



Australian Bureau of Statistics

4364.0.55.012 - Australian Health Survey: Consumption of Food Groups from the Australian Dietary Guidelines, 2011-12

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Summary

Key Findings

KEY FINDINGS

The 2013 Australian Dietary Guidelines (ADG or the Guidelines) include the Guideline that Australians “Enjoy a wide variety of nutritious foods from the Five Food Groups every day and drink plenty of water” where the food groups are:

- Vegetables and legumes/beans
- Fruit
- Milk, yoghurt, cheese and/or alternatives
- Lean meat and poultry, fish, eggs, tofu, nuts and seeds and legumes/beans (lean meats and alternatives)
- Grain (cereal) foods

The Guidelines include minimum recommended numbers of serves that the population should usually consume to satisfy their nutrient requirements and minimise diet related chronic disease risk.¹

ARE AUSTRALIANS MEETING THE GUIDELINES?

Most Australians did not usually meet their recommended minimum number of serves for any of the Five Food Groups from non-discretionary food sources.

Vegetables and legumes/beans group

- Overall, Australians aged two years and over consumed an average of 2.7 serves of *vegetables and legumes/beans* per day, with less than 4% of the population meeting the recommended number of serves.
- Adults (aged 19 years and over) had an average of 3.0 serves of *vegetables and legumes/beans* per day with less than 4% usually consuming the minimum recommended number of serves.
- Children aged 2-18 years averaged 1.8 serves per day and less than 1% usually consumed their recommended number of vegetable serves.

Fruit group

- Around 1.5 serves of *fruit* (including fruit juice and dried fruit) were consumed on average by Australians two years and over, with fruit consumed fresh or canned contributing around 1 serve, and fruit juice and dried fruit 0.5 serve.
- Children on average consumed more serves of *fruit* than adults (1.7 compared with 1.5).
- Nearly one third of Australians aged two years and over (31%) met the recommendation for *fruit*, males more likely to meet the recommendation than females (33% compared with 28%).

Milk, yoghurt, cheese and alternatives group

- On average, Australians aged two years and over consumed 1.5 serves of *milk, yoghurt, cheese and alternatives* per day.
- One in ten (10%) Australians aged two years and over met the recommended number of serves of dairy and alternatives.
- One in fourteen (7.2%) females met their recommended number of serves for dairy and alternatives compared with one in eight males (12%).

Lean meats and poultry, fish, eggs, tofu, nuts and seeds, and legumes/beans group

- The average consumption of *lean meats and alternatives* was around 1.7 serves per day for persons aged two years and over.
- Around 14% of Australians met the recommended consumption of *lean meats and alternatives*.
- Adults were more likely to meet their recommended number of serves of *lean meats and alternatives* than children (18% compared with 4.5%).

Grain (Cereal) foods group

- On average, Australians aged two years and over consumed around 4.5 serves of *grain (cereal)* foods.
- Almost one in three Australians (30%) met the recommended guidelines for *grain (cereal)* foods.
- Males were more likely to meet the guidelines for *grain (cereal)* foods than females (35% compared with 25%).

DO AUSTRALIANS DRINK PLENTY OF WATER?

The Guidelines also include the recommendation that Australians consume plenty of water. In 2011-12, the average amount of plain water, either tap or bottled, consumed by Australians was 1,064ml. An additional 325ml of water was consumed from non-discretionary beverages such as tea and coffee. Plain water contributed around half (50%) of Australians' total beverage consumption.

WHAT ABOUT DISCRETIONARY FOODS?

The Guidelines recommend that discretionary foods (i.e. those not necessary for nutrients but are often high in saturated fat, salt, sugar or alcohol) are only consumed sometimes and in small amounts. However, over one-third (35%) of total daily energy in 2011-12 came from foods and beverages classified as discretionary.² To remain consistent with the ADG, only non-discretionary food sources were counted towards the amounts of Five Food Groups consumed in comparisons with recommendations.

ENDNOTES

1. National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*. Canberra: Australian Government. <https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf>, Last accessed 05/05/2016

2. See discussion of Discretionary foods from 4364.0.55.007 - *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, <<http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/4364.0.55.007~2011-12~Main%20Features~Discretionary%20foods~700>>

Measuring the consumption of food groups from the Australian Dietary Guidelines

MEASURING THE CONSUMPTION OF FOOD GROUPS FROM THE AUSTRALIAN DIETARY GUIDELINES

The 2013 Australian Dietary Guidelines (ADG) provide evidence-based guidance for all Australians on the amounts and types of foods and dietary patterns required for optimal health and wellbeing.¹ Whilst the ADG consist of five Guidelines (see Appendix 1), the major focus of this publication was to analyse consumption of foods groups within Guideline 2, these are referred to as the 'Five Food Groups' and comprise:

- Grain (cereal) foods, mostly wholegrain and/or high cereal fibre varieties
- Vegetables and legumes/beans
- Fruit
- Milk, yoghurt, cheese and/or other alternatives, mostly reduced fat
- Lean meats and poultry, fish, eggs, tofu, nuts and seeds and legumes/beans

In addition to the recommendations of servings from the Five Food Groups, the ADG recommend drinking plenty of water and recommend small allowances for unsaturated spreads and oils.

This publication uses the 2011-12 NNPAS to present data showing the population's usual consumption from each of the food groups and make comparisons with the recommended servings in the ADG for each age and sex group. A further objective is to break down the Five Food Groups into sub-groups to examine the relative contribution of those groups and also look at the form in which the foods were consumed.

METHODS

Because many foods recorded within the 2011-12 NNPAS were mixed foods (e.g. a lasagne may contain meat, vegetables, cereal and dairy foods), it was necessary to create a new database specifying the amounts of each of the Five Food Groups for each of the approximately 5,700 unique foods in the NNPAS. Development of the ADG database was undertaken by Food Standards Australia New Zealand (FSANZ) who designed the protocol and classification for assigning proportions foods to food groups. This database complements the underlying nutrient database (known as AUSNUT 2011-13) and may be accessed along with the detailed explanatory notes from the FSANZ website.²

Treatment of discretionary foods

The ADG (Guideline 3 in particular) provides clear advice that Australians should limit their intake of discretionary foods which are characterised as nutrient poor and energy dense and are often high in saturated fat, salt or added sugars.¹ Therefore, in order to be consistent with the Guidelines only foods that were classified as non-discretionary³ were included when reporting against the ADG recommendations (regardless of whether those discretionary foods have ingredients that would otherwise be considered as belonging to the Five Food Groups). However, the ADG database distributed all AUSNUT foods into the Five Food Groups irrespective of whether the food was classified as non-discretionary or discretionary, and this information is used for some supplementary analysis estimating of how much extra serves were consumed if the Five Food Group components within discretionary food was counted.

Usual Intakes

Estimates of the proportions of the population meeting/not meeting the minimum recommended number of serves were based on 'usual intakes', which are modelled estimates of the amounts usually consumed by population groups. Usual intakes were

modelled from two non-consecutive 24 hour dietary recalls collected from 2011-12 NNPAS. These estimates differ from the actual proportions meeting/not meeting based on a single day's intake, because on any day, a respondent may have more or less than their usual amount. Therefore, analysis of usual intakes is the preferred method of estimating the proportion of the population who in the long-run would consume above or below a target amount. All estimates of the distribution of consumption (including proportions of people who were above or below recommended amount) were based usual intakes. However, where overall averages consumption is presented or where food groups are broken down by contribution of sub-groups and where the amount of discretionary component is analysed, means (averages) based on a single day's consumption were used. For more information, see Australian Health Survey: Usual Nutrient Intakes, 2011 12, cat. no. 4364.0.55.008.

Under-reporting

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 food groups consumed in this publication may be an underestimate of the true amounts consumed. See the AHS Users' Guide for more information on under-reporting.

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ENDNOTES

1. National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*. Canberra: Australian Government. <https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf>_Last accessed 05/05/2016
2. 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/ausnut/>>
3. For more information on the development of the discretionary foods classification see the 4363.0.55.001 - Australian Health Survey: Users' Guide, 2011-13 available from: <<http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/4364.0.55.007~2011-12~Main%20Features~Discretionary%20foods~700>>

Vegetables, legumes and beans

VEGETABLES AND LEGUMES/BEANS

The ADG advice to “enjoy plenty of vegetables, including different types and colours, and legumes/beans” is a long standing message supported by an accumulating body of evidence.¹ In addition to being a vital source of vitamins, minerals and fibre, *vegetables and legumes/beans* can help reduce a person's risk of developing chronic conditions such as cardiovascular disease, diabetes and certain cancers. A further and related benefit of a diet rich in *vegetables and legumes/beans* is to help to maintain healthy body weight when consumed in place of energy-dense foods.^{1,2}

How much is a serve of vegetables*?¹

A standard serve is about 75 g (100-350 kJ) or:

- ½ cup cooked green or orange vegetables (for example, broccoli, spinach, carrots or pumpkin)
- ½ cup cooked dried or canned beans, peas or lentils**
- 1 cup green leafy or raw salad vegetables
- 1 medium tomato

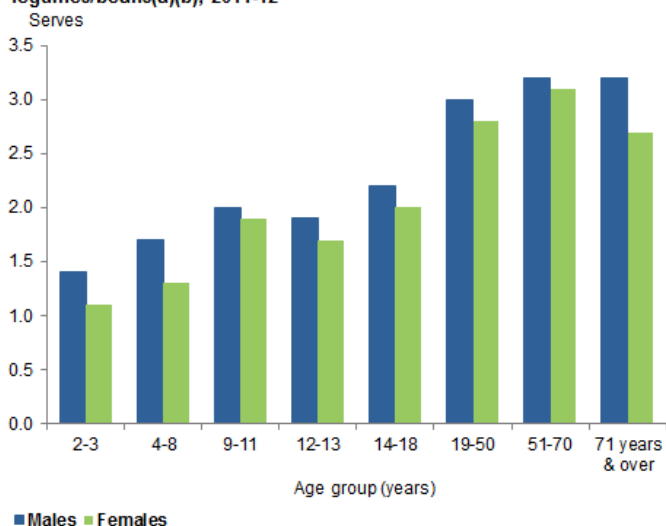
*With canned varieties, choose those with no added salt

**Legumes/beans also contribute to serves within the Lean meats and alternatives group, see Glossary for more information

HOW MANY SERVES OF VEGETABLES AND LEGUMES/BEANS WERE CONSUMED?

In 2011-12, Australians usually consume an average 2.7 serves of *vegetables and legumes/beans* from non-discretionary sources. The average number of serves of *vegetables and legumes/beans* consumed generally increased with age, with adults (aged 19 years and over) having almost twice that of children (2-18 years) 3.0 serves compared with 1.8 serves.

Persons 2 years and over - Mean serves of vegetables and legumes/beans(a)(b), 2011-12



(a) Based on Day 1. See Glossary for definition.

(b) From non-discretionary sources.

Source: National Nutrition and Physical Activity Survey, 2011-12.

HOW MANY PEOPLE MET THE RECOMMENDED NUMBER OF VEGETABLES AND LEGUMES/BEANS SERVES?

