Australian Health Survey: Consumption of Added Sugars

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2011-12

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MEDIA RELEASE

27 April 2016 Embargo 11.30am (Canberra time)

Consumption of added sugars exceeds recommendations

One in two Australians (52 per cent) usually exceed the World Health Organisation's (WHO) recommendation that free sugars contribute to less than 10 per cent of total energy intake, according to new Australian Bureau of Statistics (ABS) data.

Director of Health, Louise Gates, said the new ABS report showed the average amount of free sugars consumed was 60 grams per day (equivalent to 14 level teaspoons of white sugar).

Free sugars are the added sugars from food and beverage processing and preparation as well as honey and the sugar naturally present in fruit juice.

"The groups most likely to exceed the WHO recommendation were children and young people aged 9-13 and 14-18 years with close to three-quarters of them usually deriving 10 per cent or more of their energy from free sugars," said Ms Gates.

"The highest consumption of free sugars was among males aged 14-18 years who averaged 22 teaspoons per day, while the top 10 per cent of male teenagers have at least 38 teaspoons of free sugars per day."

Beverages were the source of just over half of the free sugars, with soft drinks, sports and energy drinks providing 19 per cent, followed by fruit and vegetable juices with 13 per cent. The leading food sources of free sugars were muffins, cakes or scones and confectionary (each contributing 8.7 per cent), followed by free sugars in honey, jams (and similar spreads), ice confection and plain sugar.

More details are available in Australian Health Survey: Consumption of added sugars (cat. no. 4364.0.55.011), available for free download from the ABS website, http://www.abs.gov.au.

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IN THIS RELEASE

This publication is the fifth release of information from the nutrition component of the 2011-12 National Nutrition and Physical Activity Survey (NNPAS). It is intended to update the Nutrition First Results and Usual Nutrient Intakes publications using new information about the added sugar content of foods developed by Food Standards Australia New Zealand. It contains tables and analysis including the usual intakes of added sugars, and types of foods and beverages contributing to added sugars. It also includes comparisons with the World Health Organisation (WHO) 2015 guideline on sugars consumption which makes recommendations to limit the amount of energy derived from 'free sugars'. Free sugars is a broader definition of added sugar that counts the sugar in fruit juice and honey, in addition to the sugars added in food processing and preparation. Although both added sugars and free sugars are included in the Excel table sets, the commentary focuses on free sugars for consistency with the WHO definition.

Usual intakes are modelled estimates of the amounts (or proportions) usually consumed by population groups, which is different from the actual amount reported by respondents on a given day. Analysis of usual intakes is therefore a preferred method of estimating the proportion of the population who in the long-run would consume above or below a target amount. They are also useful for estimating the amounts usually consumed by defined proportions (percentiles) of the population, such as the 75th or 90th percentiles.

Analysis of the 2011-12 NNPAS suggests that, like other nutrition surveys, the results are affected (biased) by some under-reporting of food intake by participants in the survey. Therefore, estimates of the amounts of sugar reported in this publication may underestimate of the true level of sugars consumed. See the AHS Users' Guide for more information on under-reporting.

KEY FINDINGS

- In 2011-12, Australians consumed an average of 60 grams of free sugars per day (equivalent to 14 teaspoons of white sugar). The majority of free sugar intakes comes from added sugars with an average 52 grams (or 12 teaspoons), with 7 grams of free sugars coming from honey and fruit juice.

- Intakes of free sugars were highest among teenage males (aged 14-18 years), who consumed an average 92 grams per day. The top 10% of the 14-18 year old males were estimated to usually consume at least 160 grams (or 38 teaspoons) of free sugars per day.

- Just over half of all Australians aged 2 years and over exceeded the WHO recommendation to limit energy from free sugars to less than 10% of dietary energy. Children and teenagers were most likely to exceed the recommendation with almost three-quarters of 9-13 and 14-18 year olds usually consuming 10% or more of their dietary energy from free sugars. The highest 10% of 14-18 year olds were deriving at least 23% of their energy from free sugars. Adults aged 51-70 years were least likely to exceed the recommendation (38% of males and 35% of females).

- The majority (81%) of free sugars were consumed from the energy-dense, nutrient-poor 'discretionary' foods and beverages. Just over half (52%) of free sugars in the diet were consumed from beverages, with the leading beverages being soft drinks, sports and energy drinks (19%), fruit and vegetable juices and drinks (13%) and cordial (4.9%). The leading foods were confectionary and cakes/muffins (each contributing 8.7%).

ADDED SUGARS AND FREE SUGARS

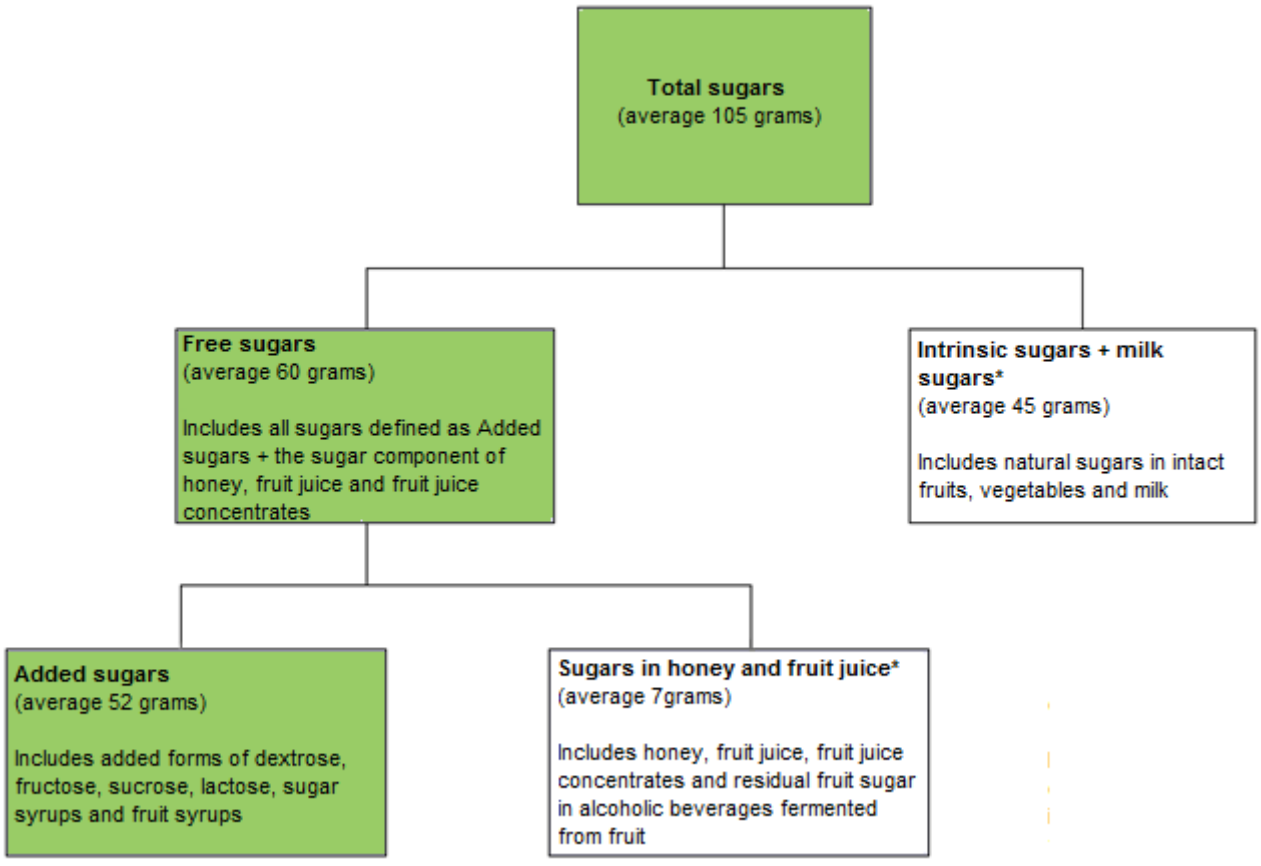
The 2013 Australian Dietary Guidelines (ADG) advises Australians to limit their intakes of foods and beverages containing added sugars.[1] Diets high in added sugars may displace nutritious foods with energy-dense, nutrient poor foods, and are associated with weight gain and dental caries.[1,2] Added sugars include sucrose, fructose, dextrose, lactose and sugar syrups such as glucose syrup which are added during manufacture of foods or added by the consumer in the preparation of food and beverages.[3]

The term 'free sugars' extends the definition of added sugars to include sugars naturally present in honey, fruit juice and fruit juice concentrates. In 2015 the World Health Organisation (WHO) issued a recommendation that both adults and children reduce their intake of free sugars to less than 10% of total dietary energy to help reduce the significant non-communicable disease burden from unhealthy weight gain and dental caries.[2]

HOW MUCH SUGAR WAS CONSUMED?

In 2011-12, Australians consumed an average of 105 grams of total sugars per day. Just over half of this was free sugars (60 grams, equivalent to approximately 14 level teaspoons of white sugar[4]), with the balance (45 grams) being the intrinsic sugars[5] within intact fruit plus the naturally occurring sugar in milk. The majority of free sugar intakes comes from added sugars with an average 52 grams (or 12 teaspoons), with 7 grams of free sugars coming from honey and fruit juice (see Figure 1).

Figure 1: Total sugars, free sugars and added sugars - average consumption(a)(b), 2011-12

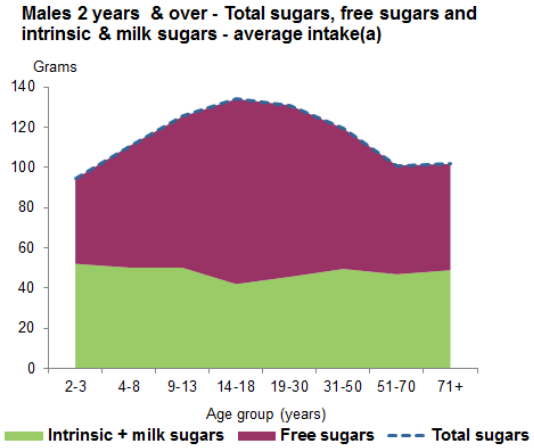


(a) Based on Day 1. See Glossary for definition.
(b) Persons aged 2 years and over.
Source: National Nutrition and Physical Activity Survey, 2011-12
See Glossary for detailed inclusions of each definition.
* Not directly measured - calculated from the difference between the measured sugar components.

The total amount of sugar consumed increased throughout childhood years peaking in the 14-18 years age group for males and 9-13 years for females, then declined in successively older adult age groups. The peaks in

total sugar intakes amongst teenagers are driven almost entirely by the consumption of free sugars, evident from the relatively constant intake of intrinsic sugars from intact fruit plus natural milk sugar across age groups.

