elusive. *Internal Medicine Journal*, 44(11), 1141-1143.
39. Browne, J., Hayes, R., & Gleeson, D. (2014). Aboriginal health policy: is nutrition the 'gap' in 'Closing the Gap'? *Australian and New Zealand Journal of Public Health*, 38(4), 362-369.
40. Wright, P., & Lewis, P. (2017). Close the Gap: progress and priorities report 2017. Canberra: Close the Gap Campaign Steering Committee.
41. Apunipima Cape York Health Council. (2013). Cape York food and nutrition strategy 2012-2017. Cape York, Qld: Apunipima Cape York Health Council.
42. Australian Institute of Health and Welfare. (2016, 2016). Folic acid & iodine fortification. from <https://www.aihw.gov.au/reports/food-nutrition/folic-acid-iodine-fortification/contents/summary>
43. Maxwell, S. J., Brameld, K. J., Bower, C., D'Antoine, H., Hickling, S., Marley, J., & O'Leary, P. (2013). Baseline investigations of folate status in Aboriginal and non-Aboriginal West Australians prior to the introduction of mandatory fortification. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 53(1), 26-31.
44. Bower, C., Maxwell, S., Hickling, S., D'Antoine, H., & O'Leary, P. (2016). Folate status in Aboriginal people before and after mandatory fortification of flour for bread-making in Australia. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 56(3), 233-237.
45. Mackerras, D. E. M., Singh, G. R., & Eastman, C. J. (2011). Iodine status of Aboriginal teenagers in the Darwin region before mandatory iodine fortification of bread. *Medical Journal of Australia*, 194(3), 126-130.
46. Aquino, D., Marley, J. V., Senior, K., Leonard, D., Helmer, J., Joshua, A., Hadgraft, N. (2013). Early Childhood Nutrition and Anaemia Prevention Project: summary report. Darwin: The Fred Hollows Foundation, Indigenous Australia Program.
47. Kalokerinos, A. (1977). Australian Aboriginal health and vitamin C. *Australasian Nurses Journal*, 7(5), 8.
48. Northern Territory National Emergency Response Act 2007 (2008).
49. Brimblecombe, J., McDonnell, J., Dhurrkay, J. G., Thomas, D. P., & Bailie, R. S. (2010). Impact of income management on store sales in the Northern Territory: after the intervention — research. *Medical Journal of Australia*, 192(10), 549-554.
50. Australian Department of Social Services. (2016). Cashless Debit Card Trial - third site: 2016 Budget. Canberra: Australian Department of Social Services.
51. Gwynn, J., Sim, K., Searle, T., O'Dea, K., Lee, A., & Brimblecombe, K. (2017). The effect of nutrition interventions on diet related health outcomes of Aboriginal and Torres Strait Islander Australians- what works: a systematic review. *Medical Journal of Australia*, review article.

52. Rowley, K. G. (2001). Improvements in circulating cholesterol, antioxidants, and homocysteine after dietary intervention in an Australian Aboriginal community. *American Journal of Clinical Nutrition*, 74(4), 442-448.
53. Bear-Wingfield, R. (1996). *Sharing good tucker stories: a guide for Aboriginal and Torres Strait Islander communities*. Canberra: Commonwealth Department of Health and Family Services.
54. Lee, A. J., Hobson, V., & Katarski, L. (1996). Review of the nutrition policy of the Arnhem Land Progress Association. *Australian and New Zealand Journal of Public Health*, 20(5), 538-544.
55. Lee, A. (1996). The effect of retail store managers on Aboriginal diet in remote communities. *Australian and New Zealand Journal of Public Health*, 20, 212-214.
56. Pollard, C. M., Nyaradi, A., Lester, M., & Sauer, K. (2014). Understanding food security issues in remote Western Australian Indigenous communities. *Health Promotion Journal of Australia*, 25(2), 83-89.
57. Gracey, M., Bridge, E., Martin, D., Jones, T. W., Spargo, R. M., Shephard, M., & Davis, E. A. (2006). An Aboriginal-driven program to prevent, control and manage nutrition-related "lifestyle" diseases including diabetes. *Asia Pacific Journal of Clinical Nutrition*, 15(2), 178-188.