Less than 4% of the population consumed the minimum recommended number of serves of *vegetables and legumes/beans* on a usual basis. Among children, it was estimated that less than 1% usually met their recommended number of serves. Although the proportions of adults consuming the recommended number of serves of vegetables was higher than children, they were still a very small minority, the highest rates being for males aged 71 years and over and females aged 51-70 years (8.3% and 7.5% respectively).

Vegetables and legumes/beans: Recommended number of usual serves, median serves consumed and proportion meeting recommendation

Age group (years)	Recommended minimum (a) Serves		Median (b) Serves		Proportion meeting recommendation (b) %	
	Males	Females	Males	Females	Males	Females
2-3	2½	2½	1.4	1.1	1.0	0.1
4-8	4½	4½	1.6	1.3	0.0	0.0
9-11	5	5	1.8	1.8	0.7	0.5
12-13	5½	5	2.0	1.7	0.4	0.4
14-18	5½	5*	2.1	1.9	0.5	0.7
19-50	6	5*	2.8	2.7	1.7	4.2
51-70	5½	5	3.1	3.0	5.5	7.5
71 +	5	5	3.0	2.7	8.3	4.3

(a) National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*

https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf

(b) From non-discretionary sources

Source: National Nutrition and Physical Activity Survey, 2011-12

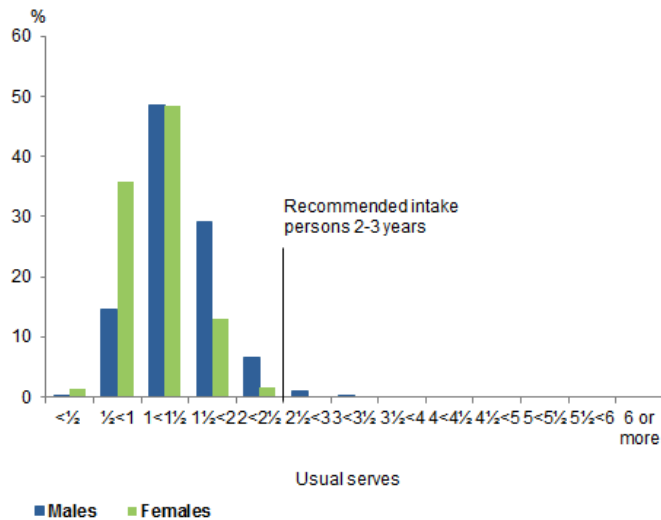
*For breastfeeding women, the recommended usual serves of vegetables is 5½ serves for women aged 14-18 years and 7½ serves for women aged 19-50 years. However, both the pregnant and breastfeeding populations have been excluded from this analysis.

...Young children 2-8 years

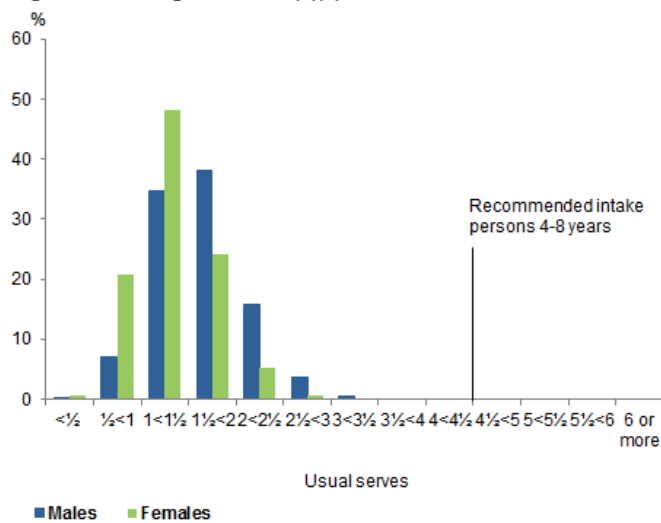
Less than one percent of the 2-3 year olds met the recommended 2½ serves of *vegetables and legumes/beans* per day. Around three quarters (74%) consumed less than 1½ serves, including around one-quarter (26%) who usually ate less than 1 serve.

While the 4½ serves recommended for the 4-8 year olds is 2 serves higher than recommended for the 2-3 year olds, the 4-8 year olds only consumed an extra 0.2 of a serve more on average. The median amount consumed by the 4-8 year olds was 1.5 serves with 13% consuming 2 or more serves.

Persons 2-3 years - Usual serves consumed per day of vegetables and legumes/beans(a)(b), 2011-12



Persons 4-8 years - Usual serves consumed per day of vegetables and legumes/beans(a)(b), 2011-12

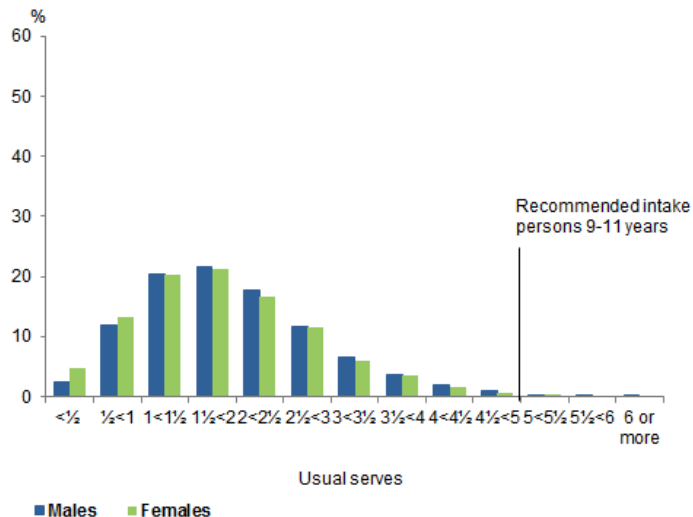


(a) Usual intake. See Glossary for definition.
 (b) From non-discretionary sources.
 Source: National Nutrition and Physical Activity Survey, 2011-12.

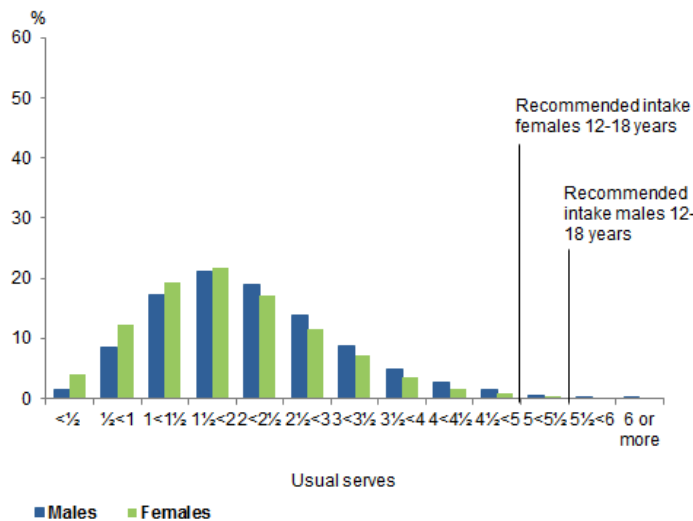
...Children and adolescents 9-18 years

Five serves of vegetables per day are recommended for females aged 9-18 years and males aged 9-11, while for 12-18 years males the ADG recommendation is for 5½ serves per day. Less than 1% of any of these groups managed to meet their respective recommendations, with the great majority (96%) consuming less than 4 serves and half of them consuming less than 1.9 serves (ranging from 1.7 for 12-13 years females and 2.1 for 14-18 years males).

Persons 9-11 years - Usual serves consumed per day of vegetables and legumes/beans(a)(b), 2011-12



Persons 12-18 years - Usual serves consumed per day of vegetables and legumes/beans(a)(b), 2011-12



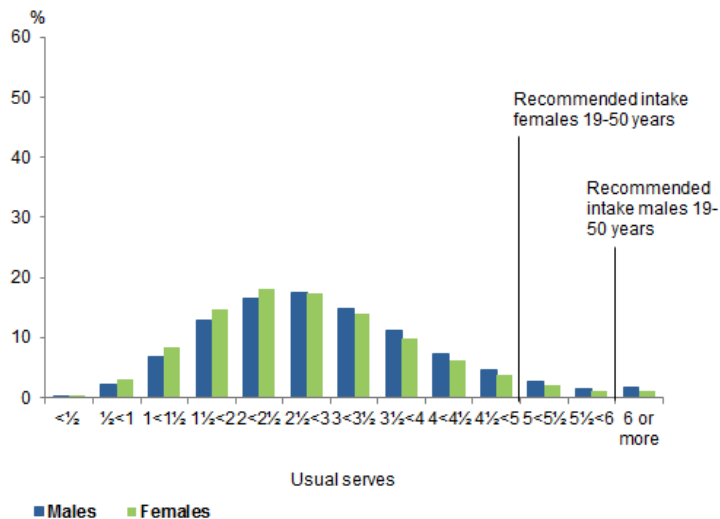
(a) Usual intake. See Glossary for definition.
 (b) From non-discretionary sources.
 Source: National Nutrition and Physical Activity Survey, 2011-12.

...Adults 19 years and over

The recommended number of serves for vegetables and legumes/beans for males aged 19-50 years is 6 serves per day - the highest of any group. Less than 2% of males this age consumed 6 serves per day on a usual basis, with half usually consuming 2.8 serves per day.

Females aged 19-50 years are recommended 5 serves per day, which was met by 4.2%, while half these women usually consume less than 2.7 serves per day.

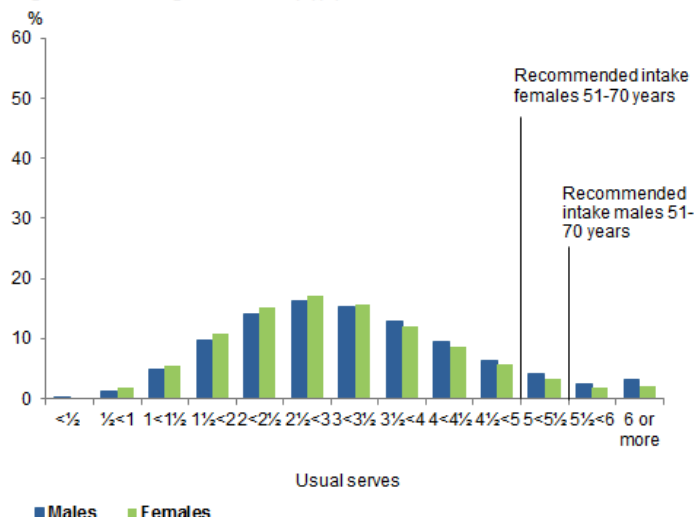
Persons 19-50 years - Usual serves consumed per day of vegetables and legumes/beans(a)(b), 2011-12



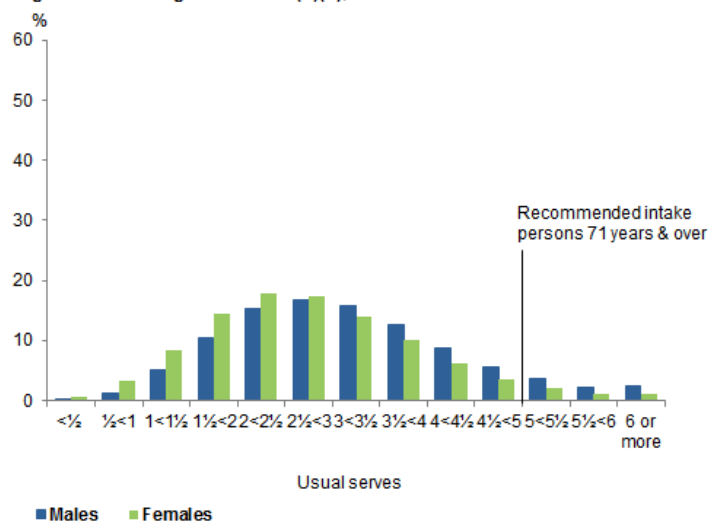
(a) Usual intake. See Glossary for definition.
 (b) From non-discretionary sources.
 Source: National Nutrition and Physical Activity Survey, 2011-12.