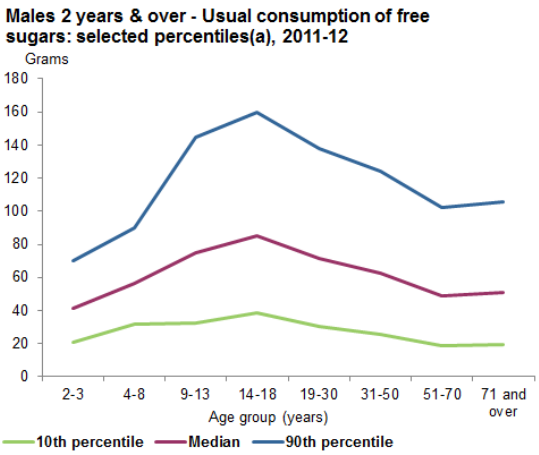
At 14-18 years, the average daily intakes of free sugars were 92 grams for males and 70 grams for females (22 and 17 teaspoons respectively). The lowest free sugar consumption was by the 2-3 year olds who had around 39-42 grams (or 9-10 teaspoons) per day, reflecting the overall smaller quantity of food consumed by young children. Similarly, the declining amounts of free sugars consumed in older adult age groups in part reflects the lower volume of food consumed by older adults, but also the types of foods consumed.

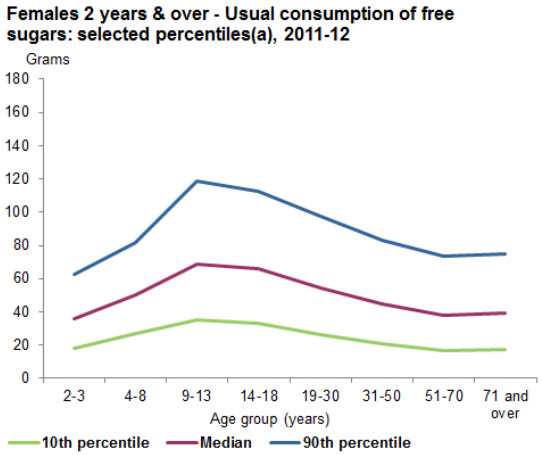


(a) Based on Day 1. See Glossary for definition.
Source: National Nutrition and Physical Activity Survey, 2011-12

While the average provides an overall summary of consumption for a group, the distribution of usual consumption[6] highlights the wide variation in amounts consumed. For instance, the amount consumed by the top 10% (or 90th percentile) of the 14-18 year old males was at least 160 grams (38 teaspoons) per day, followed by 9-13 year old males, where the amount of free sugars consumed by the top 10% was at least 145 grams (34 teaspoons) per day, while the top 10% of 19-30 year old males had at least 138 grams (33 teaspoons) per day. In contrast, the median consumption (which represents the midpoint in the distribution) for most age groups was around half the amount of the 90th percentile.

Among females, the top 10% (or 90th percentile) of the 9-13 year olds had at least 119 grams (28 teaspoons) per day, with the top 10% of the 14-18 year old females usually having at least 113 grams (27 teaspoons) per day. The median amount for these age groups was equivalent to around 17 and 16 teaspoons respectively.



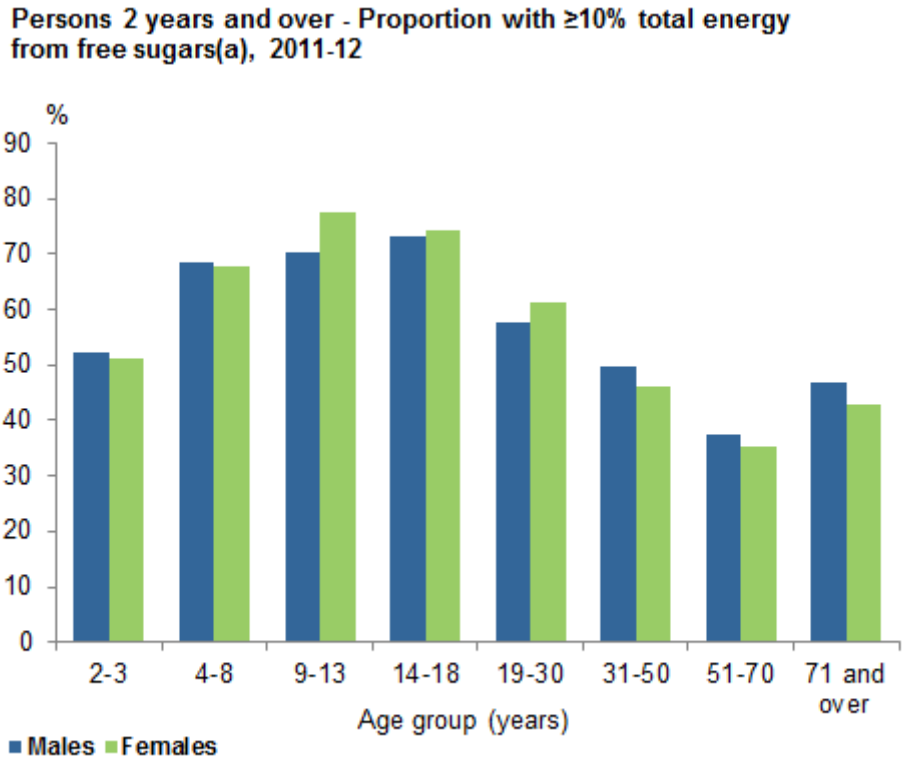


(a) Usual intake. See Glossary for definition.
Source: National Nutrition and Physical Activity Survey, 2011-12

DIETARY ENERGY FROM FREE SUGARS

Dietary energy is sourced from the macronutrient components of the diet and may include the energy from fat, alcohol, protein, fibre and carbohydrate (including sugars and starch). In 2011-12, Australians derived an average of 10.9% of their dietary energy from free sugars, exceeding the WHO recommendation that both adults and children consume less than 10% of energy from free sugars.[2,7] Just over half (52%) of the population

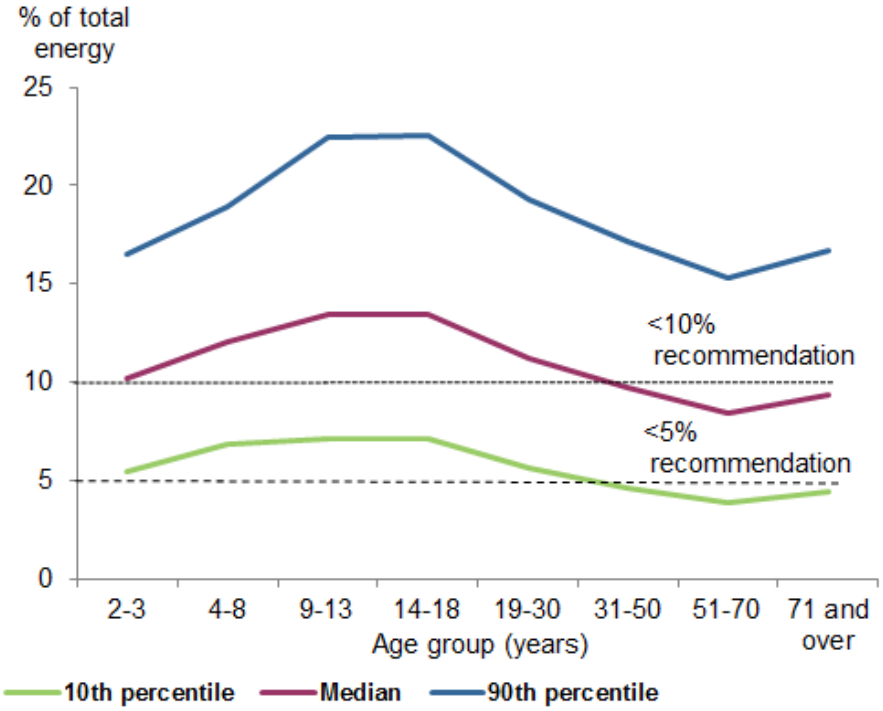
usually exceeded the recommendation, with the highest rates among child and teenage groups. Close to three-quarters of 9-13 and 14-18 year olds usually derived 10% or more of their dietary energy intake from free sugars, with the top 10% of this age group usually consuming at least 23% of energy from free sugars – over twice the recommendation. Males and females aged 51 to 70 years were the least likely to exceed the recommendation (38% of males and 35% of females this age).



(a) Usual intake. See Glossary for definition.
Source: National Nutrition and Physical Activity Survey, 2011-12

The WHO have also made a further conditional recommendation that free sugar intakes be reduced to below 5% of total energy intake.[2] Overall, nine out of ten people (89%) exceeded this recommendation, with the most likely to exceed being children and teenagers (aged between 4 and 18 years) where almost all (97%) usually derived 5% or more of their energy from free sugars. Adults aged 51-70 year olds were least likely to exceed the recommendation with 81% consuming 5% or more of total energy from free sugars.

Persons 2 years & over - Usual proportion of energy from free sugars: selected percentiles(a), 2011-12



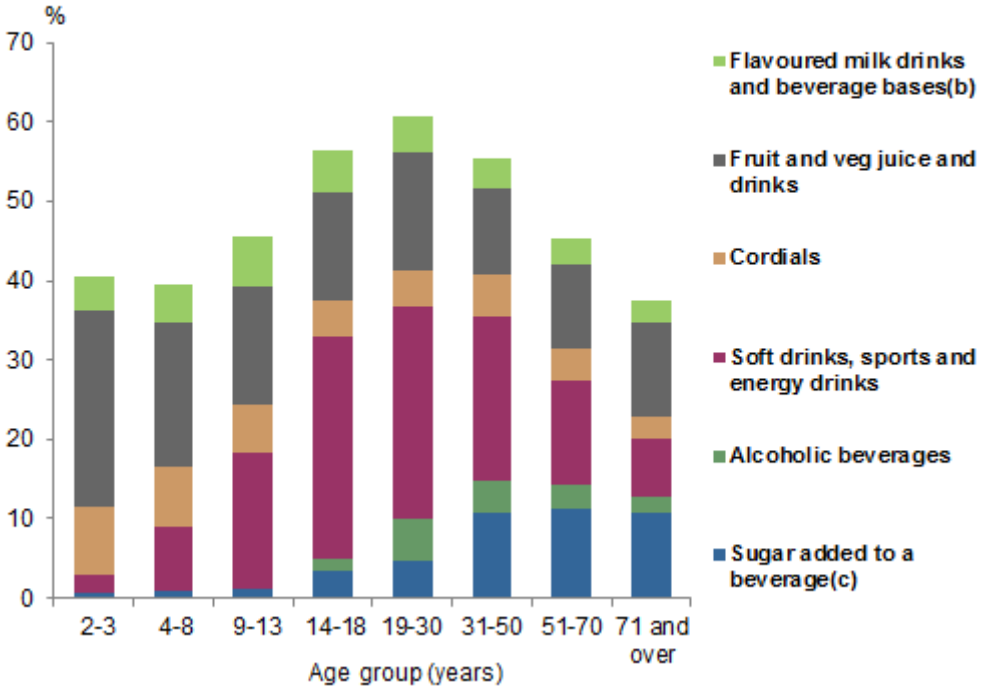
(a) Usual intake. See Glossary for definition.
Source: National Nutrition and Physical Activity Survey, 2011-12

SOURCES OF FREE SUGARS

Just over half (52%) of all free sugars consumed were from beverages, led by soft drinks, sports and energy drinks (19%), fruit juice and fruit drinks (13%), with the sugar added to beverages such as tea and coffee contributing 7.3% and cordials 4.9%.