58. Gwynn, J. D., Blunden, S. V., Turner, N., Flood, V., Attia, J., Smith, W., Wiggers, J. (2014). Many Rivers Diabetes Prevention Project 2007-2012: final report. Sydney: Ministry of Health.
59. Lee, A., Rainow, S., Tregenza, J., Tregenza, L., Balmer, L., Bryce, S., Schomburgk, D. (2015). Nutrition in remote Aboriginal communities: lessons from Mai Wiru and the Anangu Pitjantjatjara Yankunytjatjara Lands. *Australian and New Zealand Journal of Public Health*, 40(S1), S81-S88.
60. Brimblecombe, J., Ferguson, M., Liberato, S. C., Ball, K., Moodie, M. L., Magnus, A., Bailie, R. S. (2013). Stores Healthy Options Project in Remote Indigenous Communities (SHOP@RIC): a protocol of a randomised trial promoting healthy food and beverage purchases through price discounts and in-store nutrition education. *BMC Public Health*, 13. Retrieved from: <http://dx.doi.org/10.1186/1471-2458-13-744>
61. Brimblecombe, J., Ferguson, M., Chatfield, M. D., Liberato, S. C., Gunther, A., Ball, K., Bailie, R. (2017). Effect of a price discount and consumer education strategy on food and beverage purchases in remote Indigenous Australia: a stepped-wedge randomised controlled trial. *The Lancet Public Health*, 2(2), e82-e95.
62. Mills, P., Pensio, P., & Sailor, B. (1997). The Garden Kai Kai Project. In N. H. a. M. R. Council (Ed.), *Promoting the health of Aboriginal and Torres Strait Island Communities: case studies and principles of good practice* (pp. 3-8). Canberra: National Health and Medical Research Council.
63. Remote Indigenous Gardens Network. (2016, 2017). Remote Indigenous Gardens Network. from <http://www.remoteindigenousgardens.net/>
64. Green, R. (2009). *From little things, big things grow: investigating remote Aboriginal community gardens*. University of Sydney, Sydney.
65. Leonard, D., Beilin, R., & Moran, M. (1995). Which way kaikai blo umi? Food and nutrition in the Torres Strait. *Australian Journal of Public Health*, 19(6), 589-595.
66. Viola, A. (2006). Evaluation of the Outreach School Garden Project: building the capacity of two Indigenous remote school communities to integrate nutrition into the core school curriculum. *Health Promotion Journal of Australia*, 17(3), 233-239.
67. Stephanie Alexander Kitchen Garden Foundation. (2018, 2018). Stephanie Alexander Kitchen Garden Foundation website. from <https://www.kitchengardenfoundation.org.au/>
68. Gibbs, L., Staiger, P. K., Townsend, M., Macfarlane, S., Gold, L., Block, K., Waters, E. (2013). Methodology for the evaluation of the Stephanie Alexander Kitchen Garden program. *Health Promotion Journal of Australia*, 24(1), 32-43.
69. Yeatman, H., Quinsey, K., Dawber, J., Nielsen, W., Condon-Paoloni, D., Eckermann, S., Fildes, D. (2013). Stephanie Alexander kitchen garden national program evaluation: final report. Wollongong, NSW: Centre for Health Service Development, University of Wollongong.
70. Hume, A., Wetten, A., Feeney, C., Taylor, S., O'Dea, K., & Brimblecombe, J. (2014). Remote school gardens: exploring a cost-effective and novel way to engage Australian Indigenous students in nutrition and health. *Australian and New Zealand Journal of Public Health*, 38(3), 235-240.
71. Rodgers, K., Willis, D., & Thomas, R. (1998). Environmental factors influencing Aboriginal nutrition in Western New South Wales. *Health Promotion Journal of Australia*, 8(1), 18-23.
72. Leonard, D., Turner, C., Hobson, V., Pollard, C., Lewis, J., & Bowcock, R. (2003). FoodNorth: food for health in north Australia. Perth: North Australia Nutrition Group, Department of Health, Western Australia.