Older males, both the 51-70 year olds and the 71 years and over groups were more likely than the younger adults aged 19-50 years to meet their recommendations of 5 (males 71 years and over) or 5½ (males 51-70) serves (6.2% compared with 1.7%). While this was in part due to the lower minimum requirement for the older age groups it is also reflective of higher vegetable consumption, with the median serves for these age groups being 3.1 and 3.0 respectively compared with 2.8 for the 19-50 years group.

Persons 51-70 years - Usual serves consumed per day of vegetables and legumes/beans(a)(b), 2011-12



Persons 71 years & over - Usual serves consumed per day of vegetables and legumes/beans(a)(b), 2011-12

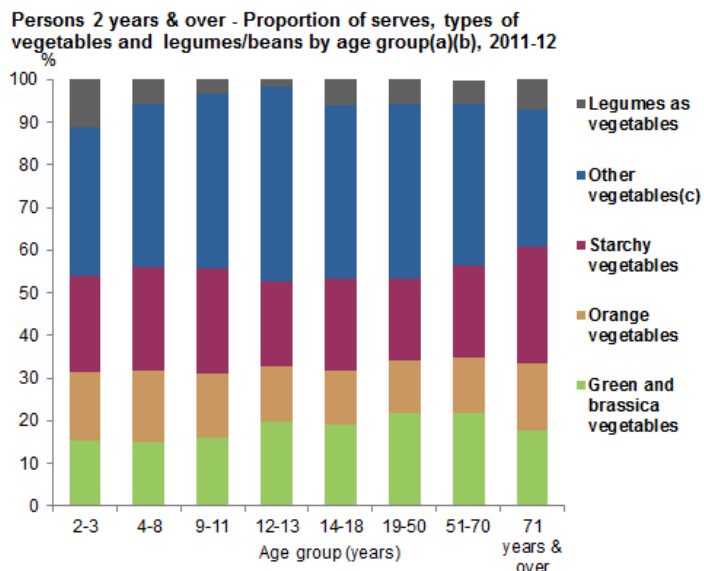


(a) Usual intake. See Glossary for definition.
 (b) From non-discretionary sources.
 Source: National Nutrition and Physical Activity Survey, 2011-12.

Females aged 51-70 years were the female group with the highest vegetable consumption with 7.5% meeting the recommended 5 serves per day and half consuming 3.0 serves per day. Females aged 71 years and over had similar levels of vegetable consumption as the 19-50 year olds with 4.3% meeting the recommendations and a median consumption of 2.7 serves.

TYPES OF VEGETABLES AND LEGUMES/BEANS

Serves of *vegetables and legumes/beans* from non-discretionary sources comprised green and brassica (21%), starchy vegetables (21%), orange vegetables (13%), and the largest group being the 'other' category (includes vegetables such as tomato, cucumber, zucchini, mushroom) with 39%.



(a) Based on Day 1. See Glossary for definition.

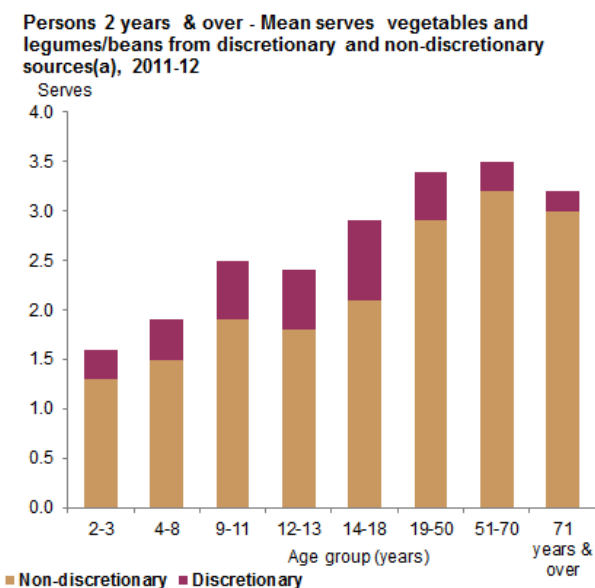
(b) From non-discretionary sources.

(c) Included tomato, capsicum, mushroom, zucchini, squash and other vegetables. For a list of included vegetables in each category see Appendix 2.

Source: National Nutrition and Physical Activity Survey, 2011-12.

VEGETABLES AND LEGUMES/BEANS FROM DISCRETIONARY SOURCES

The ADG recommendations for serves of the vegetables group does not include vegetables from foods flagged as discretionary, however, if they had been counted in the total consumption of the ADG vegetables food group, average usual serves would have increased by 0.4 serves from 2.7 to 3.1. The age group with highest potential contribution from discretionary sources of vegetables was children and young people aged 12-18 years where the increase from discretionary sources would be 0.7 serves from 2 to 2.7.



(a) Based on Day 1. See Glossary for definition.

Source: National Nutrition and Physical Activity Survey, 2011-12.

The most common type of vegetables consumed from discretionary sources was potatoes with chips, fries and similar products making up 39% of the discretionary vegetables while potato snack foods (such as potato crisps) made up 23%. These were followed by pastry products (which include vegetable spring rolls, dumplings and pies and pasties (11%), then gravies and savoury sauces (mostly tomato sauces) making up another 12%) and mixed dishes where cereal is the major component (such as higher saturated fat pizzas and burgers) at 7%.

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ENDNOTE

1. National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*. Canberra: Australian Government. <https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf>, Last accessed 05/05/2016

2. Legumes/beans also contribute to lean meats and alternatives group. For more information about the food groups refer to Explanatory Notes.

Fruit

FRUIT

Fruits, like vegetables, are rich in vitamins, minerals and fibre, and dietary patterns including daily *fruit* consumption can help prevent chronic conditions such as cardiovascular disease and certain cancers.¹ Other health benefits associated with consuming fruits include a reduced risk of obesity and weight gain.¹

Fruits in the form of fresh, frozen, canned, dried or juices are all suitable foods to be enjoyed as part of a healthy diet.¹

How much is a serve of fruit?¹

A standard serve is about 150 g (350 kJ) or:

- 1 medium apple, banana, pear or orange
- 2 small apricots, kiwi fruits or plums
- 1 cup diced or canned fruit (no added sugar)

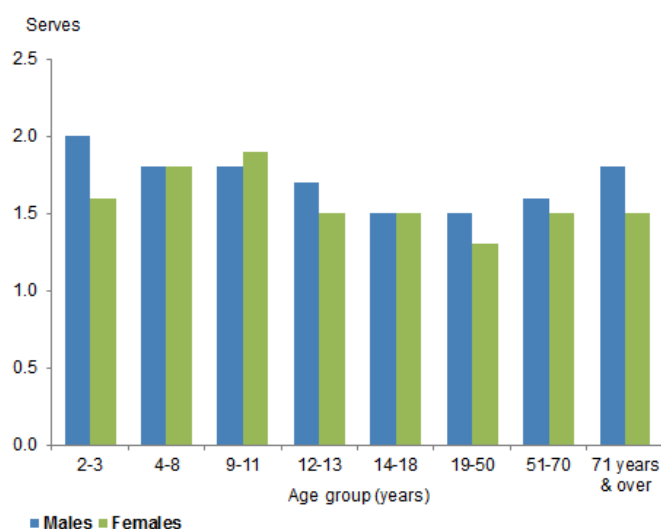
Or only occasionally:

- ½ cup fruit juice (no added sugar)
- 30 g dried fruit

HOW MANY SERVES OF FRUIT WERE CONSUMED?

In 2011-12, Australians usually consume an average of 1.5 serves of total *fruits* from non-discretionary sources. Children on average consumed more serves of total *fruits* than adults (1.7 compared with 1.5), particularly among those aged 2-11 years, who consumed an average of 1.8 serves. On average, males consumed only slightly more fruit (around 0.1 of a serve) than females.

Persons 2 years & over - Mean serves of fruit(a)(b), 2011-12



(a) Based on Day 1. See Glossary for definition.

(b) From non-discretionary sources.

Source: National Nutrition and Physical Activity Survey, 2011-12.

HOW MANY PEOPLE MET THE RECOMMENDED NUMBER OF FRUIT SERVES?

Nearly one-third (31%) of the Australian population consumed the recommended number of serves of *fruit* on a usual basis. The youngest age groups were most likely to meet the recommendations with 78% of 2-3 year olds and 59% of 4-8 year olds usually consuming at least one and one and half serves respectively. In contrast, females aged 19-50 years had the lowest rate with 20% usually consuming the recommended 2 serves of *fruit* per day.

Fruit: recommended number of usual serves, median serves consumed and proportion meeting recommendation

Age group (years)	Recommended minimum (a) Serves		Median (b) Serves		Proportion meeting recommendation (b) %	
	Males	Females	Males	Females	Males	Females
2-3	1	1	1.6	1.5	79.7	76.0
4-8	1½	1½	1.8	1.6	61.8	56.7
9-11	2	2	1.7	1.9	41.0	45.0
12-13	2	2	1.5	1.5	33.9	34.1
14-18	2	2	1.1	1.3	25.7	28.2

19-50	2	2	1.2	1.1	25.9	20.0
51-70	2	2	1.4	1.4	32.9	27.2
71 +	2	2	1.7	1.4	39.6	26.5

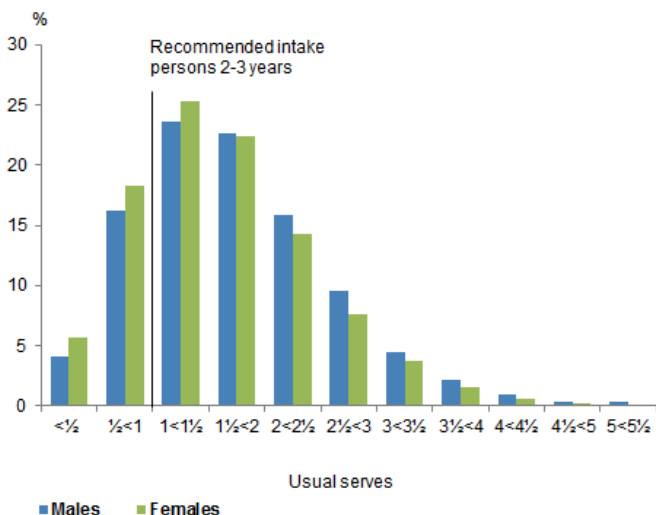
(a) National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*
https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf
 (b) From non-discretionary sources.
 Source: National Nutrition and Physical Activity Survey, 2011-12

... Young children 2-8 years

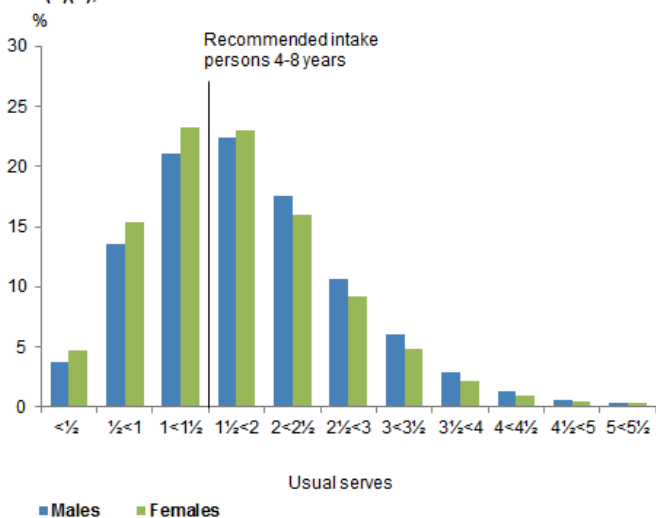
The recommended number of *fruit* serves for children aged 2-3 years is 1 serve per day. Almost four out of five (78%) of them met that recommendation, including 31% who consumed 2 or more serves per day. Of the children who consumed less than 1 serve, the majority (17% of all children that age) had at least half a serve.