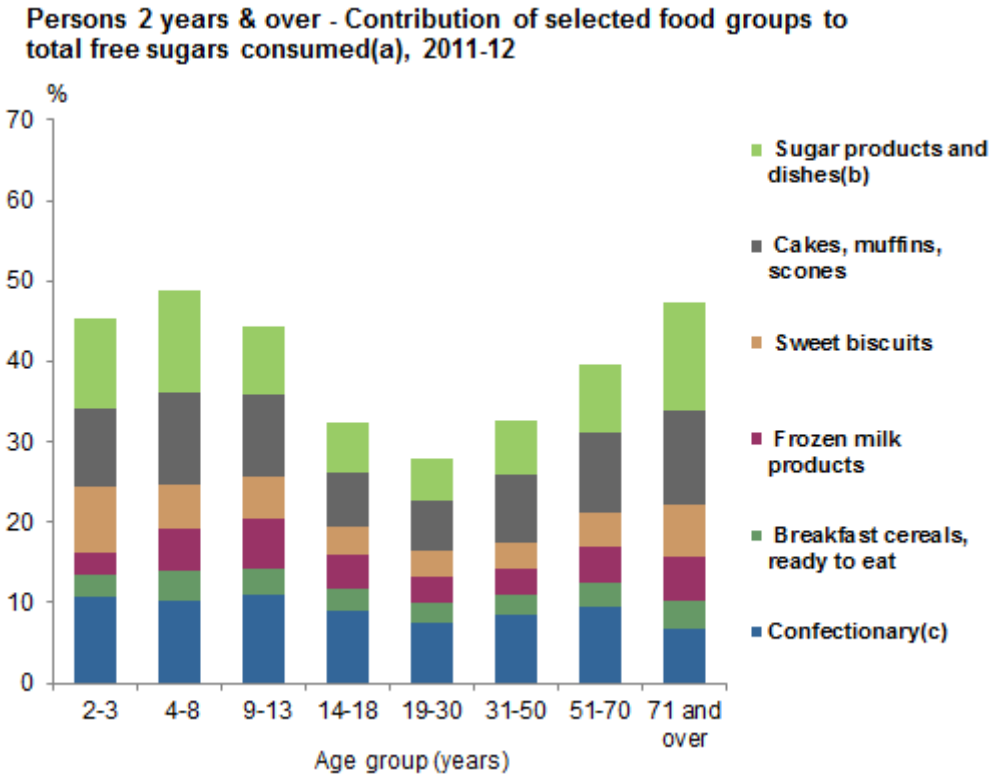
The overall contribution of beverages to free sugars consumption ranged from around 40% for young children and older adults to around 60% for 19-30 year olds. Fruit and vegetable juices were the leading contributor among 2-3 and 4-8 year olds (25% and 18% of all free sugars respectively), whereas soft drinks, sports and energy drinks were the leading source in 14-18 year olds (28%) and 19-30 year olds (27%). The relatively high proportion of free sugars from soft drinks, sports and energy drinks in the 14-18 years group was driven by the males who consumed 35% of their free sugars from these beverages compared with 19% for the females aged 14-18 years. Alcoholic beverages contributed 5.2% of the free sugars among the 19-30 years olds (mostly from pre-mixed drinks). In older age groups the contribution of beverages to free sugar declined mainly due to lower consumption of soft drinks, although higher proportions of free sugar came from the sugar added to beverages (mainly tea & coffee).

Persons 2 years & over - Contribution of beverages to total free sugars consumed(a), 2011-12



(a) Based on Day 1. See Glossary for definition.
(b) Includes tea and coffee powders, beverage bases, and breakfast beverages. See Endnote 8 for details.
(c) See Endnote 9 for details.
Source: National Nutrition and Physical Activity Survey, 2011-12

In terms of food sources of free sugars, the highest contributors were Cakes, muffins, scones and cake-type desserts (8.7%); Confectionery and cereal/nut/fruit/seed bars (8.7%) and Sugar products and dishes (excluding where added to a beverage) (7.6%). In contrast to the pattern from beverages, younger children and older adults consumed a higher proportion of their free sugars from foods, and together, these three non-beverage groups contributed around 30% of all free sugars for both the younger and older age groups. Sweet biscuits and frozen milk products each contributed 4% of all free sugars, and similarly with the leading food sources, they contributed relatively more to free sugars intakes for younger children and older adults than to the 14-50 year olds.



(a) Based on Day 1. See Glossary for definition.
(b) Excluding sugar, honey and syrup added to beverages. See Endnote 9.
(c) Includes nut/seed/fruit bars
Source: National Nutrition and Physical Activity Survey, 2011-12

Given the types of food and beverage categories contributing to free sugars consumption, it is not surprising that discretionary foods[10] accounted for the majority (81%) of free sugars. The leading foods contributing to the 19% of free sugars from non-discretionary food sources were fruit and vegetable juice which contributed 6.4%, breakfast cereals (2.5%), flavoured milks and milkshakes (2.3%) and yoghurt (1.8%).

CONSUMPTION OF ADDED SUGARS - A COMPARISON OF 1995 TO 2011-12 (released 13/12/2017)

MEDIA RELEASE

13 December 2017 | Embargo: 11.30 am (Canberra time) | 166/2017

Children lead the way in falling sugar consumption

A fall in children's consumption of sugary drinks drove an overall reduction in Australians' intake of added sugars in new data released by the Australian Bureau of Statistics (ABS).

New analysis of the 2011-13 Australian Health Survey showed that the average daily intake of free sugars (those added in the consumption and production of food as well as honey and those naturally present in fruit juices), declined by almost one-quarter (23%) for children aged between 2-18 between 1995 and 2011-12.

Director of Health at the ABS, Louise Gates, said, "Most of the decline of children's free sugar consumption can be accounted for by the reduction in consumption of soft drinks, cordial and fruit juice/drinks.

"Per 10,000 kJ of energy, total free sugars of children aged 2-18 years dropped by almost six teaspoons of sugar on average (from 105 grams to 81 grams per day). As a proportion of total daily energy intake, it fell from 17 per cent of total energy in 1995 to 13 per cent in 2011-12.

"Beverages are the most common source of free sugars so the reduction in this has made a big difference."

Overall, the ABS data showed people received less energy from free sugars in 2011-12 than in 1995, 10.9 per cent compared with 12.5 per cent. For 2011-12, average Australian consumption of free sugars just exceeded the World Health Organisation's (WHO) globally recommended limit of 10 per cent.

Ms Gates said, "While parents may claim some credit in changing children's habits, adults themselves had a more modest improvement with a 6 per cent reduction in their consumption of free sugars over the period (from 11.0 per cent in 1995 to 10.4 per cent in 2011-12)."

More details are available in Australian Health Survey: Consumption of Added Sugars (cat. no. 4364.0.55.011), available for free download from the ABS website, http://www.abs.gov.au.

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INTRODUCTION

As the role of dietary behaviour gains increasing recognition as having significant potential for both positive and negative influence on many of the most prevalent chronic diseases[11], there has naturally been great demand from researchers and policymakers on how consumption patterns have changed over time. Prior to the 2011-12 Australian Health Survey, the last national representative survey was the 1995 National Nutrition Survey conducted jointly by ABS and the then Commonwealth Department of Health and Family Services. Limited comparison between 1995 and 2011-12 was given in the 2011-12 first results. While many methodological aspects of the surveys were similar, a side-by-side analysis of food consumption would not provide a true comparison between the two time periods without accounting for changes in food coding and classification and the increased level of under-reporting in 2011-12. These are discussed in detail the AHS Users' Guide, available from the links below:

- Comparisons with 1995 NNS
- Under-reporting in Nutrition Surveys

The analysis in this chapter provides a comparison between the two time periods using a common basic food database and presenting comparisons on a per-unit of energy basis. While these data transformations are also subject to limitations, the magnitude of any remaining bias is considered to be minimal and within the bounds of the sampling error (margins of error).

The basic food database used in this analysis was the added and free sugars component of the AHS database developed by FSANZ for the NNPAS 2011-12, and an adaption of that database for the 1995 NNS. This enables comparisons of the consumption of added and free sugars.

Treatment of under-reporting

As outlined in Under-reporting in Nutrition Surveys, under-reporting of food consumption was estimated to be considerably higher in 2011-12 than 1995. In order to account for this, all comparisons made in this section are provided on a relative basis (such as proportion of energy from free sugars or grams of sugar per 10,000 kJ) rather than a direct comparison of the amount of grams consumed (for context, the average energy consumption was 9,343 kJ in 1995 and 8,522 kJ in 2011-12).

KEY FINDINGS

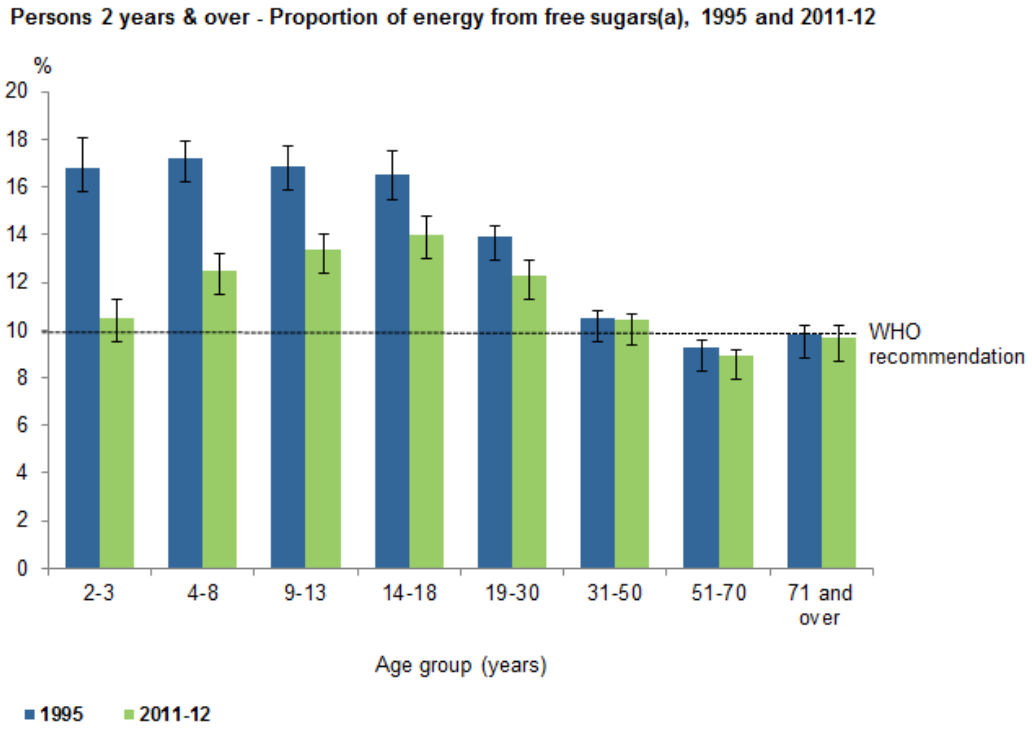
- Between 1995 and 2011-12, Australians had a relative decrease in their consumption of free sugars, with the average proportion of dietary energy from free sugars declining from 12.5% to 10.9%.
- While the average proportions of dietary energy from free sugars in each period were each higher than the recommended limit of 10% by the World Health Organisation (WHO), the proportion of people exceeding the 10% level on any given day fell from more than half (54%) of the population in 1995 to less than half (46%) in 2011-12.
- The largest declines (and contributing most to the overall declines) in free sugars were seen among children. Between 1995 and 2011-12, the average proportion of energy derived from free sugars by children aged 2-18 years decreased from 17% to 13%.
- Most of the decline of children's free sugar consumption can be accounted for by the reduction in consumption of soft drinks, cordial and fruit juice/drinks. On a per 10,000 kJ of energy basis, total free sugars consumed by children aged 2-18 years dropped by an average 24 grams (from 105 grams to 81 grams per day). Over the same period the average daily consumption of free sugars from soft drinks, energy/electrolyte drinks, cordials and fruit juice/drinks dropped an average 22 grams (from 55 grams to 33 grams per 10,000 kJ).
- Soft drinks, energy/electrolyte drinks, cordials and fruit juice/drinks were the most common source of free sugars for the populations in both periods. However, Australians aged 2 years and over sourced a higher proportion of free sugars from these beverages in 1995 than in 2011-12 (44% compared with 37%).

