

# Cost and affordability of healthy, equitable and more sustainable diets in the Torres Strait Islands

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In 2008, the Australian Government committed to working with the Aboriginal and Torres Strait Islander Peoples of Australia to achieve equality in health status and life expectancy between Indigenous and non-Indigenous Australians.<sup>1</sup> Yet, for Australia's Aboriginal and Torres Strait Islander Peoples, life expectancy is still 10 years less than that of non-Indigenous Australians, with little improvement over the past 25 years.<sup>2</sup> Non-communicable diseases (NCDs) are responsible for 75% of this gap, with poor diet among the leading modifiable risk factors.<sup>3,4</sup> Governments are obliged to ensure that a healthy and culturally acceptable diet is accessible for Indigenous peoples.<sup>5</sup> Australia's National Aboriginal and Torres Strait Islander Health Plan 2013-2023<sup>6</sup> recognises the importance of improving Indigenous peoples' physical and economic access to healthy foods.

This study is set in the Torres Strait Islands in Queensland, Australia. The Torres Strait region comprises 18 island and two Northern Peninsula Area communities, across a geographic area of 48,000km<sup>2</sup> from Cape York towards the borders of Papua New Guinea and Indonesia (Figure 1). The Islands are home to around 4,500 people, 91.8% of whom are Indigenous. Of these, 86.6% identify as Torres Strait Islander, 1% as Aboriginal and 12% as both Torres Strait Islander and Aboriginal.<sup>7</sup> Torres Strait Islanders are of Melanesian origin and have a distinct identity, history and cultural traditions, including diet, to Aboriginal Australians.

## Abstract

**Objectives:** To assess the cost, cost differential and affordability of current and recommended (healthy, equitable, culturally acceptable and more sustainable) diets in the Torres Strait Islands and compare with other Queensland locations.

**Methods:** The Aboriginal and Torres Strait Islander Healthy Diets ASAP (Australian Standardised Affordability and Pricing) methods protocol was applied in five randomly selected communities in the Torres Strait Islands.

**Results:** The current diet was 32% more expensive than that recommended; 'discretionary' foods comprised 64% of the current diet cost. Families could save at least A\$281.38 a fortnight by switching to recommended diets. However, these cost 35-40% more than elsewhere in Queensland. Recommended diets would cost 35% of median and 48% of welfare household income in the Torres Straits.

**Conclusions:** While less expensive than the current diet, recommended diets are unaffordable for most households. Consequently, many Torres Strait Islander families are at high risk of food insecurity and diet-related disease.

**Implications for public health:** Urgent policy action is required to further lower the relative price of recommended diets, and also increase household incomes and welfare supplements to equitably improve food security and diet-related health, and contribute to environmental sustainability in the Torres Strait Islands.

**Key words:** Torres Strait Islands, food price, diet cost, diet affordability, healthy diet

Marine foods continue to make substantial contributions to the diet of many people living in the Torres Strait Islands, and production of traditional garden staples is important, especially for ceremonial purposes.<sup>4</sup> Store surveys in the 1990s showed more than half the energy of the communities' diet was derived from white flour, white rice, tinned meat and vegetable oil, and intake of fruit and vegetables was about 15% and 30% respectively of recommended levels.<sup>9</sup> More recent dietary intake data specific for the region are not

available. The diet of Aboriginal and Torres Strait Islander Peoples was assessed for the first time in Australia in the National Aboriginal and Torres Strait Islander Nutrition and Physical Activity Survey (NATSINPAS) conducted in 2012-2013.<sup>10</sup> While the survey was designed to include a nationally representative sample of Indigenous Australians, the Torres Strait Islands were not over-sampled and hence specific detailed reported dietary data for Torres Strait Islanders are not available.<sup>4</sup>

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The widely-held perception that recommended (healthy) diets are more expensive than the current (unhealthy) diet is an identified barrier to healthy eating.<sup>11</sup> Yet, there has been little focus on measuring the relative cost and affordability of such diets in Aboriginal and Torres Strait Islander communities.<sup>12,13</sup> Therefore, in response to community request, this study aimed to assess the cost, cost differential and affordability of current (unhealthy) and recommended (healthy, equitable and more sustainable) diets in the Torres Strait Islands and to compare results with those available from other Queensland locations.<sup>14</sup>