Children aged 4-8 years are recommended to have 1½ serves of *fruit* per day, which is 50% more than the 2-3 year olds, yet they consumed a similar amount. Not surprisingly then, the proportion of children aged 4-8 years meeting the recommended fruit serves was lower at 59%. However, most (22%) of those who did not meet the recommended minimum were short by half a serve or less.

Persons 2-3 years - Usual serves consumed per day of fruit(a)(b), 2011-12



Persons 4-8 years - Usual serves consumed per day of fruit(a)(b), 2011-12



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

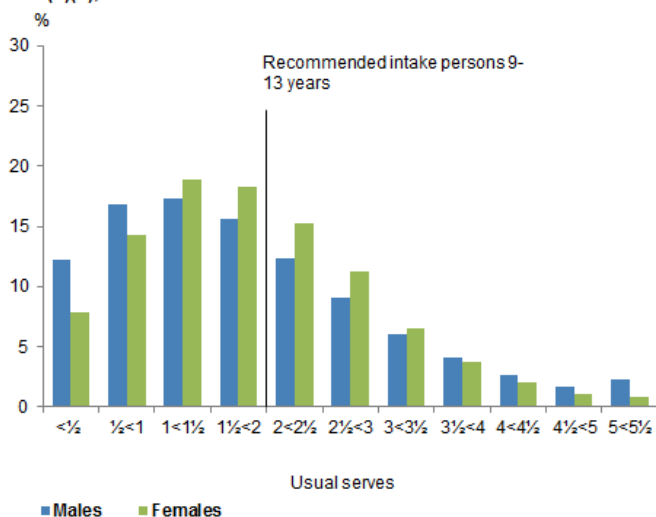
... Children and adolescents 9-18 years

Consuming at least 2 serves of *fruit* per day is recommended for all children and adolescents aged 9 years and over – which is also the recommendation for all adults.

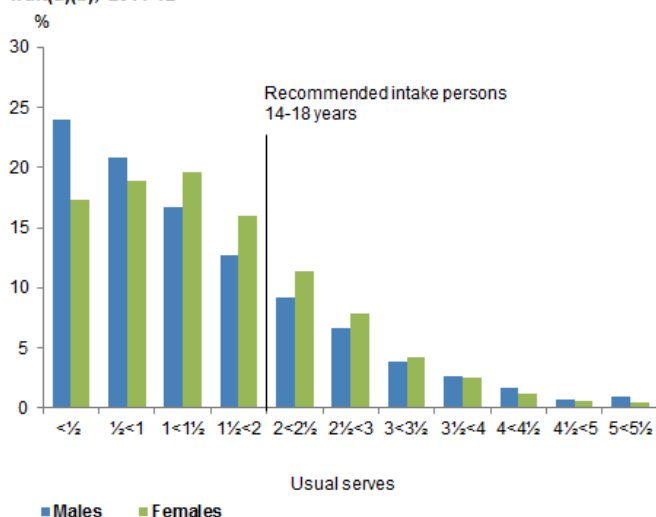
Some 39% of children and adolescents aged 9-13 years met the recommended 2 serves of *fruit* per day. While another 17% were within half a serve of the recommendation, there remained one-quarter this age who usually consumed less than 1 serve.

Among adolescents aged 14-18 years, nearly three quarters were below the recommended guidelines (73%) and over half (59%) were having less than 1½ serves, including 41% who usually consumed less than 1 serve per day.

Persons 9-13 years - Usual serves consumed per day of fruit(a)(b), 2011-12



Persons 14-18 years - Usual serves consumed per day of fruit(a)(b), 2011-12



(a) Usual intake. See Glossary for definition.

(b) From non-discretionary sources.

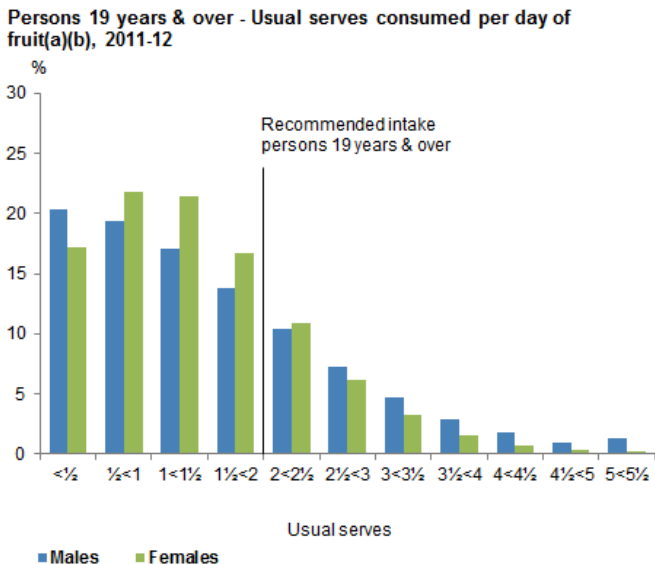
Source: National Nutrition and Physical Activity Survey, 2011-12.

... Adults 19 years and over

Around a quarter of the adult population met the recommended *fruit* consumption guidelines of 2 serves per day (26%), and over half (59%) had less than $1\frac{1}{2}$ serves on a usual basis. Although the proportion of total *fruit* consumers was higher among females on any given day in 2011-12, overall they were less likely to meet the recommended number of serves than males (23% compared with 29%), as males who did consume *fruit* ate larger amounts.

Among males, those aged 19-50 years had the lowest usual consumption of *fruit* with just over a quarter meeting the recommended two serves per day (26%). In contrast, males aged 51-70 years and 71 years and over were more likely to meet the *fruit* guidelines (33% and 40%, respectively), with the median serves for these age groups being 1.4 and 1.7 respectively compared with 1.2 for the 19-50 years age group.

Likewise, females aged 19-50 years were the least likely to meet recommended *fruit* consumption, with half the population eating less than 1.1 serve per day. On the other hand, females aged 51 years and over were more likely to meet the recommendation (27%), with the median serves for these age groups being 1.4.



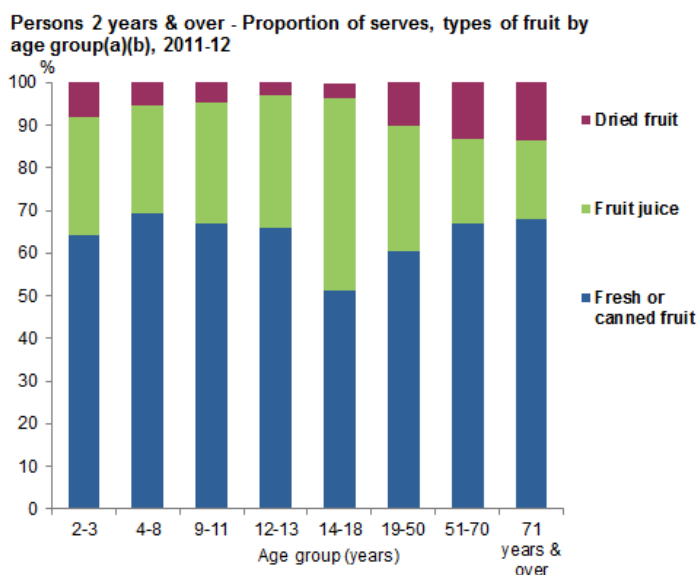
(a) Usual intake. See Glossary for definition.
 (b) From non-discretionary sources.
 Source: National Nutrition and Physical Activity Survey, 2011-12.

FORM OF FRUITS CONSUMED

On average, the greatest proportion of serves consumed comprised of fresh or canned fruits contributing 63%, followed by fruit juices with 27% and the least from dried fruit with 9.8%. Although all three forms of fruits have been counted in the numbers of serves of *fruit* consumption, the Guidelines advise that fruit juices and dried fruits be consumed only occasionally as substitutes for fresh fruit. This is because most fruit juices lack dietary fibre and tend to be high in acidity (which can contribute to increased risk of dental caries) and the concentrated form of dried fruit makes it more energy dense.¹

The percent contribution of fresh or canned fruits, fruit juices or dried fruits varied according to age. In particular, children had a greater share from fruit juice than adults (32% compared with 25%), while dried fruits made up a greater proportion of adult serves than children's (11% compared with 4.8%). Although there was no significant difference in fresh or canned fruits consumption between children and adults, adolescents aged 14-18 years were the least likely to consume fresh or canned fruits on any given day in 2011-12 (51%). Instead, a larger proportion of their *fruit* consumption was made up of fruit juices compared with the rest of the population (45% compared with 27%).

Among the adult population, the form of fruits consumed differed between males and females. Females, especially those aged 51 years and over, had a higher proportion of fresh or canned fruits as part of their daily serve of fruits than males (67% compared with 60%). In contrast, males were more likely than females to consume fruit juices (28% compared with 22%).



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

HOW MANY PEOPLE MET THE RECOMMENDED NUMBER OF FRUIT SERVES IF FRUIT JUICES AND DRIED FRUITS

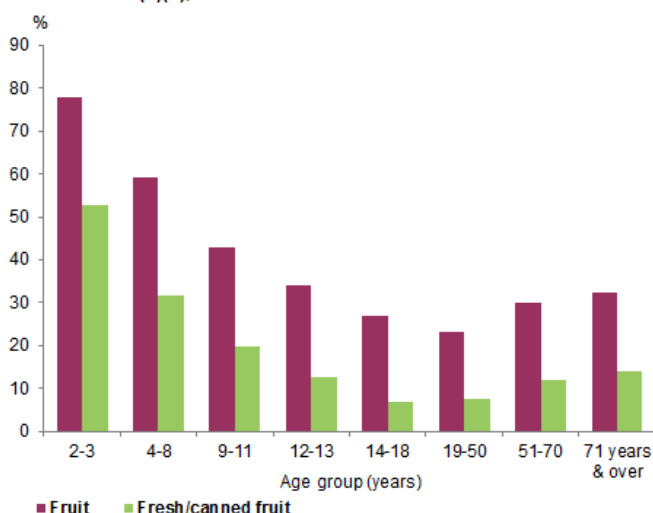
WERE EXCLUDED?