DIETARY ENERGY FROM FREE SUGARS – 1995 AND 2011-12 COMPARISON

On average, Australians derived a higher proportion of their dietary energy from free sugars in 1995 (12.5%) compared with 2011-12 (10.9%), with both periods exceeding the WHO recommendation that adults and children consume less than 10% of energy from free sugars.[2,7]

On any given day in 1995, more than half (54%) of the Australian population was estimated to exceed the WHO recommendation. By 2011-12, the proportion exceeding the recommendation on a typical day had fallen to less than half (46%). While six in ten (61%) children aged 2-18 years still exceeded the WHO guidelines on the day prior to interview in 2011-12, this was an improvement from the three quarters of children (75%) who derived 10% or more of their dietary energy intake from free sugars on the day prior to interview in 1995.

Children have experienced the largest shift between 2011-12 and 1995, with the proportion of energy derived from free sugars decreasing by four percentage points (from 17% to 13%). In particular, the contribution of free sugars to total daily energy for children aged 2-3 years decreased from 17% in 1995 to 11% in 2011-12.



(a) Based on Day 1. See Glossary for definition.
Sources: National Nutrition and Physical Activity Survey, 2011-12 and National Nutrition Survey, 1995

In contrast to the change for children, the adult population (19 years and over) had a less appreciable decline of just 0.6 percentage points (most of which can be seen to come from the 19-30 years group). On the other hand, the older adults still had the lowest free sugar contribution to energy with 8.9% and 9.7% respectively for the 51-70 year olds and 71 years and over population in 2011-12.

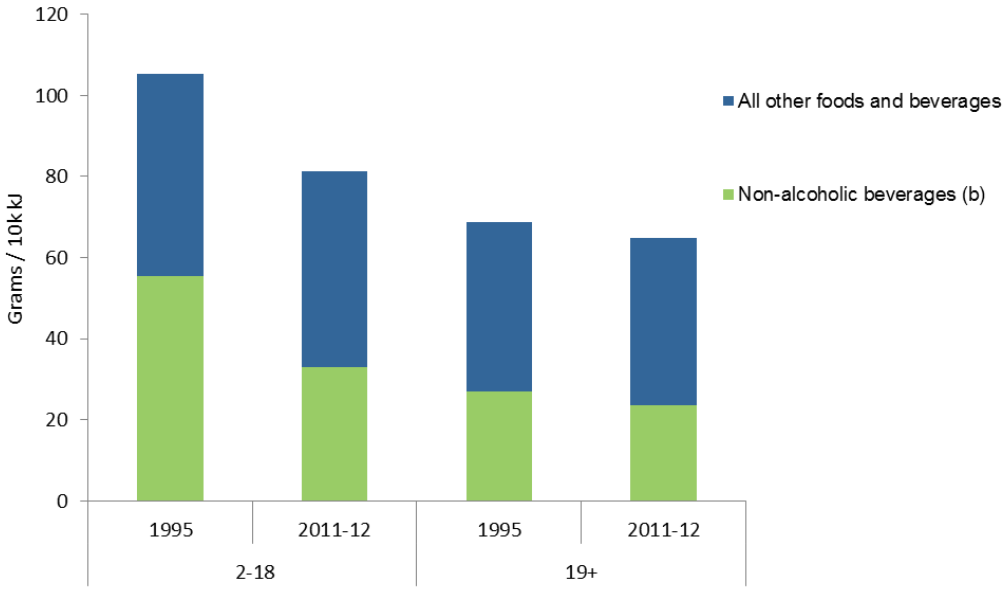
The result of the declines in free sugars being limited to younger age groups is reflected in the contrasting age distributions of proportion of energy from free sugars, which shows that in 1995 energy derived from free sugars generally decreased with age, from 17% for children aged 2-3 years, to 9.8% for people aged 71 years and over. In 2011-12 by contrast, the highest consumption was for 14-18 year olds at 14%, although that was still a decrease from 17% in 1995.

FREE SUGARS PER 10,000 KJ – 1995 AND 2011-12 COMPARISON

Another way of presenting relative changes in free sugar consumption is in grams per 10,000 kJ. For children aged 2-18 years, average daily consumption of free sugars decreased by 24 grams per 10,000 kJ (from 105 to 81 grams per 10,000 kJ between 1995 and 2011-12). In contrast, adults declined 4 grams, from 69 grams to 65 grams per 10,000 kJ.

The larger declines in children can be seen as coming primarily from reductions in consumption of certain sugary beverages. Together, soft drinks, energy/electrolyte drinks, cordials and fruit juice/drinks accounted for over half children's free sugar intake in 1995 at an average 55 grams per 10,000 kJ. By 2011-12, these beverages provided 33 grams per 10,000 kJ - a reduction of 22 grams - an amount which helps account for most of the entire decline in free sugars for children over the period.

Mean grams of free sugars per 10,000 kJ by non-alcoholic beverages and other foods(a), 1995 and 2011-12



(a) Based on Day 1. See Glossary for definition.
(b) Comprises soft drinks, energy/electrolyte drinks, cordials and fruit juice/drinks
Sources: National Nutrition and Physical Activity Survey, 2011-12 and National Nutrition Survey, 1995

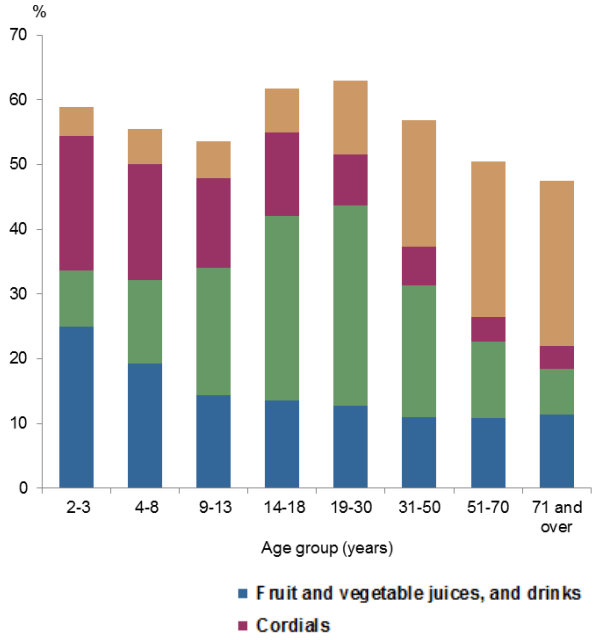
SOURCES OF FREE SUGARS - 1995 AND 2011-12 COMPARISON

Non-alcoholic beverages (soft drinks, energy/electrolyte drinks, cordial and fruit juice/drinks in particular) were the most significant source of free sugars in both 1995 and 2011-12, although the share has shrunk over time. Consumption of these beverages accounted for 44% of free sugars in 1995 and 37% in 2011-12. This is consistent with previously published results, where 49% of people in 1995 reported consuming sweetened beverages on any given day, compared with 42% of people in 2011-12.

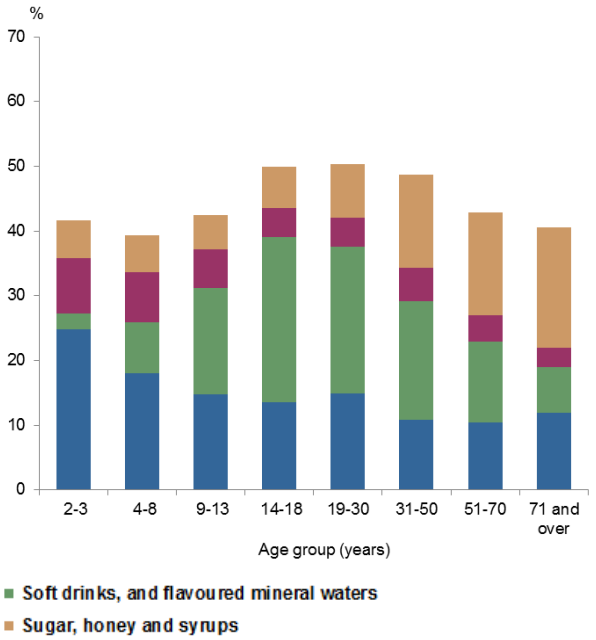
In particular, in 1995, children (2-18 years) consumed a greater proportion of their free sugar intake from soft drinks (20%) and cordials (15%) than children in 2011-12 who consumed 16% of their free sugars in the form of soft drinks, and 6.1% in the form of cordials.

One-quarter (26%) of total free sugars consumed by adults 71 years and over in 1995 were sourced from Sugar, Honey and Syrups (much of which was table sugar added to tea, coffee and breakfast cereals). This decreased to 19% in 2011-12 resulting in small proportional increases spread among a number of other foods including chocolate which increased from 1.9% to 3.7%.

Persons 2 years & over - Contribution of selected food groups to total free sugars consumed(a), 1995



Persons 2 years & over - Contribution of selected food groups to total free sugars consumed(a), 2011-12



(a) Based on Day 1. See Glossary for definition.
Source: National Nutrition Survey, 1995, National Nutrition and Physical Activity Survey, 2011-12

ENDNOTES

1 National Health and Medical Research Council, 2013, *Eat for Health: Australian Dietary Guidelines.* Canberra: Australian Government. <https://www.nhmrc.gov.au/guidelines-publications/n55>, Last accessed 19/04/2016

2 World Health Organization, 2015, *Guideline: Sugars intake for adults and children.* Geneva: WHO. <http://www.who.int/nutrition/publications/guidelines/sugars_intake/en/>, Last accessed 19/04/2016

3 Food Standards Australia New Zealand, 2016, *Determining the amount of added Sugars and free sugars in foods listed in the AUSNUT 2011-13 dataset*. Canberra: Australian Government. <http://www.foodstandards.gov.au/science/monitoringnutrients/ausnut/>, Last accessed 19/04/2016

4 All references to teaspoons within this publication refer to a level teaspoon of white sugar.

5 The definitions of free sugars, intrinsic sugars and sugars from milk are based on WHO concepts and terminology. See Glossary for definitions.

6 Usual intakes are modelled estimates which account for the day-to-day variation in intake of individuals the amounts of (or proportions of energy of) free sugar usually consumed by a given proportion of the population. See the AHS Users' Guide for more details.