## Methods

This study applied the Aboriginal and Torres Strait Islander Healthy Diets ASAP (Australian Standardised Affordability and Pricing) methods protocol, a modified version of the Healthy Diets ASAP protocol, both of which have been described in detail elsewhere.<sup>14,15</sup> The Healthy Diets ASAP protocol has been applied in studies in different regions of Australia<sup>14,16-18</sup> and includes five components: current and recommended diet pricing tools for a reference household of four

persons; calculation of household income; store location and sampling; food price data collection; and analysis and reporting.<sup>15</sup> To provide a more sensitive measurement of diet cost and affordability for Indigenous Peoples living in remote areas, the first and second components were better contextualised to develop the Aboriginal and Torres Strait Islander Healthy Diets ASAP protocol.<sup>13</sup>

### Diet pricing tools

As the best available proxy for current Torres Strait Islander diets, the reported dietary intake of Aboriginal and Torres Strait Islander peoples in the NATSINPAS 2012-2013 was used.<sup>10</sup> The recommended diet is based on the relevant Australian Dietary Guidelines (ADGs).<sup>19</sup> Diet pricing tools (detailed in Supplementary File 1 Table A) include the types and amounts of foods and drinks per fortnight in both diets for the reference household of four: an adult male and female, a 14-year-old boy and an eight-year-old girl.<sup>13</sup> The recommended diet (33,610 kJ/day) contains only healthy foods and drinks.<sup>19</sup> The current diet (35,347 kJ/day) includes healthy items in quantities less than recommended and 'discretionary' foods and drinks – items not necessary for health, and

high in saturated fat, added sugar, salt, and/or alcohol.<sup>19</sup> The recommended diet is healthier and more equitable than the current diet<sup>19</sup> and also more sustainable as its production requires less water, supports biodiversity and generates 25% less greenhouse emissions.<sup>20</sup>

### Calculation of household incomes

Median gross household income (before taxation) using localised income data and welfare-only household income (only welfare payments such as unemployment benefits, which are nationally standardised) were calculated for the reference households at each community (detailed in Supplementary File 1 Tables B, C and D).

### Store location and sampling

Of the 15 Torres Strait Island communities that had major food outlets at the time, five were randomly selected for inclusion. Potential food outlets included community stores, takeaway outlets, independent bakeries and liquor stores.<sup>13</sup>

### Price data collection

A trained Senior Public Health Nutritionist (SS) collected the prices of food and drink items listed in the diet pricing tools using a data collection form (Supplementary File 2), between October 2019 and February 2020. Permission to collect data was sought from local councils, store management groups and store managers. If an item was not available in an outlet the mean cost of the item in the other community stores was substituted.<sup>13</sup>

### Analysis and reporting

Price data were double entered, crosschecked, cleaned in Microsoft® Office Excel (2016) and then checked again. Cost, cost differential and affordability of current and recommended diets were calculated for the reference household of four per fortnight in each community. To better reflect more common household composition in the Torres Strait Islands, these values also were calculated for a household of six (an adult male and female, an older female pensioner, and a 14-year-old boy, eight-year-old girl and four-year-old boy). Based on previous research, a diet was considered unaffordable if it cost more than 30% of household income; if it cost 25% of income, the household was deemed to be under food stress. Further, data were adjusted for the different reported dietary patterns of Aboriginal and Torres



Strait Islander groups compared to the whole population<sup>13,21</sup> to enable equivalised comparison with available results from other Queensland locations reported elsewhere.<sup>14</sup>

## Results

### Locations and stores

Five community stores, including one that also sold alcoholic drinks and two takeaway food outlets were surveyed in the five communities.

### Diet costs

Table 1 presents the mean cost of the current and recommended diets, cost of diet components by ADG food group and as discretionary or healthy food categories, and the affordability of the diets in the Torres Strait Islands. Figure 1 depicts the mean equivalised costs of current and recommended diets and their discretionary and healthy food components in the Torres Strait Islands and other Queensland locations.<sup>14</sup> Total diet and food group costs for the reference household in each community are presented in Supplementary File 1 Table E. Details of the mean equivalised cost of the diets and component food groups per fortnight, and affordability of the diets for the reference household in the Torres Strait Islands, elsewhere in Queensland, and also in the Greater Brisbane area, are in Supplementary File 3. Detailed results for the additional household of six are presented in Supplementary File 4.