Limiting the analysis to include fresh and canned fruit only shows the proportion of Australians meeting the minimum recommended number of *fruit* serves at 12% which was less than half as many people than when the fruit juice and dried fruit are included (31%).

Similar to the pattern observed for total fruits, the proportion of people meeting minimum recommended number of *fruit* serves based on fresh or canned fruit only decreased steadily with age among younger age groups, before a slight increase from the 51-70 years age group.

The greatest reliance on fruit juice and dried fruits to total ADG fruit group consumption was among adolescents aged 14-18 years, where the proportion meeting guidelines would drop from 27% to 6.7% if fruit juices and dried fruits were excluded. For adolescents almost half their serves of fruit comprised fruit juices and dried fruits. This reflects a typical *fruit* serve consumed by adolescents which was almost half comprised fruit juices and dried fruits.

Persons 2 years & over - Proportion meeting guidelines for serves of fruit(a)(b), 2011-12



(a) Usual intake. See Glossary for definition.

(b) From non-discretionary sources.

Source: National Nutrition and Physical Activity Survey, 2011-12.

TYPES OF FRUIT

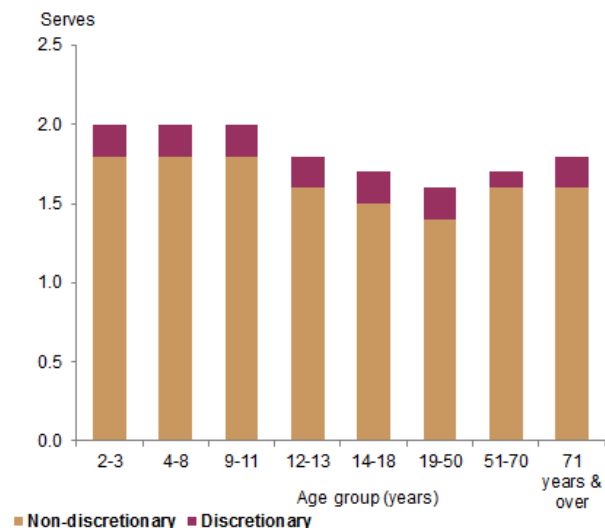
Of the fresh/canned fruit, apples contributed the highest proportion of serves (29%), followed by bananas (19%), stone fruit (11%) oranges (8.1%) and pears (6.9%).

FRUIT FROM DISCRETIONARY SOURCES

The ADG recommendation for serves of the fruit group does not include fruit from food sources flagged as discretionary, however, if they had been counted in the total consumption of the ADG fruit food group, average usual serves would have increased by 0.2 serves from 1.5 to 1.7. This would increase average total fruit consumption of children aged 2-8 years from 1.8 to 2 serves, almost twice their daily recommended number of fruit serves. However, people aged 12 years and over would still fall short of meeting their minimum recommended daily serves of fruit by at least 0.2 serves.

The most common discretionary food sources consumed containing *fruit* was non-alcoholic beverages (62%). These include 48% of fruit drinks (made from concentrates), 11% of cordials and 3.3% of soft drinks. Cereals and cereal products was the next greatest contributor, making up 22% of the fruit from discretionary food sources, with cake and cake mixes at 16% followed by sweet pastry products at 4.5%. Other food products such as jams, and muesli and cereal bars contributed approximately 3.8% and 3.6%, respectively.

Persons 2 years & over - Mean serves fruit from discretionary and non-discretionary sources(a), 2011-12



(a) Based on Day 1. See Glossary for definition.

Source: National Nutrition and Physical Activity Survey, 2011-12.

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ENDNOTES

1. National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*. Canberra: Australian Government. <https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf>, Last accessed 05/05/2016

Milk, yoghurt, cheese and alternatives

MILK, YOGHURT, CHEESE AND ALTERNATIVES

Certain dairy products and their non-dairy alternatives are an essential component of a healthy diet. Milk, cheese and yoghurt are rich sources of calcium, protein, vitamins and minerals. The Australian Dietary Guidelines (ADG) recommends choosing low fat varieties for everyone over two years as full fat varieties can increase the saturated fat content of the diet and reduced fat varieties enable nutrient guidelines to be met without exceeding energy requirements. Full fat varieties are recommended for children under two.¹

Alternatives are available for those who avoid dairy. Products such as calcium-enriched soy or rice drinks count towards the serves in this food group. Other products high in calcium such as almonds, tofu, seafood, fish with bones and many plant foods may also be consumed as alternatives but are not included in this analysis for the *milk, yoghurt, cheese and alternatives* food group.²

A key finding from previous analysis of nutrition data from the Australian Health Survey was that nearly three quarters of females (73%) and half of all males (51%) aged two years and over did not meet usually meet their Estimated Average Requirements (EAR) for calcium from foods and beverages (see Australian Health Survey: Usual Nutrient Intakes, 2011 12, cat. no. 4364.0.55.008).

How much is a serve of milk, yoghurt, cheese and alternatives*?¹

A standard serve is (500-600 kJ) or:

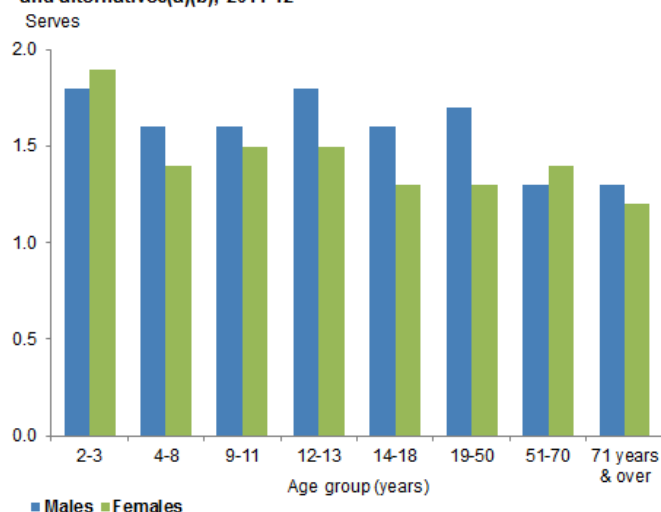
- 1 cup (250 ml) fresh, UHT long life, reconstituted powdered milk or buttermilk
- ½ cup (120 ml) evaporated milk
- 2 slices (40 g) of hard cheese, such as cheddar
- ¾ cup yoghurt

*Choose mostly reduced fat

HOW MANY SERVES OF MILK, YOGHURT, CHEESE AND ALTERNATIVES WERE CONSUMED?

In 2011-12, Australians aged two years and over consumed an average 1.5 serves of dairy and/or alternatives per day, with children aged 2-3 years being the highest consumers (1.9 serves per day) and people aged 71 years and over consuming the least with an average 1.2 serves per day. Males generally consumed slightly more than females, although the only statistically significant difference was for 14-18 years and 19-50 years where males on average consumed an extra 0.3 and 0.4 serves respectively compared with females.

Persons 2 years & over - Mean serves of milk, yoghurt, cheese and alternatives(a)(b), 2011-12



(a) Based on Day 1. See Glossary for definition.

(b) From non-discretionary sources.

Source: National Nutrition and Physical Activity Survey, 2011-12.

HOW MANY PEOPLE MET THE RECOMMENDED NUMBER OF MILK, YOGHURT, CHEESE AND ALTERNATIVES SERVES?

The ADG recommends greater amounts (3½ serves) be consumed in adolescence (12-18 years) and also in older adulthood (3½ serves for males 71 years and over and 4 serves for females aged 51 years and over).

A comparison of the usual number of serves consumed against the recommendations shows that around one in ten (10%) Australians consumed sufficient dairy products and/or alternatives to meet the recommendation. Children aged 2-8 years were most likely to meet the recommendation (43%) while 6.4% of people aged 9 years and over were able to do so, including less than 1% of people aged 71 years and over.

Milk, yoghurt, cheese and alternatives: Recommended number of usual serves, median serves consumed and proportion meeting recommendation

Age group (years)	Recommended minimum (a) Serves		Median (b) Serves		Proportion meeting recommendation (b) %	
	Males	Females	Males	Females	Males	Females
2-3	1½	1½	1.9	1.7	70.0	60.3
4-8	2	1½	1.5	1.3	26.3	40.2
9-11	2½	3	1.5	1.5	12.0	3.9
12-13	3½	3½	1.7	1.4	3.9	1.8
14-18	3½	3½*	1.6	1.1	2.5	0.5
19-50	2½	2½*	1.6	1.3	13.9	6.0
51-70	2½	4	1.2	1.2	5.4	0.1
71 +	3½	4	1.2	1.2	0.5	0.1

(a) National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*

https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf

(b) From non-discretionary sources

Source: National Nutrition and Physical Activity Survey, 2011-12

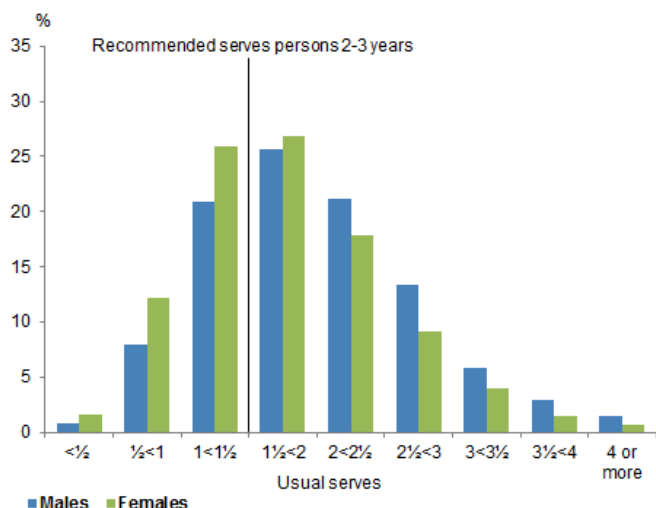
*For pregnant women up to 18 years of age the recommended usual intake of dairy is 3½ serves and 4 serves for breastfeeding women of the same age. For pregnant and breastfeeding women 15-50 years, the recommended usual intake of dairy is 2½ serves. However, both the pregnant and breastfeeding populations have been excluded from this analysis.