7 The percentage of energy from free and added sugars was estimated by multiplying each gram of free and added sugars by a conversion factor of 16 to determine the kilojoules of energy.

8 The category 'flavoured milk drinks and beverage bases' was a grouping to capture the free sugars in the AUSNUT foods: Flavoured milk and milkshakes, Dairy milk substitutes, unflavoured, Dairy milk substitutes, flavoured, Other beverage flavourings and prepared beverages (includes products such as Milo, breakfast beverages), chai latte, bubble tea, tea mix powders, coffee mixes and coffees prepared from coffee mix, and coffees prepared with soy milk.

9 Sugar added to a beverage was measured by summing the free sugar within the AUSNUT major food group 'Sugar products and dishes' where those food records also had the 'beverage with additions' combination code. While this category includes toppings and jam spreads, over 98% of the free sugar with the 'beverage with additions' combination code was sugar. The balance of the free sugar in 'Sugar products and dishes' (i.e. the proportion not consumed in a beverage) was made up of: sugar (30%, with three quarters of that being added to cereal), jams (33%), water ice confection (13%) and sugar-based desserts (10%).

10 Foods categorised as discretionary were defined for the AHS using criteria-based decision rules (see AHS Users' Guide for details) but are generally described as energy-dense and nutrient-poor and associated with being high in saturated fat, added salt, added sugars or alcohol.

11 Australian Institute of Health and Welfare 2016. Australian Burden of Disease Study: Impact and causes of illness and death in Australia 2011. Australian Burden of Disease Study series no. 3. BOD 4. Canberra: AIHW.

ABBREVIATIONS

The following symbols and abbreviations are used in this publication:

ABS	Australian Bureau of Statistics
AHS	Australian Health Survey
AMPM	Automated Multiple-Pass Method
AUSNUT	Australian Food, Supplement and Nutrient Database
FSANZ	Food Standards Australia New Zealand
mg	milligram
g	gram
g/day	grams per day
kJ	kilojoule
MoE	Margin of Error
NCI	National Cancer Institute
NHMRC	National Health and Medical Research Council
NHS	National Health Survey
NNPAS	National Nutrition and Physical Activity Survey
NNS	National Nutrition Survey
SEIFA	Socio- Economic Indexes for Areas
WHO	World Health Organisation

GLOSSARY

The definitions used in this survey are not necessarily identical to those used for similar items in other collections. Additional information is contained in the Australian Health Survey: Users' Guide, 2011-13 (cat. no. 4363.0.55.001).

24-hour dietary recall

This was the methodology used to collect detailed information on food and nutrient intake in the National Nutrition and Physical Activity Survey (NNPAS). The 24-hour dietary recall collected a list of all foods, beverages and dietary supplements consumed the previous day from midnight to midnight, and the amount consumed. For more information, see the 24-hour Dietary Recall chapter of the AHS: Users' Guide, 2011-13 (cat. no. 4363.0.55.001).

Added sugars

The definition for added sugars is based on the definition of 'sugars' in Clause 1 of Standard 2.8.1 of the Australia New Zealand Food Standards Code.

"Sugars means –

a) hexose monosaccharides and disaccharides, including dextrose, fructose, sucrose and lactose; or
b) starch hydrolysate; or
c) glucose syrups, maltodextrin and similar products; or
d) products derived at a sugar refinery, including brown sugar and molasses; or
e) icing sugar; or
f) invert sugar; or
g) fruit sugar syrup; derived from any source,

but does not include –

h) malt or malt extracts; or
i) sorbitol, mannitol, glycerol, xylitol, polydextrose, isomalt, maltitol, maltitol syrup or lactitol."

Maltodextrin was not reported as part of total sugars in AUSNUT 2011-13 and thus could not be considered in this analysis. Honey, fruit juices and fruit juice concentrates are not included in this Standard and as such were not considered 'added sugars' for this definition of added sugars.

For more information see: *Developing the Added Sugars and Free Sugars datasets* available from Food Standards Australia New Zealand http://www.foodstandards.gov.au/science/monitoringnutrients/ausnut/

Australian Dietary guidelines

The National Health and Medical Research Council 2013 Australian Dietary Guidelines use the best available scientific evidence to provide information on the types and amounts of foods, food groups and dietary patterns that aim to:

- promote health and wellbeing
- reduce the risk of diet-related conditions
- reduce the risk of chronic disease.

The Guidelines are for use by health professionals, policy makers, educators, food manufacturers, food retailers and researchers.

The content of the Australian Dietary Guidelines applies to all healthy Australians, as well as those with common diet-related risk factors such as being overweight. They do not apply to people who need special dietary advice for a medical condition, or to the frail elderly.

Australian Health Survey (AHS)

The Australian Health Survey 2011-13 is composed of three separate surveys:

- National Health Survey (NHS) 2011-12
- National Nutrition and Physical Activity Survey (NNPAS) 2011-12
- National Health Measures Survey (NHMS) 2011-12.

In addition to this, the AHS Survey contains a Core dataset, which is produced from questions that are common to both the NHS and NNPAS. See The Structure of the Australian Health Survey for details.

Automated Multiple-Pass Method (AMPM)

The method used to collect the 24 hour food recall in the 2011-12 NNPAS was the Automated Multiple-Pass Method (AMPM) developed by the Agricultural Research Service of the United States Department of Agriculture (USDA). ABS with assistance from Food Standards Australia New Zealand (FSANZ) adapted the AMPM instrument to reflect the Australian food supply. See the Users' Guide for more information

Carbohydrate

Carbohydrates usually provide the major part of energy in human diets. Carbohydrates are comprised of the elements of carbon, hydrogen and oxygen. Data for total carbohydrates include starch, sugars and related substances (sugar alcohols and oligosaccharides). Sugar alcohols and oligosaccharides are included in 'Total carbohydrates' but not in starch and sugar sub-totals. Therefore, total carbohydrate does not always equal the sum of sugars and starch.

Day 1 / Day 2 intake

Day 1 intake refers to information collected from the first 24-hour dietary recall, while Day 2 refers to information from the second 24-hour recall. In the 2011-12 NNPAS, Day 1 intake information was collected from all respondents, with a second 24-hour recall (Day 2) collected from around 64% of respondents. Nutrient intakes derived from 24-hour recall data do not represent the usual intake of a person because there is variation in day-to-day intakes. The second 24-hour recall is used to estimate and remove within-person variation in order to derive a usual nutrient intake distribution for the population. Usual nutrient intakes represent intakes over a long period of time.

Disaccharides

Disaccharides are sugars composed of two monosaccharides. Sucrose, maltose, galactose and lactose are examples of disaccharides.

Dietary energy

Dietary energy is measured in kilojoules (kJ) and consists of the energy provided by protein, fat, alcohol and carbohydrate (comprising sugars and starch). Small amounts of additional energy are from dietary fibre and organic acids.

Discretionary foods

The Australian Dietary Guidelines describes discretionary foods as being: "foods and drinks not necessary to provide the nutrients the body needs, but that may add variety. However, many of these are high in saturated fats, sugars, salt and/or alcohol, and are therefore described as energy dense. They can be included sometimes in small amounts by those who are physically active, but are not a necessary part of the diet". For more information, see the Discretionary Foods chapter of the AHS: Users' Guide, 2011-13 (cat. no. 4363.0.55.001).

Free sugars

Free sugars, as defined by the WHO, refers to monosaccharides and disaccharides added to foods and drinks by the manufacturer, cook or consumer, and sugars naturally present in honey, syrups, fruit juices and fruit juice

concentrates. For more information see WHO/FAO (2003) Diet, nutrition and the prevention of chronic diseases: report of a joint WHO/FAO Expert consultation

For information on the process for calculating free sugars for AUSNUT foods see *Developing the Added Sugars and Free Sugars datasets* available from Food Standards Australia New Zealand http://www.foodstandards.gov.au/science/monitoringnutrients/ausnut/

Intrinsic sugars

Intrinsic sugars are defined by the WHO as the sugars incorporated in the structure of intact fruit and vegetables. In this analysis, intrinsic sugars plus milk sugars are estimated from total sugars minus free sugars. See WHO Guideline http://apps.who.int/iris/bitstream/10665/149782/1/9789241549028_eng.pdf

Lactose

Lactose is a disaccharide and is the sugar found naturally in milk products. Lactose is made up of two monosaccharides; glucose and galactose.

Margin of Error (MoE)

Margin of Error (MoE) describes the distance from the population value that the sample estimate is likely to be within, and is specified at a given level of confidence. Confidence levels typically used are 90%, 95% and 99%. For example, at the 95% confidence level the MoE indicates that there are about 19 chances in 20 that the estimate will differ by less than the specified MoE from the population value (the figure obtained if the entire population had been enumerated). In this publication, MoE has been provided at the 95% confidence level for proportions of persons and usual daily proportions of energy from macronutrients. For more information see the Technical Note of this publication.

Median

The median is the middle value in a set of observations. In this release, median usual intakes for each age and sex group are shown as the 50th percentile of the range of observations simulated by the NCI method.

Mean

The mean is the sum of the value of each observation in a dataset divided by the number of observations. This is also known as the arithmetic average. In this release, mean usual intakes for each age by sex group are calculated from the distribution of usual nutrient intakes simulated by the NCI method.

Milk sugars

Milk sugars are the natural sugars present in milk. In this analysis, intrinsic sugars + milk sugars are estimated from total sugars – free sugars.

Monosaccharides

Monosaccharides are the simplest forms of sugars. Examples are glucose (also sometimes called dextrose) and fructose.

National Nutrition and Physical Activity Survey (NNPAS)

The National Nutrition and Physical Activity Survey focused on collecting information on:

- dietary behaviour and food avoidance (including 24-hour dietary recall)
- selected medical conditions that had lasted, or were expected to last, for six months or more
    - cardiovascular and circulatory conditions
    - diabetes and high sugar levels
    - kidney disease
- blood pressure
- female life stages
- physical activity and sedentary behaviour (including eight-day pedometer component)
- use of tobacco
- physical measurements (height, weight and waist circumference).

NCI method

The NCI method is a statistical model developed by the National Cancer Institute of the USA. In this publication, the model has been used to estimate the distribution of long term or usual intakes for each age and sex group, using the two days of dietary intake data for all respondents in that age and sex group. For more information, see the Overview of the NCI Method chapter of the AHS: Users' Guide, 2011-13 (cat. no. 4363.0.55.001).

Nutrient

Nutrients are chemical substances provided by food that are used by the body to provide energy, structural materials, and biochemical cofactors to support the growth, maintenance, and repair of body tissues. Major sources of nutrients are available in AHS: Nutrition First Results - Foods and Nutrients, 2011-12 (cat. no. 4364.0.55.007).

Nutrient Database (AUSNUT)

The Nutrient Database used to derive energy and nutrient estimates for the 24-hour dietary recall data was developed by Food Standards Australia New Zealand. See AUSNUT 2011-13.

Percentage contribution to energy intake

Percentage contribution to energy intake refers to the proportion of energy that a food or macronutrient contributes to each person's total energy intake. In the NNPAS, the energy from each macronutrient was estimated by multiplying each gram of a particular macronutrient by a conversion factor to determine the kilojoules of energy. For more information, see the Nutrient Intake chapter of the AHS: Users' Guide, 2011-13 (cat. no. 4363.0.55.001). For more information on the way in which percentage usual contribution to total energy intake has been calculated using the NCI method, see the Model implementation: data used and model specification chapter of the AHS: Users' Guide, 2011-13 (cat. no. 4363.0.55.001).