73. House of Representatives Aboriginal and Torres Strait Islander Affairs Committee. (2009). Everybody's business: remote Aboriginal and Torres Strait community stores. Canberra: The Parliament of the Commonwealth of Australia.
74. Cummins, S., & Macintyre, S. (2005). Food environments and obesity - neighbourhood or nation? *International Journal of Epidemiology*, 35(1), 100-104.
75. MacDonald, C., Genat, B., Thorpe, S., & Browne, J. (2015). Establishing health-promoting workplaces in Aboriginal community organisations: healthy eating policies. *Australian Journal of Primary Health*, Online early(<http://dx.doi.org/10.1071/PY14144>).
76. Reilly, R. E., Cincotta, M., Doyle, J., Firebrace, B. R., Cargo, M., van den Tol, G., Rowley, K. G. (2011). A pilot study of Aboriginal health promotion from an ecological perspective. *BMC Public Health*, 11. Retrieved from: <http://dx.doi.org/10.1186/1471-2458-11-749>
77. Edwards, C., & Colbey, A. (2007). Yirrkala active cooking. *Aboriginal and Islander Health Worker Journal*, 31(4), 5-7.
78. Black, A. P., Brimblecombe, J., Eyles, H., Morris, P., Vally, H., & O'Dea, K. (2012). Food subsidy programs and the health and nutritional status of disadvantaged families in high income countries: a systematic review. *BMC Public Health*, 12. Retrieved from: <http://dx.doi.org/10.1186/1471-2458-12-1099>

79. Crawford, B., Yamazaki, R., Franke, E., Amanatidis, S., Ravulo, J., Steinbeck, K., Torvaldsen, S. (2014). Sustaining dignity? Food insecurity in homeless young people in urban Australia. *Health Promotion Journal of Australia*, 25(2), 71-78.
80. Mullum Mullum Indigenous Gathering Place. (2016, 2017). Mullum Mullum Indigenous Gathering Place: foodbank. from <http://www.mmigp.org.au/foodbank>
81. Coyne, T., Dowling, M., & Paoloni, D. C. (1980). Evaluation of preschool meals programmes on the nutritional health of Aboriginal children. *Medical Journal of Australia*, 2, 369-375.
82. Miller, M., Coffin, J., Shaw, P., D'Antoine, H., Larson, A., & James, R. (2004). Evaluation of Indigenous nutrition projects funded by the National Childhood Nutrition Program in Western Australia: final report. Perth: Telethon Institute for Child Health Research, Combined Universities Centre for Rural Health.
83. Indigenous Health Service. (2005). Good food great kids: an Indigenous community nutrition project 2002-2004. Healesville, VIC: Indigenous Health Service, Yarra Valley Community Health Service, Eastern Health.
84. Warchivker, I. (2003). An analysis of a community response to child nutrition problems at Kintore (Walungurru) 1998-2001. Alice Springs: Centre for Remote Health.
85. Reilly, R., Doyle, J., & Rowley, K. (2007). Koori community-directed health promotion in the Goulburn Valley. *Australian Community Psychologist*, 19(1), 39-46.
86. Roberts, D., & Simmond, T. (2007). Grace Close Nutrition and Wellbeing Programme. Sydney: Collaborative Centre for Aboriginal Health Promotion.
87. Briggs, J. (2001). Impact of an integrated approach to diabetes care at Rumbalara Aboriginal Health Service. Melbourne: Department of Rural Health, University of Melbourne.
88. Curtis, S., Pegg, D., & Curtis, O. (2004). Aunty Jean's Good Health Team: listening to the voices of the Elders to create an Aboriginal chronic and complex care program. Unanderra, NSW: Illawarra Health.
89. Browne, J., Thorpe, S., MacDonald, C., Atkinson, P., Bonnell, E., Murray, M., Yam, C. (2014). Aboriginal community food program success stories: sharing the tracks to good tucker. Melbourne: Victorian Aboriginal Community Controlled Health Organisation.
90. Jones, R., & Smith, F. (2006). Are there health benefits from improving basic nutrition in a remote Aboriginal community? *Australian Family Physician*, 35(6), 453-454.