... Young children 2-8 years

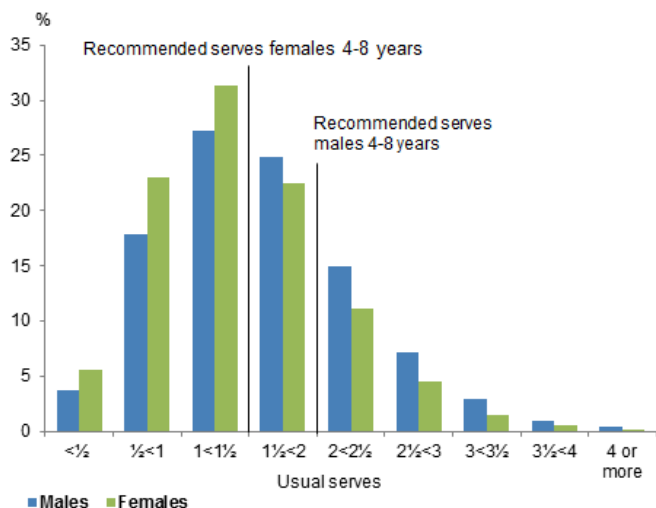
Almost two-thirds (65%) of the 2-3 year olds consumed the recommended 1½ serves of dairy and alternatives per day, including one in five who usually consumed 2½ or more serves per day. Among the 35% who did not meet the recommendation, the majority (23%) were only half a serve or less below the guidelines. While the recommended number of serves for 4-8 years females is the same as the 2-3 year olds, the 4-8 year old females consumed half a serve or less on average than their younger counterparts, resulting in a minority (40%) who met the recommended minimum of 1½ serves.

The recommendation for males aged 4-8 years is 2 serves per day (half a serve more than for the 2-3 years male age groups), yet they consumed slightly less (0.2 serves) on average, leaving just over one-quarter (26%) meeting the recommended 2 serves. However, a further 25% fell short by only half a serve or less than the recommended 2 serves.

Persons 2-3 years - Usual serves consumed per day of milk, yoghurt, cheese and alternatives(a)(b), 2011-12



Persons 4-8 years - Usual serves consumed per day of milk, yoghurt, cheese and alternatives(a)(b), 2011-12



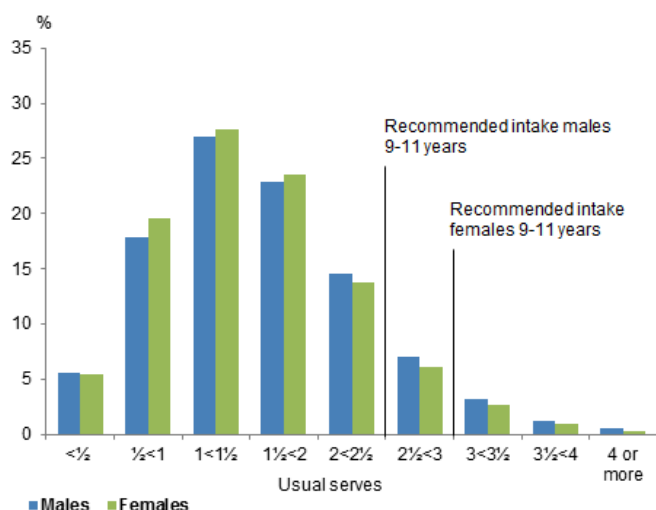
(a) Usual intake. See Glossary for definition.
 (b) From non-discretionary sources.
 Source: National Nutrition and Physical Activity Survey, 2011-12.

... Children and adolescents 9-18 years

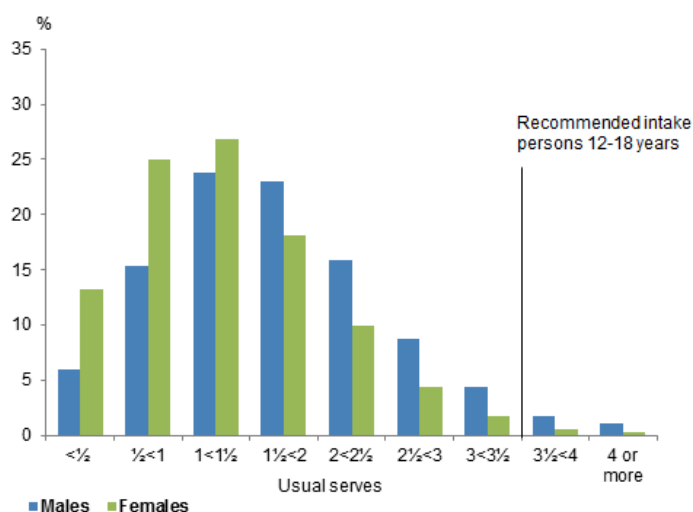
Less than 10% of children aged 9-11 years met the recommended $2\frac{1}{2}$ (for males) and 3 serves (females) per day. Half of the 9-11 year olds had less than $1\frac{1}{2}$ serves, including around one-quarter who usually had less than 1 serve per day.

The recommendation for adolescents aged 12-18 years is $3\frac{1}{2}$ serves per day. However, less than two percent consumed that amount, with the great majority (68% of males and 83% of females) usually having less than 2 serves per day and only the top 12% of consumers having $2\frac{1}{2}$ or more serves.

Persons 9-11 years - Usual serves consumed per day of milk, yoghurt, cheese and alternatives(a)(b), 2011-12



Persons 12-18 years - Usual serves consumed per day of milk, yoghurt, cheese and alternatives(a)(b), 2011-12



(a) Usual intake. See Glossary for definition.

(b) From non-discretionary sources.

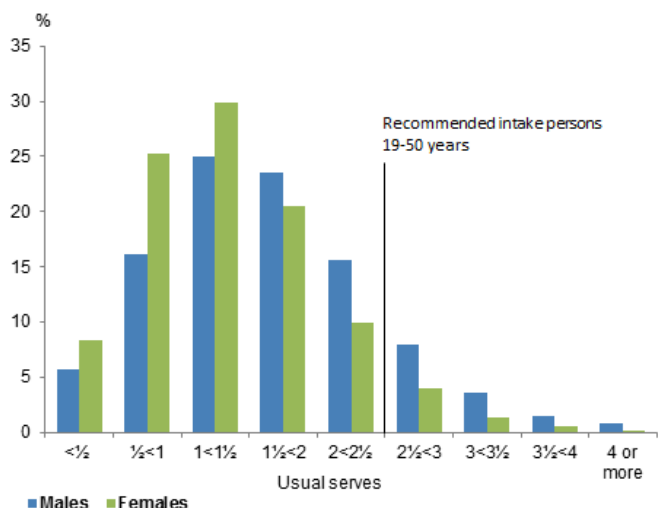
Source: National Nutrition and Physical Activity Survey, 2011-12.

... Adults 19 years and over

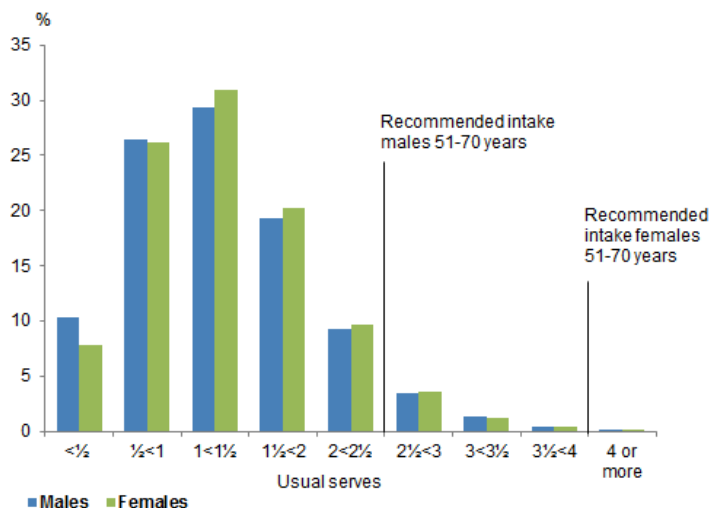
Overall, 14% of males and 6% of females aged 19-50 years usually consumed the recommended 2 1/2 serves of *milk, yoghurt, cheese or alternatives* per day. Half of males and females this age usually had less than 1.6 and 1.3 serves respectively, and around one-fifth of males and one-third of females usually consumed less than 1 serve per day.

At age 51-70 years, the recommended serves for males and females is 2 1/2 and 4 serves per day respectively. Around 5% of the males and less than 1% of females consumed their respective recommended number of serves, with around two-thirds of both males and females getting less than 1 1/2 serves.

Persons 19-50 years - Usual serves consumed per day of milk, yoghurt, cheese and alternatives(a)(b), 2011-12



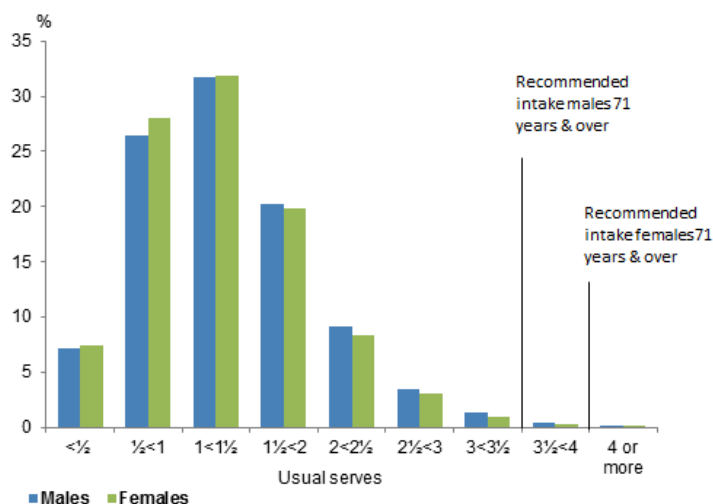
Persons 51-70 years - Usual serves consumed per day of milk, yoghurt, cheese and alternatives(a)(b), 2011-12



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

The ADG recommend that males and females aged 71 years and over consume 3 1/2 and 4 serves respectively. However, less than 1% of either males or females achieved the recommendation on a usual basis and half the male and female population aged 71 years males consumed less than one third of the recommendation, including around one third of males and females who usually consumed less than 1 serve per day.

Persons 71 years & over - Usual serves consumed per day of milk, yoghurt, cheese and alternatives(a)(b), 2011-12

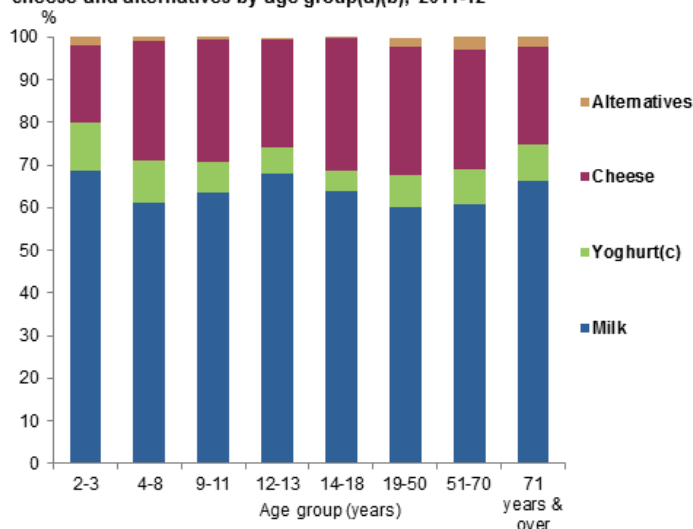


(a) Usual intake. See Glossary for definition.
 (b) From non-discretionary sources.
 Source: National Nutrition and Physical Activity Survey, 2011-12.