SEIFA

SEIFA is based on the 2006 Index of Relative Socio-Economic Advantage and Disadvantage. A lower quintile/decile (e.g. the first quintile/decile) indicates an area with relatively greater disadvantage and lack of advantage in general. A higher Index of Advantage and Disadvantage (e.g. the fifth quintile/tenth decile) indicates an area with relative lack of disadvantage and greater advantage in general.

Sucrose

Sucrose is a natural form of sugar found in many foods. It is also known as table sugar. Sucrose is a disaccharide comprising of glucose and fructose.

Total sugars

Total sugars are the sum of fructose, glucose, sucrose, maltose, lactose and galactose.

Under-reporting

Under-reporting refers to the tendency (bias) of respondents to underestimate their food intake in self-reported dietary surveys. It includes actual changes in foods eaten because people know they will be asked about them, and misrepresentation (deliberate, unconscious or accidental), for example to make their diets appear more 'healthy' or be quicker to report. See the AHS Users' Guide for more information.

Usual Intakes

Usual intakes represent food and nutrient intake over a long period of time. For a single person, dietary intake varies day-to-day. A single 24-hour dietary recall does not represent the usual, or long term, intake of a person because of this variation. In the 2011-12 NNPAS, all respondents were asked for follow-up contact phone details in order to conduct a second 24-hour recall over the phone at least eight days later. A second 24-hour recall was collected from 64% of respondents. The second 24-hour recalls were used to estimate and remove within-person variation in order to derive a usual nutrient intake distribution for the population.

EXPLANATORY NOTES

INTRODUCTION

1 This publication is the fifth release of nutrition data from the 2011-12 National Nutrition and Physical Activity Survey (NNPAS). The first release was published in May 2014. The statistics presented in this publication are only a selection of the nutrition information collected from the NNPAS.

2 The 2011-12 NNPAS was conducted throughout Australia from May 2011 to June 2012. The NNPAS was collected as one of a suite of surveys conducted from 2011-2013, called the Australian Health Survey (AHS).

3 The Australian Health Survey: Consumption of Added Sugar publication contains usual (long term) added and free sugar intake information modelled from two days of 24-hour dietary recall data using the National Cancer Institute (NCI) method. For more information on the NCI method, see the Overview of the NCI Method chapter of the AHS: Users' Guide, 2011-13 (cat. no. 4363.0.55.001).

4 The comparison of added sugars and ADG food group consumption between the 1995 National Nutrition Survey (NNS) and the 2011 AHS required the development of a 1995 NNS-ADG database. This was produced by the ABS by deriving relevant information from the 2011-12 AHS-ADG database discussed on the FSANZ website. Details of the 1995 NNS-ADG database development are given in APPENDIX 1. An Excel file of the 1995 NNS-ADG database is available from the Downloads tab from the AHS Users' Guide.

5 Usual intakes of added and free sugars are provided by age groups and sex at the national level, including comparison with the World Health Organisation (WHO) recommended intake of free sugars. More information on WHO recommendation of free sugars is available on the Sugars Intake for adults and children website.

SCOPE OF THE SURVEY

6 The National Nutrition and Physical Activity Survey (NNPAS) contains a sample of approximately 9,500 private dwellings across Australia.

6 Urban and rural areas in all states and territories were included, while Very Remote areas of Australia and discrete Aboriginal and Torres Strait Islander communities (and the remainder of the Collection Districts in which these communities were located) were excluded. These exclusions are unlikely to affect national estimates, and will only have a minor effect on aggregate estimates produced for individual states and territories, excepting the Northern Territory where the population living in Very Remote areas accounts for around 23% of persons.

8 Non-private dwellings such as hotels, motels, hospitals, nursing homes and short-stay caravan parks were excluded from the survey. This may affect estimates of the number of people with some chronic health conditions (for example, conditions which may require periods of hospitalisation).

9 Within each selected dwelling, one adult (aged 18 years and over) and, where possible, one child (aged 2 years and over) were randomly selected for inclusion in the survey. Sub-sampling within households enabled more information to be collected from each respondent than would have been possible had all usual residents of selected dwellings been included in the survey.

10 The following groups were excluded from the survey:

- certain diplomatic personnel of overseas governments, customarily excluded from the Census and estimated resident population
- persons whose usual place of residence was outside Australia
- members of non-Australian Defence Forces (and their dependents) stationed in Australia
- visitors to private dwellings.

DATA COLLECTION

11 Trained ABS interviewers conducted personal interviews with selected residents in sampled dwellings. One person aged 18 years and over in each dwelling was selected and interviewed about their own health characteristics including a 24-hour dietary recall and a physical activity module. An adult, nominated by the household, was interviewed about one child (aged two years and over) in the household. Selected children aged 15-17 years may have been personally interviewed with parental consent. An adult, nominated by the household, was also asked to provide information about the household, such as the combined income of other

household members. Children aged 6-14 years were encouraged to be involved in the survey, particularly for the 24-hour dietary recall and physical activity module. For further information, see Data Collection in the AHS: Users' Guide, 2011-13 (cat. no. 4363.0.55.001).

12 All selected persons were required to have a follow-up phone interview at least eight days after the face to face interview to collect a further 24-hour dietary recall. For those who participated, pedometer data was reported during this telephone interview.

SURVEY DESIGN

13 Dwellings were selected at random using a multistage area sample of private dwellings for the NNPAS.

The initial sample selected for the survey consisted of approximately 14,400 dwellings. This was reduced to approximately 12,400 dwellings after sample loss (for example, households selected in the survey which had no residents in scope of the survey, vacant or derelict buildings, or buildings under construction). Of those remaining dwellings, 9,519 (or 77.0%) were fully or adequately responding, yielding a total sample for the survey of 12,153 persons (aged two years and over).

NNPAS, APPROACHED SAMPLE, FINAL SAMPLE AND RESPONSE RATES

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Aust
Households approached (after sample loss)	2 227	1 983	1 988	1 551	1 545	1 155	911	1 006	12 366
Households in sample	1 666	1 371	1 525	1 211	1 334	1 003	592	817	9 519
Response rate (%)	74.8	69.1	76.7	78.1	86.3	86.8	65.0	81.2	77.0
Persons in sample	2 139	1 749	1 964	1 526	1 706	1 245	763	1 061	12 153

14 Of the 12,153 people in the final sample, 98% provided the first (Day 1), with the missing 2% of Day 1 dietary recalls being imputed. The second 24-hour dietary recall (Day 2) had 7,735 participants (64% of the total). The Day 2 24-hour dietary recall participation was slightly higher among older respondents, and sex did not appear as a factor in participation.

15 More information on response rates and imputation is provided in the AHS: Users' Guide, 2011-13 (cat. no. 4363.0.55.001).

16 To take account of possible seasonal effects on health and nutrition characteristics, the NNPAS sample was spread randomly across a 12-month enumeration period. Between August and September 2011, survey enumeration was suspended due to field work associated with the 2011 Census of Population and Housing.

WEIGHTING, BENCHMARKING AND ESTIMATION

17 Weighting is a process of adjusting results from a sample survey to infer results for the in-scope total population. To do this, a weight is allocated to each sample unit; for example, a household or a person. The weight is a value which indicates how many population units are represented by the sample unit.

18 The first step in calculating weights for each person was to assign an initial weight, which was equal to the inverse of the probability of being selected in the survey. For example, if the probability of a person being selected in the survey was 1 in 600, then the person would have an initial weight of 600 (that is, they represent 600 others). An adjustment was then made to these initial weights to account for the time period in which a person was assigned to be enumerated.

19 The weights are calibrated to align with independent estimates of the population of interest, referred to as 'benchmarks', in designated categories of sex by age by area of usual residence. Weights calibrated against population benchmarks compensate for over or under-enumeration of particular categories of persons and ensure that the survey estimates conform to the independently estimated distribution of the population by age, sex and area of usual residence, rather than to the distribution within the sample itself.

20 The NNPAS was benchmarked to the estimated resident population living in private dwellings in non-Very Remote areas of Australia at 31 October 2011. Excluded from these benchmarks were persons living in discrete Aboriginal and Torres Strait Islander communities, as well as a small number of persons living within Collection Districts that include discrete Aboriginal and Torres Strait Islander communities. The benchmarks, and hence the estimates from the survey, do not (and are not intended to) match estimates of the total Australian resident population (which include persons living in Very Remote areas or in non-private dwellings, such as hotels) obtained from other sources. For the NNPAS, a seasonal adjustment was also incorporated into the person weights.

21 Survey estimates of counts of persons are obtained by summing the weights of persons with the characteristic of interest. Estimates of non-person counts (for example, number of organised physical activities) are obtained by multiplying the characteristic of interest with the weight of the reporting person and aggregating.

RELIABILITY OF ESTIMATES

22 All sample surveys are subject to sampling and non-sampling error. Estimates derived from models, including the NCI method, are also subject to prediction error and simulation variance.

23 Sampling error is the difference between estimates, derived from a sample of persons, and the value that would have been produced if all persons in scope of the survey had been included. For more information refer to the Technical note. Indication of the level of sampling error is given by the 95% Margin of Error (MoE).

24 In this publication, MoEs are provided for all estimates (unless noted otherwise) to assist users in assessing the reliability of these types of estimate. The estimate combined with the MoE defines a range which is expected to include the true population value with a 95% level of confidence. This is known as the 95% confidence interval. This range should be considered by users to inform decisions based on the estimate.

25 Non-sampling error may occur in any data collection, whether it is based on a sample or a full count such as a census. Non-sampling errors occur when survey processes work less effectively than intended. Sources of non-sampling error include non-response, errors in reporting by respondents or in recording of answers by interviewers, and occasional errors in coding and processing data.

26 Prediction error and simulation variance are forms of error which may occur when using a model such as the NCI method. Care was taken to ensure the input 24-hour dietary recall data was suitable for use in the model. Every effort is made to ensure an appropriate model specification is used through external literature research and statistical testing. For more information see Data Quality in the Users' Guide.

27 Where comparisons with WHO recommended intake have been made, any error in these guideline values will affect the quality of the resulting estimates. The WHO recommends both adults and children to reduce their intake of free sugars to less than 10% of total energy intake.

28 Of particular importance to nutrition surveys is a widely observed tendency for people to under-report their food intake. This can include:

- actual changes in foods eaten because people know they will be participating in the survey
- misrepresentation (deliberate, unconscious or accidental), e.g. to make their diets appear more ‘healthy’ or be quicker to report.

Analysis of the 2011-12 NNPAS suggests that, like other nutrition surveys, there has been some under-reporting of food intake by participants in this survey. Given the association of under-reporting with overweight/obesity and consciousness of socially acceptable/desirable dietary patterns, under-reporting is unlikely to affect all foods and nutrients equally. No respondents were excluded from the sample on the basis of low total reported energy intakes (low energy reporters were included in the input data set for usual nutrient intakes). For more information see Under-reporting in Nutrition Surveys in the AHS Users' Guide, 2011-13.