In the Torres Strait Islands, the mean cost of the current diet (A\$1149.72 ±\$57.15 per fortnight) was 32% more than the recommended diet (A\$868.34 ±\$48.26 per fortnight) (Table 1). The current diet cost more than the recommended diet in each of the five communities (Supplementary File 1 Table E). Torres Strait Islander families of four could save A\$281.38 a fortnight by switching to the recommended diet (Table 1). For the household of six, the current diet (A\$1541.13 ±\$81.71 per fortnight) cost A\$323.68 per fortnight more than the recommended diet (A\$1217.45 ±\$69.13 per fortnight) (Supplementary File 4 Table A). In the Torres Strait Islands, discretionary foods and drinks cost 64% of the total cost of the current diet (Table 1).

The current (equivalised) diet per fortnight (A\$1086.33 ±\$55.54) was 35% more expensive in the Torres Strait Islands than

**Table 1: Mean cost of diets and components, and affordability of diets in the Torres Strait Islands.**

Total diet and food group costs for the reference household per fortnight				
Food/food groups	Current diet		Recommended diet	
	Mean cost ±SD (A\$) (n=5)	Proportion of total (%)	Mean cost ±SD (A\$) (n=5)	Proportion of total (%)
Water, bottled	\$12.68 ±4.71	1%	\$12.68 ±4.71	1%
Fruits	\$70.93 ±20.11	6%	\$115.96 ±20.95	13%
Vegetables (& legumes)	\$46.87 ±3.35	4%	\$152.15 ±15.61	17%
Grain (cereal) foods	\$64.53 ±3.65	6%	\$172.11 ±16.88	20%
Lean meats, poultry, fish, eggs, nuts, seeds & alternatives	\$138.61 ±11.64	12%	\$257.67 ±15.91	30%
Milk, yoghurt, cheese & alternatives	\$64.84 ±3.52	6%	\$144.47 ±8.70	17%
Unsaturated oils and spreads	\$1.20 ±0.12	0%	\$13.31 ±0.95	2%
Artificially sweetened beverages	\$11.21 ±0.75	1%	-	-
Sugar sweetened beverages	\$94.27 ±7.06	8%	-	-
Takeaway foods	\$232.45 ±16.84	20%	-	-
Alcoholic beverages	\$97.80 ±0.00	9%	-	-
All other discretionary choices	\$314.34 ±13.15	27%	-	-
Total diet	\$1149.72 ±57.15	100%	\$868.34 ±48.26	100%
Healthy foods and drinks	\$410.87 ±27.74	36%	\$868.34 ±48.26	100%
Discretionary foods and drinks	\$738.86 ±31.55	64%	-	-

Mean income and diet affordability for the reference household per fortnight			
Income categories	Income (A\$) (n=5)	Affordability of current diet (% of income)	Affordability of recommended diet (% of income)
Median gross household income	\$2722.42 ±843.30	46%	35%
Welfare-only household income	\$1800.72 ±0.00	64%	48%

elsewhere in Queensland (A\$806.15 ±\$99.34) (Figure 2) and 41% more than in Greater Brisbane (A\$772.20 ±\$14.18) (Supplementary File 3). The recommended diet would also cost 35% more in the Torres Strait Islands (A\$868.34 ±\$48.26) than elsewhere in Queensland (A\$644.25 ±\$66.28) (Figure 2), and 40% more than in Greater Brisbane (A\$619.04 ±\$22.66) (Supplementary File 3). All healthy food group components would be more expensive in the Torres Strait Islands than elsewhere in Queensland: fruit, 46%; vegetables, 36%; grain (mostly wholegrain) foods, 53%; lean meats, poultry, fish, eggs, nuts, seeds, and alternatives, 32%; milk, yoghurt, cheese and alternatives, 22%; and unsaturated oils and spreads, 53% (Supplementary File 3). Bottled water was an exception, costing 30% less in the Torres Strait Islands than elsewhere in Queensland (Supplementary File 3).

### Diet affordability

Affordability of the current and recommended diets for the reference household in the Torres Strait Islands is presented in Table 1. Details of diet affordability in each location are in Supplementary File 1 Table F. Affordability of the equivalised current and recommended diets in the Torres Strait Islands and elsewhere

in Queensland is summarised in Figure 3 and detailed in Supplementary File 3; affordability of the diets for the household of six is presented in Supplementary File 4.

In the Torres Strait Islands, recommended diets would be unaffordable for households on median income (costing 35% of gross income) and also for those on welfare (48% of disposable income) (Table 1, Figure 3). However, recommended diets would be more affordable than the current diet, which cost 46% of median, and 64% of welfare-only, household incomes, respectively (Table 1).