AMOUNTS FROM MILK, YOGHURT CHEESE AND ALTERNATIVES

The greatest proportion of serves on average come from dairy milk with 62% or 0.9 serves to the total non-discretionary *milk, yoghurt, cheese and alternatives* consumed. This was followed by cheese (29%), yoghurt and dairy snacks (7.9%) with less than 2% from dairy alternatives (such as calcium enriched soy and rice drinks).

Persons 2 years & over - Proportion of serves, milk, yoghurt, cheese and alternatives by age group(a)(b), 2011-12



(a) Based on Day 1. See Glossary for definition.
 (b) From non-discretionary sources.
 (c) Includes dairy snacks such as custard and fromage frais.
 Source: National Nutrition and Physical Activity Survey, 2011-12.

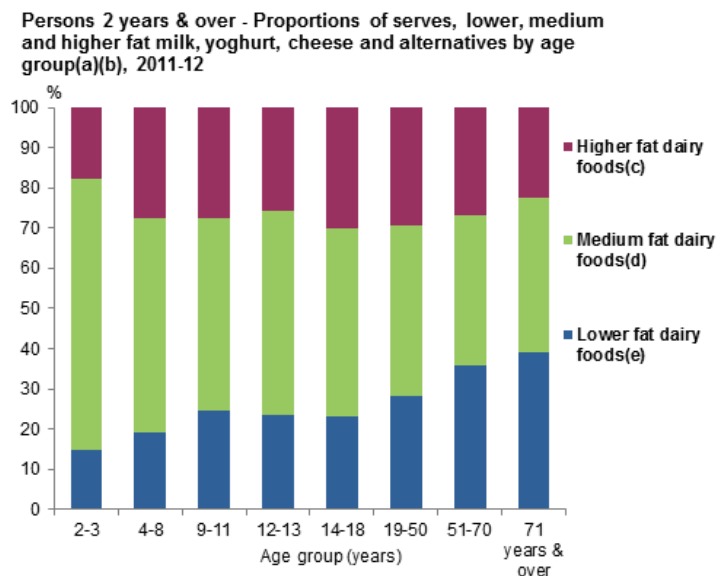
The majority (68%) of the milk consumed was in beverages (including 14% in café style coffee) with a further 26% was added to breakfast cereals.

The cheese contributing to the total non-discretionary *milk, yoghurt, cheese and alternatives* was most commonly consumed in sandwiches, rolls and on toast (42%). A further 12% was in (non-discretionary) pizza while 20% was consumed alone and not consumed as part of mixed dish or combined with other food, with the remainder being consumed in other mixed dishes and combinations.

... Higher, medium and lower fat varieties³

The ADG recommends choosing reduced fat varieties of *milk, yoghurt, cheese and alternatives* for everyone over two years on most occasions in order to ensure nutrient requirements are met without exceeding energy requirements. The lower fat sub-group (defined as including reduced fat milk and other products having less than 4 g of fat per serving)⁴ made up 29% of all non-

discretionary serves of the *milk, yoghurt, cheese and alternatives* group, but was generally a higher proportion among females than males (34% compared with 25%). The contribution of the lower fat relative to medium and higher fat choices was also closely associated with age, with the young children having 15% (2-3 year olds) and 19% (4-8 year olds) lower fat varieties, compared with 36% and 39% among people aged 51-70 years and 71 years and over, respectively. This pattern reflects the tendency for people to increasingly choose reduced fat milk and yoghurts in older age groups. For example, around half (49%) of milk consumed by people aged 51 years and over was reduced fat compared with 16% and 23% for the 2-3 and 4-8 year olds, respectively.



(a) Based on Day 1. See Glossary for definition.

(b) From non-discretionary sources.

(c) Includes mostly cheese and yoghurt with fat content greater than 10 g per 100 g.

(d) Includes reduced fat milk and alternatives plus yoghurt and cheese with fat content between 4 g and 10 g per serve.

(e) Includes reduced fat milk and alternatives plus yoghurt and cheese with fat content less than 4 g per 100 g.

Source: National Nutrition and Physical Activity Survey, 2011-12.

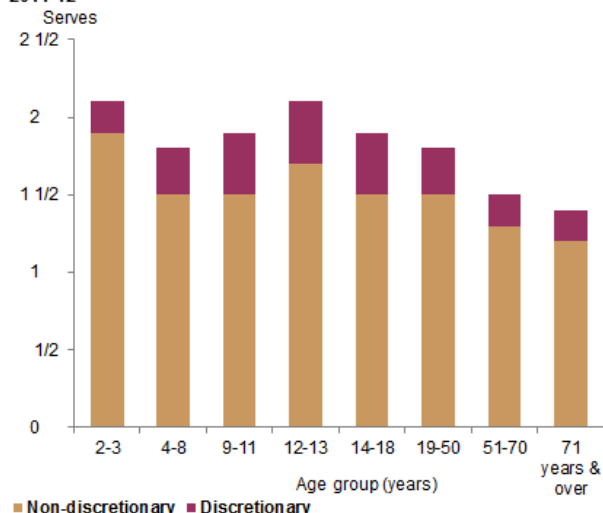
Medium fat products (defined as regular fat milk plus other products with a fat level between 4 to 10 g per serve) made up the largest share with 43% of the *milk, yoghurt, cheese and alternatives* food group. The contribution from medium fat product sub-group changes with age and food consumption patterns, for example, for younger age groups the relatively high consumption of the medium fat product sub-group compared to other age groups results in a low percentage contribution from reduced fat products.

The Higher fat component of the *milk, yoghurt, cheese and alternatives* group is almost entirely (99%) made up of cheese and contributed 28% of all the non-discretionary *milk, yoghurt, cheese and alternatives* food group. The slightly higher contribution among 14-18 year olds (30%) in part reflects a relatively low contribution from medium and lower fat products (e.g. milk and yoghurt) as the absolute amount of cheese (0.45 serves) was not significantly higher than overall (0.42 serves).

DISCRETIONARY SOURCES

The ADG recommendations for serves of the *milk, yoghurt, cheese and alternatives* group does not include food sources flagged as discretionary, however, if such foods were counted as contributing to the ADG milk, yoghurt, cheese and alternatives group, the average number of serves would be boosted from 1.5 to 1.7.⁵ The age group with the highest potential contribution from discretionary sources of dairy and alternatives were children and adolescents 9-18 years, where the increase from discretionary sources would be from 1.5 to 2 serves.⁵

Persons 2 years & over - Mean serves milk, yoghurt, cheese and alternatives from discretionary and non-discretionary sources(a), 2011-12



(a) Based on Day 1. See Glossary for definition.

Source: National Nutrition and Physical Activity Survey, 2011-12.

The most common discretionary sources of *milk, yoghurt, cheese and alternatives* were ice cream (24%), chocolate and chocolate-based confectionary (19%), high saturated fat pizza (9%) and cakes/ muffins/ scones and cake-type desserts (6%).

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ENDNOTES

1. National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*. Canberra: Australian Government. <https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf>, Last accessed 05/05/2016
2. The ADGs also lists several foods that are likely to contain a similar amount of calcium as a serve of milk, yoghurt or cheese. However, as these alternatives are all classified elsewhere they have not been included within 'dairy alternatives'. For more information, please see AHS ADG Classification system Explanatory Notes.
3. Lower fat products include reduced fat and skim milk, and yoghurt with less than 4g/100 g of fat. Higher fat dairy products include cheese and yoghurt with a fat content of greater than 10g/100 g. Medium fat products include cheese and yoghurt with a fat content between 4g and 10 g per 100 g. This group also includes regular fat milk, which although mostly has a fat level less than 4 g per 100 g, was included in medium fat to be consistent with the ADG modelling and recommendations. See AHS ADG Classification system Explanatory Notes.
4. National Health and Medical Research Council, 2011, A modelling system to inform the revision of the Australian guide to healthy eating, Canberra: Australian Government <https://www.eatforhealth.gov.au/sites/default/files/files/public_consultation/n55a_dietary_guidelines_food_modelling_111216.pdf> Last accessed 05/05/2016
5. May not necessarily add to total due to rounding.

Lean meats and alternatives

LEAN MEAT AND POULTRY, FISH, EGGS, TOFU, NUTS AND SEEDS AND LEGUMES/BEANS

The *lean meats and alternatives* group comprises a diverse group of foods both nutritionally and biologically. It incorporates foods from animal, seafood and plant sources including lean meats and poultry, fish, eggs, and plant based alternatives such as tofu, legumes/beans and nuts and seeds.¹

This group is an important source of protein as well as a range of micronutrients such as iodine, iron, zinc, vitamin B12 and long chain polyunsaturated fatty acids (omega-3s). Fish in particular has been found to have favourable associations with cardiovascular disease, dementia risk and age related macular degeneration.¹ Nut consumption has also been associated with favourable changes in cardiovascular disease markers. Red meats, while a rich source of nutrients, have been associated with increased risk of certain cancers when consumed in large amounts and thus guidelines recommend limiting their consumption.^{1,2}

How much is a serve of lean meats and alternatives*?¹

A standard serve is (500-600 kJ):

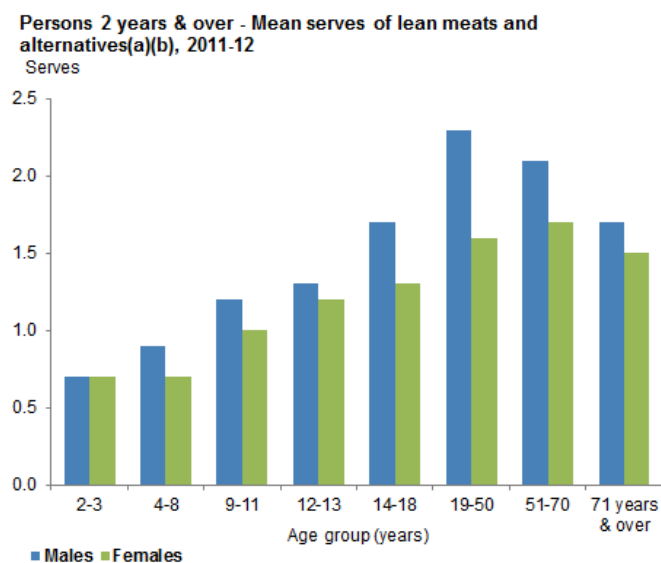
- 65 g cooked lean red meats such as beef, lamb, veal, pork, goat or kangaroo (about 90-100 g raw)
- 80 g cooked lean poultry such as chicken or turkey (100 g raw)
- 2 large eggs (120 g)
- 1 cup (150 g) cooked or canned legumes/beans such as lentils, chick peas or split peas
- 170 g tofu
- 30 g nuts, seeds, peanut or almond butter or tahini or other nut or seed paste**

*Choose those with no added salt

**Nuts/seeds also contribute to serves within the unsaturated fats and oils group, see Glossary and Appendix 2 for more information

HOW MANY SERVES OF LEAN MEATS AND ALTERNATIVES WERE CONSUMED?