91. Jones, R., & Smith, F. (2007). Fighting disease with fruit. *Australian Family Physician*, 36(10), 863-864.
92. Black, A. P., Vally, H., Morris, P., Daniel, M., Esterman, A., Karschimkus, C. S., & O'Dea, K. (2013). Nutritional impacts of a fruit and vegetable subsidy programme for disadvantaged Australian Aboriginal children. *British Journal of Nutrition*, 110(12), 2309-2317.
93. Black, A. P., Vally, H., Morris, P. S., Daniel, M., Esterman, A. J., Smith, F. E., & O'Dea, K. (2013). Health outcomes of a subsidised fruit and vegetable program for Aboriginal children in northern New South Wales. *Medical Journal of Australia*, 199(1), 46-50.
94. Weise, M., Jolley, G., & Johns, J. (2011). Crunch and Sip evaluation report. Adelaide: South Australian Community Health Research Unit, Flinders University.
95. Foley, R. M., & Pollard, C. M. (1998). Food Cent\$ - implementing and evaluating a nutrition education project focusing on value for money. *Australian and New Zealand Journal of Public Health*, 22(4), 494-501.
96. Queensland Health. (2005). 2005 Evaluation of the Healthy Weight Program: summary report. Brisbane: Queensland Health.
97. Gui, G., & Lau, Q. (2007). 'Quick meals for Kooris': an evaluation. *Aboriginal and Islander Health Worker Journal*, 31(4), 20-21.
98. Chan, L. C. K. (2007). Short term efficacy of a lifestyle intervention programme on cardiovascular health outcome in overweight Indigenous Australians with and without type 2 diabetes mellitus: the healthy lifestyle programme (HELP). *Diabetes Research and Clinical Practice*, 75(1), 65-71.
99. Tyrrell, M., Grundy, J., Lynch, P., & Wakerman, J. (2003). Laramba Diabetes Project: an evaluation of a participatory project in a remote Northern Territory community. *Health Promotion Journal of Australia*, 14(1), 48-53.
100. Community Matters Consultancy. (2007). Community Foodies Program 2006-07: a realist evaluation. Noarlunga, SA: Southern Adelaide Health Service.
101. Harris, C., & Curtis, O. (2005). Supporting self-management of diabetes in Aboriginal people living with diabetes through a 5-day residential camp. *Aboriginal and Islander Health Worker Journal*, 29(3), 4-10.
102. Longstreet, D., Health, D., Savage, I., Vink, R., & Panaretto, K. S. (2008). Estimated nutrient intake of urban Indigenous participants enrolled in a lifestyle intervention program. *Nutrition & Dietetics*, 65(2), 128-133.
103. Canuto, K., Cargo, M., Li, M., D'Onise, K., Esterman, A., & McDermott, R. (2012). Pragmatic randomised trial of a 12-week exercise and nutrition program for Aboriginal and Torres Strait Islander women: clinical results immediate post and 3 months follow-up. *BMC Public Health*, 12. Retrieved from: <http://www.biomedcentral.com/1471-2458/12/933>
104. Lee, A., Bailey, A., Yarmirr, D., O'Dea, K., & Mathews, J. (1994). Survival tucker: improved diet and health indicators in an Aboriginal community. *Australian Journal of Public Health*, 18(3), 277-285.
105. Grundy, J., Tyrrell, M., & Wakerman, J. (2001). Laramba Diabetes Project: an evaluation. Alice Springs: Centre for Remote Health.
106. Porteous, H. E., Palmer, M. A., & Wilkinson, S. A. (2014). Informing maternity service development by surveying new mothers about preferences for nutrition education during their pregnancy in an area of social disadvantage. *Women and Birth*, 27(3), 196-201.

107. Colles, S. L., Maypilama, E., & Brimblecombe, J. (2014). Food, food choice and nutrition promotion in a remote Australian Aboriginal community. *Australian Journal of Primary Health, 20*(4), 365-372.
108. Nilson, C., Kearing-Salmon, K. A., Morrison, P., & Fetherston, C. (2015). An ethnographic action research study to investigate the experiences of Bindjareb women participating in the cooking and nutrition component of an Aboriginal health promotion programme in regional Western Australia. *Public Health Nutrition, FirstView*(<http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=9669086&fulltextType=RA&fileId=S1368980015000816>).