Compared to other places in Queensland where the recommended diet would cost 23% of gross income of median income households and 37% of the disposable income of welfare-only income households, recommended diets would be 52% and 30% less affordable, respectively, for Torres Strait Islands households (Supplementary File 3). Compared to Greater Brisbane, in the Torres Strait Islands the recommended diet would be much less affordable, 68% less for households on median income and 36% less for welfare-only income households; in Greater Brisbane, the recommended diet would cost 21% of the gross income of households on median income and 36% of the disposable income of welfare-only income households (Supplementary File 3).

For families of six in the Torres Strait Islands with median gross household income the recommended diet cost 49% of income; for these households with welfare-only income, the proportion was 43% (Supplementary File 4).

## Discussion

### The high cost of recommended diets in the Torres Strait Islands, and consequences

This study is the first to measure the cost, cost differential and affordability of current and recommended diets, and their components, in the Torres Strait Islands. Application of the Healthy Diets ASAP protocols enabled comparisons with equivalised diet cost and affordability data from elsewhere in

Queensland.<sup>14</sup> Recommended (healthy, equitable and more sustainable) diets cost 35% more in the Torres Strait Islands than elsewhere in the state and 40% more than in Brisbane,<sup>14</sup> confirming the results of earlier studies in Queensland despite methodological differences.<sup>22</sup> Recommended diets cost 5% more in the Torres Strait Islands in 2020 than in remote Aboriginal communities in 2017, when assessed by identical Healthy Diets ASAP methods.<sup>13</sup> For over three decades, surveys have shown that prices in remote Aboriginal and Torres Strait Islander communities are up to 50% higher than in the nearest capital cities,<sup>4</sup> related to logistical land and sea transport challenges, high freight costs, the need to refrigerate fresh produce and small populations (limited customer base and buying power

which constrains store managers' power to negotiate price discounts).<sup>23</sup>

However, recommended diets would be 32% less expensive than the current diet, supporting the findings of previous research,<sup>14,16-18</sup> including in remote Aboriginal communities in Central Australia where this difference was 24%.<sup>13</sup> Contributing factors include exemption of basic healthy foods from Goods and Services Tax (GST) in Australia, inclusion of alcoholic drinks in the current diet and in-store cross-subsidisation to lower the price of healthy foods prescribed by nutrition policies in some remote communities.<sup>24</sup>

Nevertheless, this study found that four-person households in the Torres Strait Islands spent 64% of their total food budget on discretionary food and drinks, exceeding the proportion described in Aboriginal communities in Central Australia (62%),<sup>13</sup> other areas in Australia (58-60%)<sup>14,16,17</sup> and nationally by the Australian Bureau of Statistics in the ADGs Food Price Index data (58%).<sup>25</sup> Discretionary foods and drinks contributed 41% of the energy intake reported by Aboriginal and Torres Strait Islander people in the NATSINPAS 2012-13, compared to 35% for non-Indigenous Australians.<sup>10</sup> Such results suggest that high intake of discretionary food and drinks is a major contributor to dietary risks impacting the health gap between Indigenous and non-Indigenous Australians.<sup>4</sup>

The recommended diet is more aligned to traditional diets than the current, unhealthy diet, as the latter is high in introduced 'discretionary' foods and drinks.<sup>4,9</sup> This study shows it is also less expensive in the Torres Strait Islands. Yet households are driven to consume current diets, suggesting that other factors in addition to price are driving high intakes of discretionary foods and drinks in the Torres Strait Islands, as elsewhere throughout Australia.<sup>21</sup> Such factors include the convenience, taste, advertising and the ubiquitous availability, and dominance of discretionary choices in product placement and store promotions,<sup>14</sup> exemplifying the commercial determinants of health.<sup>26</sup> Despite strong cultural traditions and resilience in the Torres Strait Islands, such forces are undermining traditional diets and health, and also undermining efforts to address climate change, excessive water use and biodiversity.<sup>27</sup> Food security and livelihoods in the Torres Strait Islands are particularly

Figure 2: Equivalised costs of current diets and their discretionary and healthy components, and recommended diets in the Torres Strait Islands and elsewhere in Queensland, for the reference household per fortnight.