29 Another factor affecting the accuracy of the 24-hour dietary recall data is that most young children are unable to recall their intakes. Similarly, parents/carers of school-aged children may not be aware of a child’s total food intake, which can lead to systematic under-reporting. Young children were encouraged to assist in answering the dietary recall questions. See the Interviews section of Data Collection for more information on proxy use in the 24-hour dietary recall module.

30 Another source of non-sampling error specific to nutrition surveys is the accuracy of the nutrient and

measures database containing thousands of foods used to derive the nutrient estimates. The databases used for the 2011-12 NNPAS were developed by Food Standards Australia New Zealand (FSANZ) specifically for the survey. A complete nutrient profile of 51 nutrients was created based on FSANZ's latest available data and from this, intakes of 44 nutrients were reported in the NNPAS at the time when the survey results were first released. Not all data was based on directly analysed foods; some data was borrowed from overseas food composition tables, food label information, imputed from similar foods, or calculated using a recipe approach. See AUSNUT 2011-13 for more information.

31 Non-response occurs when people cannot or will not cooperate, or cannot be contacted. Non-response can affect the reliability of results and can introduce bias. The magnitude of any bias depends on the rate of non-response and the extent of the difference between the characteristics of those people who responded to the survey and those who did not.

32 The following methods were adopted to reduce the level and impact of non-response:

- face-to-face interviews with respondents
- the use of interviewers, where possible, who could speak languages other than English
- follow-up of respondents if there was initially no response
- weighting to population benchmarks to reduce non-response bias.

33 By careful design and testing of the questionnaire, training of interviewers, and extensive editing and quality control procedures at all stages of data collection and processing, other non-sampling error has been minimised. However, the information recorded in the survey is essentially 'as reported' by respondents, and hence may differ from information collected using different methodology.

NCI MODEL IMPLEMENTATION

34 There are three NCI model forms that can be applied: one-part, correlated two-part and uncorrelated-two part (see Model Implementation: Data used and Model Specification in the User's Guide for more information on model forms).The one-part model was used when less than 5% of intakes had zero amounts. It was therefore used to model usual intake of added and free sugars as these nutrients were consumed nearly every day by almost everyone. Accordingly, percentage of energy from free sugars was also modelled using the one-part model form.

35 Percentage of energy from free sugars is a distribution of usual ratios. For this publication, these ratios have been first calculated on an individual basis as the total percentage of energy coming from free sugars on the intake day, divided by the total energy intake for the day. This was done for both Day 1 and Day 2 for each respondent. The NCI method was then run on these ratios in a similar way to other food groups. The group usual distribution of these ratios, output from the NCI method, are therefore usual ratio of intakes, that is the usual daily intake ratio. For more information, see Modelling Ratio, in the User's Guide.

36 In the NCI method, covariates are data items or variables that describe characteristics of the individuals within a group, which are relevant to their nutrient or food intake. Four covariates were used in this publication for all models: sex, age, weekend vs weekday, and sequence effect. The purpose of each of these covariates is outlined in Model Implementation: Data used and Model Specification in the User's Guide.

CONFIDENTIALITY

37 The *Census and Statistics Act, 1905* provides the authority for the ABS to collect statistical information, and requires that statistical output shall not be published or disseminated in a manner that is likely to enable the identification of a particular person or organisation. This requirement means that the ABS must take care and make assurances that any statistical information about individual respondents cannot be derived from published data.

ROUNDING

38 Estimates presented in this publication have been rounded. As a result, sums of components may not add exactly to totals.

39 All statistics are rounded to one decimal place in the data cubes.

ACKNOWLEDGEMENTS

40 ABS publications draw extensively on information provided freely by individuals, businesses, governments and other organisations. Their continued cooperation is very much appreciated; without it, the wide range of statistics published by the ABS would not be available. Information received by the ABS is treated in strict confidence as required by the *Census and Statistics Act, 1905*.

41 The ABS gratefully acknowledges and thanks the Agricultural Research Service of the USDA for giving permission to adapt and use their Dietary Intake Data System including the AMPM for collecting dietary intake information as well as other processing systems and associated materials.

42 FSANZ and the ABS jointly investigated and validated the use of the NCI method with the 2011-12 NNPAS. FSANZ was contracted to provide advice throughout the survey development, processing, and collection phases of the 2011-12 NNPAS, and to provide a nutrient database for the coding of foods and dietary supplements consumed. The ABS would like to acknowledge and thank FSANZ for providing their support, advice and expertise to the 2011-12 NNPAS.

43 The ABS gratefully acknowledges and thanks researchers at the National Cancer Institute (NCI) in the USA and elsewhere for developing and making available the NCI method and corresponding SAS macros, and providing expert advice on the use of the method.

PRODUCTS AND SERVICES

44 Summary results from this survey are available in spreadsheet form from the 'Downloads' tab in this release.

45 Because the NCI method produces estimates of usual added and free sugar intakes for population sub-groups and not individuals, usual intake data is not available at the unit record level.

46 Summary tables containing aggregated estimates of the prevalence of intakes above the WHO recommended intake level are available in the ‘Downloads’ tab in this release. Information on how to aggregate estimates for different age and sex groups is in Summary Tables in the Users' Guide.

RELATED PUBLICATIONS

47 Other ABS publications which may be of interest are shown under the 'Related Information' tab of this release.

48 Current publications and other products released by the ABS are listed on the ABS website. The ABS also issues a daily Release Advice on the website which details products to be released in the week ahead.

ABOUT THE NATIONAL NUTRITION AND PHYSICAL ACTIVITY SURVEY

The 2011–13 Australian Health Survey (AHS) is the largest and most comprehensive health survey ever conducted in Australia. The survey, conducted throughout Australia, collected a range of information about health related issues, including health status, risk factors, health service usage and medications. In 2011–12, the AHS incorporated the National Nutrition and Physical Activity Survey (NNPAS). It involved the collection of detailed physical activity information using self-reported and pedometer collection methods, along with detailed information on dietary intake and foods consumed from over 12,000 participants across Australia. The nutrition component is the first national nutrition survey of adults and children (aged 2 years and over) conducted in over 15 years.

Information for the nutrition component of the NNPAS was gathered using a 24-hour dietary recall on all foods, beverages and dietary supplements consumed on the day prior to the interview. Where possible, at least eight days after the first interview, respondents were contacted to participate in a second 24-hour dietary recall via telephone interview.

This publication is the fifth release of information from the nutrition component of the NNPAS and it presents information on the usual intake of added sugars and free sugars, the proportion of energy derived from added and free sugars, as well as the relative contribution of major and sub-major food groups to added and free sugar intake.

The AHS sample included Aboriginal and Torres Strait Islander people where they were randomly selected in the general population. The AHS also included an additional representative sample of Aboriginal and Torres Strait Islander people. The National Aboriginal and Torres Strait Islander Nutrition and Physical Activity Survey (NATSINPAS) provides nutrition and physical activity results for Aboriginal and Torres Strait Islander people at the population level and provides an opportunity to compare results with the non-Indigenous population. Results for the analysis of added and free sugars of the NATSINPAS will be released in the second half of 2016.

ACKNOWLEDGEMENTS

The NNPAS has been made possible by additional funding from the Australian Government Department of Health and Ageing as well as the National Heart Foundation of Australia, and the contributions of these two organisations to improving health information in Australia through quality statistics are greatly valued.

The 2011–13 AHS, and particularly the NNPAS component, was developed with the assistance of several advisory groups and expert panels. Members of these groups were drawn from Commonwealth and state/territory government agencies, non-government organisations, relevant academic institutions and clinicians. The contributions made by members of these groups are greatly appreciated.

FSANZ was contracted to provide advice throughout the survey development, processing and collection phases of the 2011-12 NNPAS and to provide a nutrient database for the coding of foods and supplements consumed. For more information, please refer to the FSANZ website. The ABS would like to acknowledge and thank FSANZ for providing their support, advice and expertise to the 2011-12 NNPAS.

The ABS gratefully acknowledges and thanks the Agricultural Research Service of the USDA for giving permission to adapt and use their Dietary Intake Data System including the AMPM for collecting dietary intake information as well as other processing systems and associated materials.

The ABS would like to acknowledge and thank the members of the Expert Reference Group who assisted in the development of this publication:

- Commonwealth Department of Health
- Food Standards Australia New Zealand
- Department of Nutrition and Dietetics, Monash University Melbourne

- Faculty of Health Sciences, University of Sydney
- New South Wales Department of Health

Finally, the success of the 2011–13 AHS was dependent on the very high level of cooperation received from the Australian public. Their continued cooperation is very much appreciated; without it, the range of statistics published by the ABS would not be possible. Information received by the ABS is treated in strict confidence as required by the Census and Statistics Act 1905.

TECHNICAL NOTE

RELIABILITY OF THE ESTIMATES

1 Two types of error are possible in an estimate based on a sample survey: sampling error and non-sampling error. Estimates derived from models, including the NCI method, are also subject to prediction error and simulation variance. The sampling error is a measure of the variability that occurs by chance because a sample, rather than the entire population, is surveyed. Since the estimates in this publication are based on information obtained from occupants of a sample of dwellings they are subject to sampling variability; that is they may differ from the figures that would have been produced if all dwellings had been included in the survey. One measure of the likely difference is given by the standard error (SE). There are about two chances in three that a sample estimate will differ by less than one SE from the figure that would have been obtained if all dwellings had been included, and about 19 chances in 20 that the difference will be less than two SEs.

2 Another measure of the likely difference is given by the Margin of Error (MoE). The MoE describes the distance (or margin) from the estimate that the 'true' value will lie within at a given confidence level. Confidence levels typically used are 90%, 95% and 99%. For example, at the 95% confidence level the MoE indicates that there are about 19 chances in 20 that the estimate will differ by less than the specified MoE from the population value (the figure obtained if all dwellings had been enumerated). The 95% MoE is calculated as 1.96 multiplied by the SE.

3 The MoEs in this publication are calculated at the 95% confidence level. This can easily be converted to a 90% confidence level by multiplying the MoE by

$$\frac{1.645}{1.96}$$

or to a 99% confidence level by multiplying by a factor of

$$\frac{2.576}{1.96}$$

4 A confidence interval expresses the sampling error as a range in which the population value is expected to lie at a given level of confidence. The confidence interval can easily be constructed from the MoE of the same level of confidence by taking the estimate plus or minus the MoE of the estimate. Two types of error are possible in an estimate based on a sample survey: sampling error and non-sampling error.

5 The imprecision due to sampling variability, which is measured by the SE, should not be confused with inaccuracies that may occur because of imperfections in reporting by interviewers and respondents and errors made in coding and processing of data. Inaccuracies of this kind are referred to as the non-sampling error, and they may occur in any enumeration, whether it be in a full count or only a sample. In practice, the potential for non-sampling error adds to the uncertainty of the estimates caused by sampling variability. However, it is not possible to quantify the non-sampling error.

6 Prediction error is the variability attributed to the statistical accuracy of the NCI model used in this publication, including bias due to specification of the model. Simulation error is the variability due to simulating different random effects in order to generate usual distribution intakes. Although every effort is made to ensure an appropriate model specification is used, through external literature research and statistical testing, these errors are not quantified and also add to the uncertainty of the estimates.