109. Moore, L., Webb, R., Abbott, P., & Zonka, B. (2006). Cooking classes for diabetes: a partnership between Daruk Aboriginal Medical Service and the Western Sydney Institute of TAFE. *Aboriginal and Islander Health Worker Journal, 30*(6), 11-13.
110. Smith, J. (2002). Wadja Warriors football team's healthy weight program. *Aboriginal and Islander Health Worker Journal, 26*(4), 13-15.
111. Dunn, S., & Dewis, E. (2001). Healthy weight program evaluation, Queensland 1996-1999. *Aboriginal and Islander Health Worker Journal, 25*(4), 26-28.
112. Howie, R. J. (2004). Formative evaluation of the Kuwinyuwardu Aboriginal Resource Unit Gascoyne Healthy Lifestyle Program. Subiaco, Western Australia: School of Population Health, University of Western Australia.
113. Amy, S. (2008). Food For All program progress report. Swan Hill, Vic: Swan Hill Rural City Council.
114. Active Healthy Communities. (2014). Fitness and Sports Training (FAST) and Deadly Tucker programs. Sunshine Coast, Qld: Active Healthy Communities.
115. Gunnion, T. (2008). Frankston Community Kitchens pilot project report. Frankston, Vic: Frankston Community Health Service.
116. Diabetes Queensland. (2015, 2015). Need For Feed. from <http://www.needforfeed.org.au/>
117. The Good Foundation. (2017, 2017). Jamie's Ministry of Food. from <https://www.thegoodfoundation.com.au/program/jamies-ministry-of-food>
118. Vidgen, H. A., Adam, M., & Gallegos, D. (2017). Who does nutrition prevention work in Queensland? An investigation of structural and political workforce reforms. *Nutrition & Dietetics, 74*(1), 88-94.
119. Crawford, S. M., & Kallina, L. (1997). Building food security through health promotion: community kitchens. *Journal of the Canadian Dietetic Association, 58*(4), 197-201.
120. Fredericks, B., & Anderson, M. (2013). *Aboriginal and Torres Strait Islander cookbooks: promoting Indigenous foodways or reinforcing Western traditions?*, Brisbane.
121. Graham, S., McCall, E., & Morris, L. (2015). Breastfeeding education within an aboriginal community using community development principles through Australian breastfeeding association community mentoring workshops. *HNE Handover: For Nurses and Midwives, 8*(2 (Special Issue)), 217.
122. Egger, G., Fisher, G., Piers, S., Bedford, K., Morseau, G., Sabasio, S., Mills, P. (1999). Abdominal obesity reduction in Indigenous men. *International Journal of Obesity and Related Metabolic Disorders, 23*(6), 564-569.
123. Mackerras, D. (2001). Birthweight changes in the pilot phase of the Strong Women Strong Babies Strong Culture Program in the Northern Territory. *Australian and New Zealand Journal of Public Health, 25*(1), 34-40.
124. Woods, B., Campbell, C., Miller, M., & Thompson, C. (1998). 'Eat healthy tucker' Aboriginal nutrition training workshops. *Health Promotion Journal of Australia, 8*(1), 62-63.
125. Warburton, J., & Chambers, B. (2007). Older Indigenous Australians: their integral role in culture and community. *Australasian Journal on Ageing, 26*(1), 3-7.
126. Browne, J., Thorpe, S., Tunny, N., Adams, K., & Palermo, C. (2013). A qualitative evaluation of a mentoring program for Aboriginal health workers and allied health professionals. *Australian and New Zealand Journal of Public Health, 37*(5), 457-462.
127. Adams, K., Browne, J., Palermo, C., & Radford, G. (2016). Experiences of urban Australian Indigenous peer mentors in a non-communicable disease prevention program. *AlterNative, 12*(4), 425-436.
128. Malseed, C., Nelson, A., & Ware, R. (2014). Evaluation of a school-based health education program for urban Indigenous young people in Australia. *Scientific Research, 6*(7), 587 - 597.