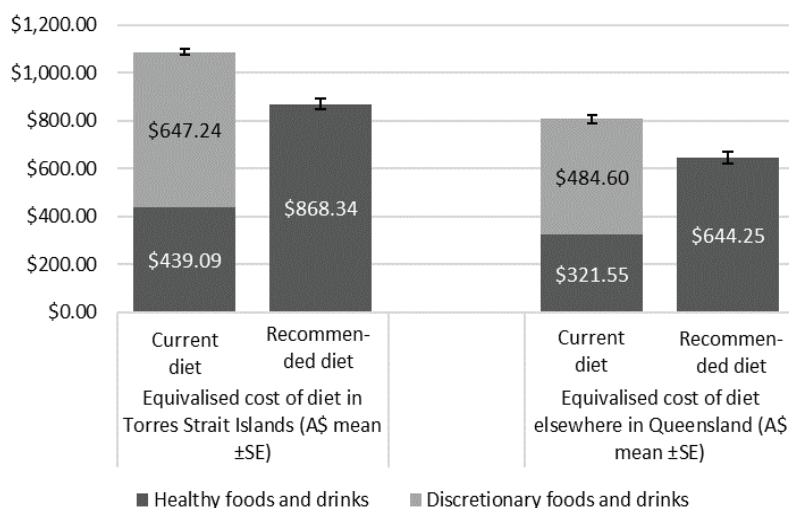
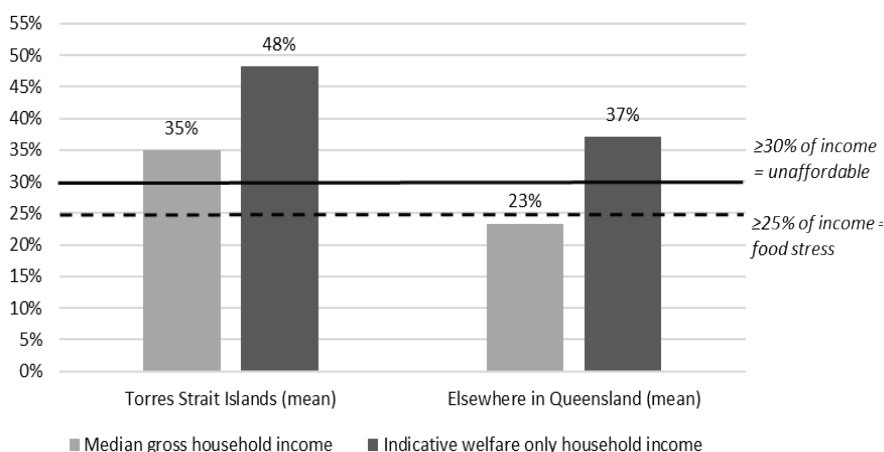


Figure 3: Affordability of the recommended diet for the reference household in the Torres Strait Islands and elsewhere in Queensland.



vulnerable to the effects of climate change: local agriculture is affected adversely by rising seas and inundation of fertile soils, increasing temperatures and drought, and local fishing and the imported food supply chain are affected by increasing frequency of cyclones, storms and high seas.<sup>27</sup>

### **The recommended diet is unaffordable based on Australian standards**

Using Australian standards, recommended diets are unaffordable for families in the Torres Strait Islands, costing more than 30% of household income for those on median income (35% of gross income) and those on welfare-only (48% of disposable income), as they are for families in remote Aboriginal communities, where the recommended diet cost 39% of both median gross and welfare-only household incomes.<sup>13</sup> These data relate to four-person households. However, in the Torres Strait Islands recommended diets were slightly more affordable for six-person families that included an aged pensioner, costing 43% of the household income for those receiving welfare only (Supplementary File 4). This is because the aged pension is set at a more liveable rate than income support payments (unemployment benefits). One challenge in interpreting results is that, in the context of global comparison, various definitions of diet affordability are used in different regions of the world; for example in Europe and Central Asia, 'affordability' is set at 63% of the poverty line.<sup>28</sup> At a population level, results are more consistent with those of low and middle income countries than developed economies.

This study's findings highlight the low incomes in the Torres Strait Islands and add weight to calls for income supplements to counter the higher food prices in very remote communities and make healthy, equitable and more sustainable diets more affordable.<sup>29</sup> In 2020, recommended diets became 27% to 29% more affordable in Greater Brisbane and elsewhere in Queensland with government supplements provided to those receiving income support payments in response to the COVID-19 pandemic.<sup>14,30</sup> The present study did not assess changes in dietary patterns due to the COVID-19 pandemic or related income supplements, but both were likely to impact Torres Strait Islander families too. Previous research has shown that government payments positively influenced

sales of fruit and vegetables (and other commodities) in Aboriginal and Torres Strait Islander communities.<sup>31</sup>

### **Policy implications**

This study has highlighted an urgent need to assess Torres Strait Islander diets in the next NATSINPAS. Factors such as high food prices and low incomes, together with high unemployment, poor housing conditions, lack of educational opportunities, and other drivers of food choice, must be addressed to reduce health inequities in the Torres Strait Islands.<sup>4</sup> Evidence shows this can be achieved by implementing multi-strategy and community-led approaches<sup>12,24</sup> that include both supply- and demand-side measures built on traditional knowledge.