COMPARISON OF ESTIMATES

8 Published estimates may also be used to calculate the difference between two survey estimates. Such an estimate is subject to sampling error. The sampling error of the difference between two estimates depends on their SEs and the relationship (correlation) between them. An approximate SE of the difference between two estimates (x-y) may be calculated by the following formula:

$$SE(x-y) = \sqrt{[SE(x)]^2 + [SE(y)]^2}$$

9 While the above formula will be exact only for differences between separate and uncorrelated (unrelated) characteristics of sub-populations, it is expected that it will provide a reasonable approximation for all differences likely to be of interest in this publication.

EXAMPLE OF INTERPRETATION OF SAMPLING ERROR

10 Standard errors can be calculated using the MoE. For example the MoE for the estimate of the proportion of females aged 51-70 years whose usual daily proportion of energy from free sugars was greater than or equal to 10% is +/- 3.6 percentage points. The SE is calculated by:

$$\text{SE of estimate} = \left(\frac{MoE}{1.96} \right)$$

$$= \left(\frac{3.6}{1.96} \right)$$

$$= 1.8$$

11 There are about 19 chances in 20 that the estimate of the proportion of females aged 51-70 years whose usual daily proportion of energy from free sugars was greater than or equal to 10% is +/- 3.6 percentage points from the population value.

12 Similarly, there are about 19 chances in 20 that the proportion of females aged 51-70 years whose usual daily proportion of energy from free sugars was greater than or equal to 10% is within the confidence interval of 31.6% to 38.8%.

SIGNIFICANCE TESTING

13 For comparing estimates between surveys or between populations within a survey it is useful to determine whether apparent differences are 'real' differences between the corresponding population characteristics or simply the product of differences between the survey samples. One way to examine this is to determine whether the difference between the estimates is statistically significant. This is done by calculating the standard error of the difference between two estimates (x and y) and using that to calculate the test statistic using the formula below:

$$\frac{|x-y|}{SE(x-y)}$$ where SE(x-y) is given in 8 above.

14 If the value of the statistic is greater than 1.96 then we may say there is good evidence of a statistically significant difference at 95% confidence levels between the two populations with respect to that characteristic. Otherwise, it cannot be stated with confidence that there is a real difference between the populations.

APPENDIX 1: DEVELOPMENT OF THE 1995 NNS–ADG DATABASE

Analysis of added sugars and ADG food consumption for the 1995 National Nutrition Survey (NNS) required the development of a new database of relevant ADG values for each food within AUSNUT 1999 (the classification used in the 1995 NNS). This 1995 NNS-ADG database was based on the 2011-13 AHS-ADG database developed by FSANZ for measuring ADG foods in the 2011-13 AHS (For more information, see *Assessing the 2011-13 AHS against the Australian Dietary Guidelines - Classification System and Database Development Explanatory notes*, available from:http://www.foodstandards.gov.au/science/monitoringnutrients/Pages/default.aspx).

The essence of the method was to assign the ADG values of foods to the AUSNUT 1999 foods from the 2011-13 database by finding/modifying suitable 'donor' records. The systematic process used to determine the most appropriate values from available information can be represented as a basic decision tree (see Figure 1) and is described more below.

Using the matching file

The first test was whether the 1999 food has a suitable match on the matching file produced and published by FSANZ. This was used a far as possible to concord AUSNUT 1999 codes to AUSNUT 2011-13 codes. In most cases, AUSNUT 1999 codes were matched to a single 2011-13 code, so these correspondences were used as is. In other cases, the matching file indicates that a single 1999 AUSNUT code had multiple 2011-13 matches (e.g. in 1999 there was a single 'Soft drink, Energy' code, however in 2011-13 this had increased to incorporate seven varieties). In these cases, an average was taken of ADG and added/free sugar information for all the possible matches and these values were assigned to the AUSNUT 1999 code.

Other assigning methods

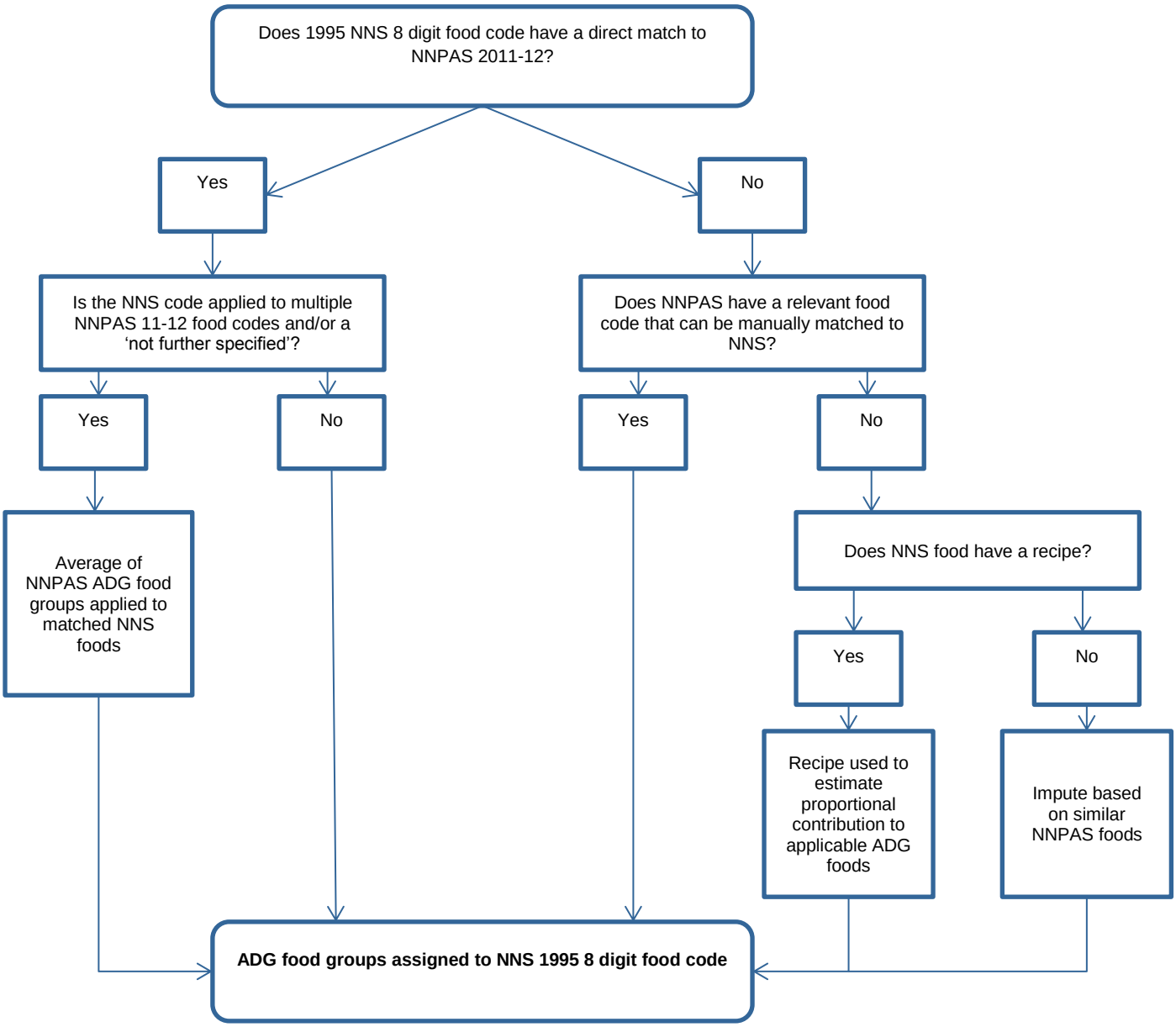
Where the matching file did not specify a match for an AUSNUT 1999 food, the following approaches were taken in order:

- Manually assigned – foods that do not have a direct concordance to the 2011-13 AUSNUT file in the matching file were manually assigned a relevant 2011-13 AUSNUT food code ensuring the food was the closest in description and composition (including macronutrient profile).
- Recipes calculation– where a clear match could not be found and the 1999 AUSNUT food had a recipe, new ADG and free/added sugars values were derived by building up from the specified ingredients.
- Foods described as 'not further specified (NFS)' – values for the not further specified codes were calculated as the average ADG/added sugars values of the foods in that group. For example, data for 'Potato, cooked, NFS' was calculated from the consumption-weighted average of all the potato codes covering various preparation methods.

Added and free sugars

Added and free sugars were also previously not available for the 1995 NNS, so assigning values for these was done using the same method as for the ADG food amounts, with a further consistency step. Where the amount of *total sugars* was different between the 1995 food and its 2011-13 'donor', the added and free sugar were adjusted to be the same ratio of free sugars to total sugars in the corresponding 2011-13 food. For example, in 2011-13 regular vanilla ice cream had 18.4g per 100g of total sugars and 13g per 100g of free sugars (ratio of 13.0/18.4). This ratio was then applied to the total sugars of regular vanilla ice cream in 1995 which was 19.8g, yielding 14g of free sugars.

Figure 1 – Decision tree for assigning ADG/added sugar values to 1999 AUSNT foods



For more information about determining the amount of added and free sugars, please refer to "Determining the amount of added sugars and free sugars in foods listed in the AUSNUT 2011-13 dataset" from Food Standards Australia and New Zealand website.

Applying the discretionary flag

Foods from the 1995 NNS were flagged as either non-discretionary or discretionary based on the same criteria used to flag foods from AUSNUT 2011-13.

Limitations

Care was taken to ensure every AUSNUT 1999 food was assigned to the most accurate values for the ADG food groups and free/added sugars possible. However, as the original AHS-ADG database was not designed specifically for the 1995 NNS data, the accuracy of the assigned ADG and added sugars information will be determined by a number of factors:

1. Changes in formulation of products. For multi-ingredient foods, specific individual ingredients may have changed. This may be the case for manufactured foods or home/commercially cooked foods where recipes have changed. On the other hand, even within a given period (whether 1995 or 2011-13) there may be variations in food composition because of factors such as production and processing practices, formulation changes, variations between brands and changes in the source of an ingredient.

2. Availability of a suitable match. While most foods in AUSNUT 1999 have direct counterparts in 2011-13, some values had to be imputed based on available recipes or as weighted averages of available similar foods where the 1995 food lacked detailed description (as described above). Such imputation is likely to introduce a degree of random error (compared to systematic the use of the comprehensive recipes used by FSANZ to create the 2011-13 AHS-ADG database). However, the impact on results from such random errors are considered to be limited and within the margins of sampling error when considering mean serves or grams of a food group at the population level.

3. The free/added sugars estimation has a further limitation with foods containing both intrinsic sugars (naturally present) and added sugars (for example, a particular yoghurt may have intrinsic sugars from the milk and fruit, but also be sweetened with sucrose). The limitation is due to the application of the 2011-13 ratio to the 1995 total sugars to determine the free and added sugars. While this ensures that the 1995 free and added sugars are adjusted in proportion with their amount total sugars, there may be instances where the difference in total sugars between a 1995 food and the 2011-13 food was due to an increase or decrease in either the intrinsic or the added sugar but not both (which is the assumption inherent in the use of the ratio).

Australian Bureau of Statistics

INQUIRIES

For further information about these and related statistics, contact the National Information and Referral Service on 1300 135 070.