129. FOODcents. (2017, 2017). FOODcents. from <http://www.foodcentsprogram.com.au/>
130. Pettigrew, S., Jongenelis, M. I., Moore, S., & Pratt, I. S. (2015). A comparison of the effectiveness of an adult nutrition education program for Aboriginal and non-Aboriginal Australians. *Social Science & Medicine, In press*(<http://dx.doi.org/10.1016/j.socscimed.2015.09.025>).
131. Diabetes Australia. (2013). Aboriginal and Torres Strait Islanders and diabetes action plan. Canberra: Diabetes Australia.
132. Queensland Health. (2012). The health of Queenslanders 2012: advancing good health. Fourth report of the Chief Health Officer Queensland. Brisbane: Queensland Health.
133. Life! (2015, 2015). About the Life! program. from <http://www.lifeprogram.org.au/about-the-life-program/about-the-program>
134. Ferguson, M., O'Dea, K., Holden, S., Miles, E., & Brimblecombe, J. (2016). Food and beverage price discounts to improve health in remote Aboriginal communities: mixed method evaluation of a natural experiment. *Australian and New Zealand Journal of Public Health, 41*(1), 32 - 37, <https://onlinelibrary.wiley.com/doi/abs/10.1111/1753-6405.12616>
135. Indigenous Allied Health Australia. (2017). Personal communication. Indigenous Allied Health Australia.

136. McDermott, R. A., Schmidt, B., Preece, C., Owens, V., Taylor, S., Li, M., & Esterman, A. (2015). Community health workers improve diabetes care in remote Australian Indigenous communities: results of a pragmatic cluster randomized controlled trial. *BMC Health Services Research*, 15. Retrieved from: <http://dx.doi.org/10.1186/s12913-015-0695-5>
137. Browne, J., D'Amico, E., Thorpe, S., & Mitchell, C. (2014). Feltman: evaluating the acceptability of a diabetes education tool for Aboriginal health workers. *Australian Journal of Primary Health*, 20(4), 319-322.
138. Australian Institute of Health and Welfare. (2013). Healthy for Life: Aboriginal Community Controlled Health Services: report card. Canberra: Australian Institute of Health and Welfare.
139. Steering Committee for the Review of Government Service Provision. (2014). Report on government services 2014: Indigenous compendium. Canberra: Productivity Commission.
140. Bywood, P., Katterl, R., & Lunnay, B. (2011). Disparities in primary health care utilisation: Who are the disadvantaged groups? How are they disadvantaged? What interventions work? Adelaide: Primary Health Care Research & Information Service.
141. Stoneman, A., Atkinson, D., Davey, M., & Marley, J. V. (2014). Quality improvement in practice: improving diabetes care and patient outcomes in Aboriginal Community Controlled Health Services. *BMC Health Services Research*, 14. Retrieved from: <http://dx.doi.org/10.1186/1472-6963-14-481>
142. Bailie, R., Si, D., Dowden, M., O'Donoghue, L., Connors, C., Robinson, G., Weeramanthri, T. (2007). Improving organisational systems for diabetes care in Australian Indigenous communities. *BMC Health Services Research*, 7. Retrieved from: <http://www.biomedcentral.com/1472-6963/7/67>
143. National Public Health Partnership. (2001). National Aboriginal and Torres Strait Islander Nutrition Strategy and Action Plan 2000-2010 and first phase activities 2000-2003. Canberra: National Public Health Partnership.
144. Myers, J. M., Thorpe, S., Browne, J., Gibbons, K., & Brown, S. (2014). Early childhood nutrition concerns, resources and services for Aboriginal families in Victoria. *Australian and New Zealand Journal of Public Health*, 38(4), 370-376.
145. Bar-Zeev, S. J. (2013). *The quality of maternal and infant health services and their utilisation by remote dwelling Aboriginal families in the top end of Australia*. University of Sydney, Sydney.
146. Hegedus, J., & Mullan, J. (2015). Are we adequately providing support services for optimal infant nutrition in Australia? A study in regional NSW. *Australian Journal of Primary Health*, 21(3), 293-298.
147. Panaretto, K. S., Mitchell, M. R., Anderson, L., Larkins, S. L., Manassis, V., Buettner, P. G., & Watson, D. (2007). Sustainable antenatal care services in an urban Indigenous community: the Townsville experience. *Medical Journal of Australia*, 187(1), 18-22.