By lowering the relative cost of healthy foods and drinks, price interventions such as supplements, subsidies and taxes can positively influence dietary patterns in Aboriginal and Torres Strait Islander communities.<sup>32</sup> Therefore, the relative cost of healthy food and drinks should be reduced further, by maintaining the GST exemption for basic, healthy foods; introducing or expanding store cross-subsidies to favour healthy products; reducing the cost of healthy foods and drinks to the store through partnerships with manufacturers, wholesalers and major supermarkets; and/or increasing GST on all discretionary foods and drinks to 20%. Further, remote community stores should be funded and supported as essential services, not business ventures, and freight subsidies introduced/expanded to lower procurement costs.<sup>24</sup>

### **Limitations**

Methodological limitations of the Healthy Diets ASAP approach, including implications of focusing on mean population intake to standardise methods for comparison, have been described previously.<sup>15</sup> The lack of specific data on current Torres Strait Islander diets, rather than nationally reported Aboriginal and Torres Strait Islander diets, has been noted in policy implications; such data would also inform inclusion in the diet pricing tools of valued traditional foods that can be purchased, such as cassava, sweet potato and coconut products, so that results would better reflect the cost of culturally appropriate diets. Additionally, the diet tools of the Aboriginal and Torres Strait Islander Healthy Diets ASAP protocols are based on

the only available nationally data from the NATSINPAS conducted nearly 10 years ago, thus they do not reflect any recent changes in dietary patterns.<sup>13</sup>

While the welfare-only income was calculated to reflect the reference household's disposable income, the median gross income values reflect pre-tax income. Because of this limitation, diets may be even less affordable for families with median gross household income than suggested.

Food and drink price data from March 2020, which would allow analysis of the impact of government supplements for low-income households in the Torres Strait Islands, could not be collected because of COVID restrictions. However, the lack of these data does not change the applicability of key findings – increasing welfare income has the potential to significantly increase affordability of recommended diets.

### **Conclusions and implications for public health**

Greater promotion of the cost, cultural, health, equity and environmental sustainability benefits of the recommended diet could help counteract the drivers of unhealthy diets in the Torres Strait Islands.

While it is less expensive than the current diet, the recommended (healthy, equitable and more sustainable) diet is unaffordable for households with median income or welfare-only income in the Torres Strait Islands, and much less affordable than elsewhere in Queensland. Consequently, many Torres Strait Islander families are at increased risk of food insecurity and diet-related disease.

Therefore, there is a need for urgent policy action to further lower the relative price of healthy, culturally acceptable foods and increase household incomes and welfare supplements to improve affordability of recommended diets. This is essential to facilitate implementation of multi-strategy, community-led programs building on traditional knowledge. These would, in turn, help improve food security, diet-related health and equity and contribute to environmental sustainability in the Torres Strait Islands.

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## Supporting Information

Additional supporting information may be found in the online version of this article:

**Supplementary File 1 (Table A):** Details of the current and recommended diets: total energy of diets and foods comprising the diets per reference household per fortnight.

**Supplementary File 1 (Table B):** Calculations of median gross household income in the five included Torres Strait Islands. (Communities have been coded for confidentiality consistent with the Ethics permission.)

**Supplementary File 1 (Table C):** Calculation of the welfare-only household income for the reference household of four in the Torres Strait Islands.

**Supplementary File 1 (Table D):** Calculation of the welfare-only household income for the reference household of six in the Torres Strait Islands.

**Supplementary File 1 (Table E):** Total diet and component costs for the reference household per fortnight in each included community in the Torres Strait Islands.

**Supplementary File 1 (Table F):** Incomes and affordability of diets for the reference household per fortnight in each included community in the Torres Strait Islands.

**Supplementary File 2:** Healthy Diets ASAP data collection form.

**Supplementary File 3:** Mean total diet and food group costs, and affordability of equivalised current and recommended diets, for the reference household in the Torres Strait Islands, elsewhere in Queensland and in the Greater Brisbane area.

**Supplementary File 4:** Total diet and food group costs for additional household of six people in the Torres Strait Islands.