148. Department of Health and Ageing. (2005). National Aboriginal and Torres Strait Islander child and maternal health exemplar site initiative: site reports 2005. Canberra: Department of Health and Ageing.
149. Murphy, E., & Best, E. (2012). The Aboriginal Maternal and Infant Health Service: a decade of achievement in the health of women and babies in NSW. *New South Wales Public Health Bulletin*, 23(4), 68-72.
150. Queensland Health. (2006). Growing strong: feeding you and your baby evaluation summary report. Brisbane: Queensland Government.
151. Apunipima Cape York Health Council. (2014, 2014). Baby One Program. from <http://www.apunipima.org.au/family-health/74-services/family-health/mums-and-bubs/294-before-bub>
152. Apunipima Cape York Health Council. (2017). Personal communication: Apunipima Cape York Health Council.
153. Rae, C. J. (1989). *Maternal nutritional status among Aborigines in the Northern Territory: impact on birth weight*. University of Sydney, Sydney, New South Wales.
154. Smith, R. M., Smith, P. A., McKinnon, M., & Gracey, M. (2000). Birthweights and growth of infants in five Aboriginal communities. *Australian and New Zealand Journal of Public Health*, 24(2), 124-135.
155. d'Espaignet, E., Measey, M., Carnegie, M. A., & Mackerras, D. (2003). Monitoring the 'Strong Women, Strong Babies, Strong Culture Program': the first eight years. *Journal of Paediatrics and Child Health*, 39(9), 668-672.
156. World Health Organization. (2003). Implementing the global strategy for infant and young child feeding: meeting report. Geneva: World Health Organization.
157. World Health Organization. (2006). *WHO child growth standards - length/height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age: methods and development*. Geneva: World Health Organization.
158. Global Nutrition Report. (2016, 2016). Global Nutrition Report. from <http://www.globalnutritionreport.org/>
159. Paterson, B. A., McKinnon, C. P., & Edmond, K. M. (2001). A review of annual growth screening in Aboriginal schoolchildren in Australia. *Journal of Paediatrics and Child Health*, 37(1), 18-23.
160. Eades, S. J., & Stanley, F. J. (2013). Improving the health of First Nations children in Australia. *Medical Journal of Australia*, 199(1), 12-13.
161. Department of Families Housing Community Services and Indigenous Affairs. (2011). Northern Territory Emergency Response evaluation report 2011. Canberra: Department of Families, Housing, Community Services and Indigenous Affairs.
162. Chew, D. P., Scott, I. A., Cullen, L., French, J. K., Briffa, T. G., Tideman, P. A., Aylward, P. E. G. (2016). National Heart Foundation of Australia and Cardiac Society of Australia and New Zealand. Australian clinical guidelines for the management of acute coronary syndromes 2016. *Heart, Lung and Circulation*, 25(9), 895-951.

163. Matthews, V., Schierhout, G., McBroom, J., Connors, C., Kennedy, C., Kwedza, R., Bailie, R. (2014). Duration of participation in continuous quality improvement: a key factor explaining improved delivery of type 2 diabetes services. *BMC Health Services Research*, 14. Retrieved from: <http://dx.doi.org/10.1186/s12913-014-0578-1>
164. Wilson, A., Delbridge, R., & Palermo, C. (2016). Why we need a community of practice for dietitians working in Indigenous health [letter]. *Nutrition & Dietetics*, 73(1), 114.
165. National Nutrition Networks Conference. (2008). National nutrition networks conference: priority recommendations - March 2008. Alice Springs: National Rural Health Alliance.
166. Colles, S. L., Belton, S., & Brimblecombe, J. (2016). Insights into nutritionists' practices and experiences in remote Australian Aboriginal communities. *Australian and New Zealand Journal of Public Health*, 40(S1), S7–S13.
167. Dietitians Association Australia. (2017). *Personal communication*. Dietitians Association Australia.
168. Laurence, S. (2009). Development of an Australian Aboriginal and Torres Strait Islander nutrition workforce: information paper. Canberra: NATSINSAP.



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