In 2011-12, Australians consumed an average 1.7 serves of *lean meats and alternatives* from non-discretionary sources per day. The average consumption of *lean meats and alternatives* increased across age groups, peaking at 2.3 serves per day for males aged 19-50 years, and at 1.7 serves for females aged 51-70 years.



(a) Based on Day 1. See Glossary for definition.

(b) From non-discretionary sources.

Source: National Nutrition and Physical Activity Survey, 2011-12.

HOW MANY PEOPLE MET THE RECOMMENDED NUMBER OF SERVES OF LEAN MEATS AND ALTERNATIVES?

One in seven (14%) people met the recommended daily number of serves of *lean meats and alternatives* on a usual basis. Adults were more likely to meet the recommendation than children (17% compared with 4.5%) and males overall were more likely than females (18% and 10% respectively).

Lean meats and alternatives: Recommended number of usual serves, median serves consumed and proportion meeting recommendation

Age group (years)	Recommended minimum (a) Serves		Median (b) Serves		Proportion meeting recommendation (b) %	
	Males	Females	Males	Females	Males	Females
2-3	1	1	0.8	0.7	15.9	5.9
4-8	1½	1½	0.8	0.7	0.4	0.1
9-11	2½	2½	1.2	1.0	3.5	0.2
12-13	2½	2½	1.3	1.2	4.2	0.7
14-18	2½	2½*	1.7	1.3	14.9	1.4
19-50	3	2½*	2.2	1.6	17.5	5.3
51-70	2½	2	2.1	1.7	29.5	27.7
71 +	2½	2	1.7	1.4	16.3	12.2

(a) National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*

https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf

(b) From non-discretionary sources

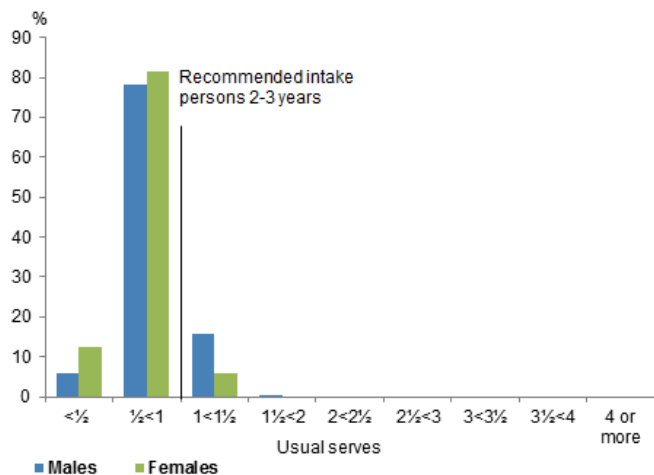
Source: National Nutrition and Physical Activity Survey, 2011-12

*For breastfeeding women, the recommended usual serves of vegetables is 2½ serves for women aged 14-18 years and 3½ serves for women aged 19-50 years. However, both the pregnant and breastfeeding populations have been excluded from this analysis.

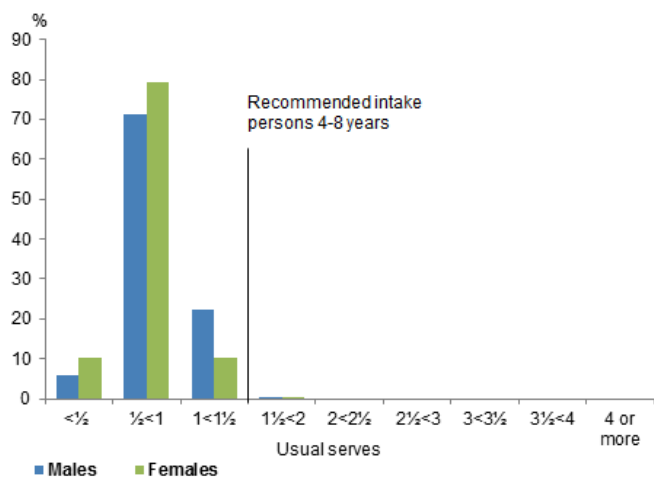
...Young children 2-8 years

Less than 16% of males and 6% of females aged 2-3 consumed the recommended 1 serve of *lean meats and alternatives* on a usual basis. However, around 80% of both males and females this age were within half a serve of the recommendation. The recommended number of serves of *lean meats and alternatives* for the 4-8 year age groups was half a serve higher at 1.5. However, with a very similar consumption pattern as the 2-3 year olds, less than 0.5% of the 4-8 year olds met the recommendation on a usual basis.

Persons 2-3 years - Usual serves consumed per day of lean meats and alternatives(a)(b), 2011-12



Persons 4-8 years - Usual serves consumed per day of lean meats and alternatives(a)(b), 2011-12



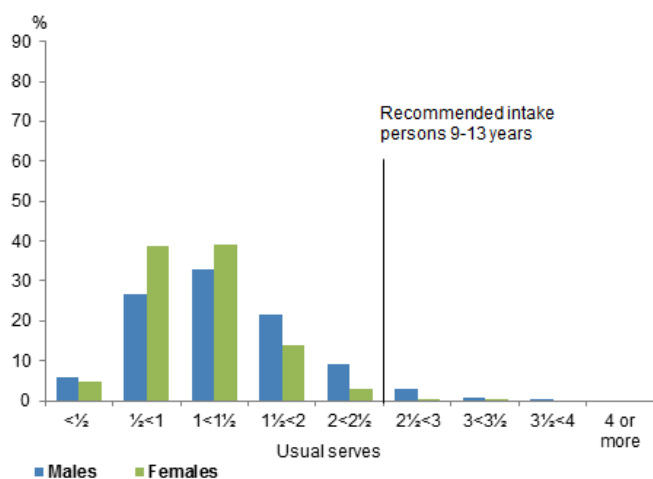
(a) Usual intake. See Glossary for definition.
 (b) From non-discretionary sources.
 Source: National Nutrition and Physical Activity Survey, 2011-12.

...Children and adolescents 9-18 years

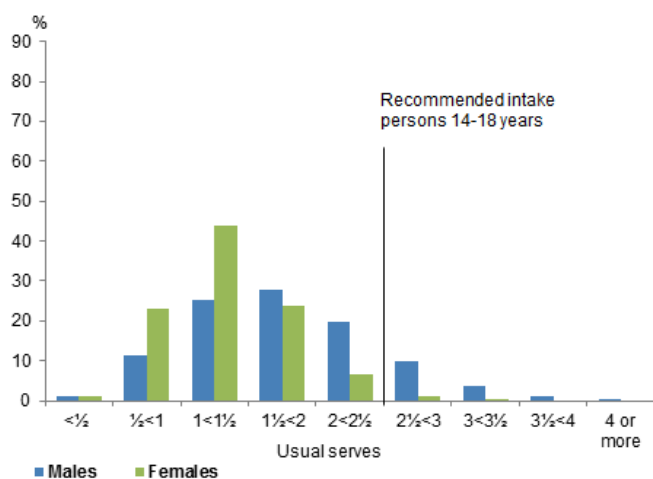
The recommended number of serves of *lean meats and alternatives* for males and females aged 9-18 years is 2 1/2 serves. Almost one in ten (9.5%) males this age reached this target with half (51%) consuming less than 1.5 serves. Less than 1% of females the same age were able to meet the 2 1/2 serve recommendation, with three-quarters of them usually consuming less than 1 1/2 serves per day.

Within the 9-18 years group, males aged 14-18 years were most likely to meet the recommendations with 15% consuming the 2 1/2 or more serves. Females aged 9-11 years were the least likely with just 0.2% consuming 2 1/2 or more serves and half consuming less than 1 serve.

Persons 9-13 years - Usual serves consumed per day of lean meats and alternatives(a)(b), 2011-12



Persons 14-18 years - Usual serves consumed per day of lean meats and alternatives(a)(b), 2011-12



(a) Usual intake. See Glossary for definition.

(b) From non-discretionary sources.

Source: National Nutrition and Physical Activity Survey, 2011-12.

...Adults 19 years and over

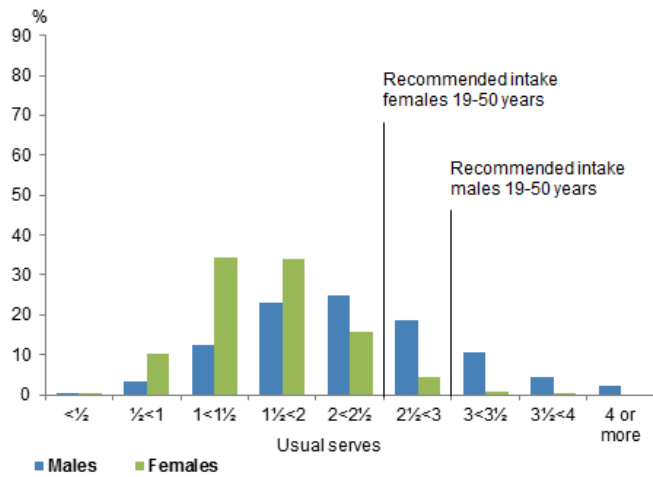
The recommended number of serves of *lean meats and alternatives* for males aged 19-50 years is 3 per day, which is the highest minimum of all groups. Some 18% of males this age met the recommendation and another 19% were within half a serve of the recommendation.

For females aged 19-50 years the recommendation is $2 1/2$ serves of *lean meat and alternatives* per day. While only one in twenty (5%) females this age consumed this amount, a further 16% were within half a serve of the target, leaving 79% consuming less than $1 1/2$ serves per day.

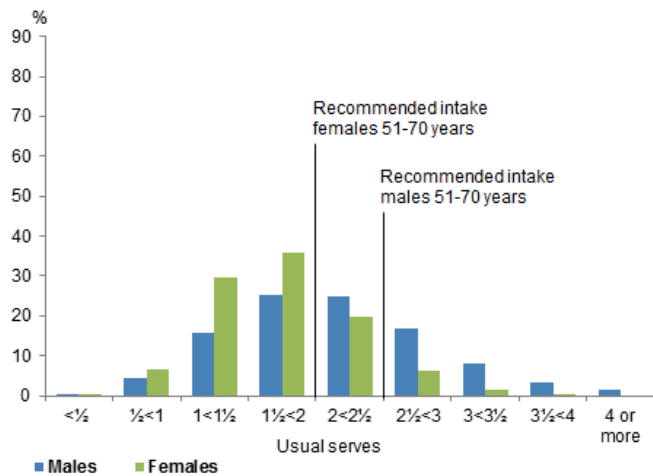
At age 51-70, 30% of males met the $2 1/2$ serves per day recommendation, which was the highest adherence for the *lean meats and alternatives* group. For females this age, the recommendation of 2 serves per day was achieved by 28% (the highest adherence among females) and a further 36% of females this age were within half a serve of the recommendation.

For males aged 71 years and over, the recommendation is $2 1/2$ serve of *lean meat and alternatives* per day. While 16% met the recommendations, there were another 20% who usually consumed only half a serve less. For females aged 71 years and over, 12% met the recommended 2 serves per day, with an extra 30% consuming only half a serve less.

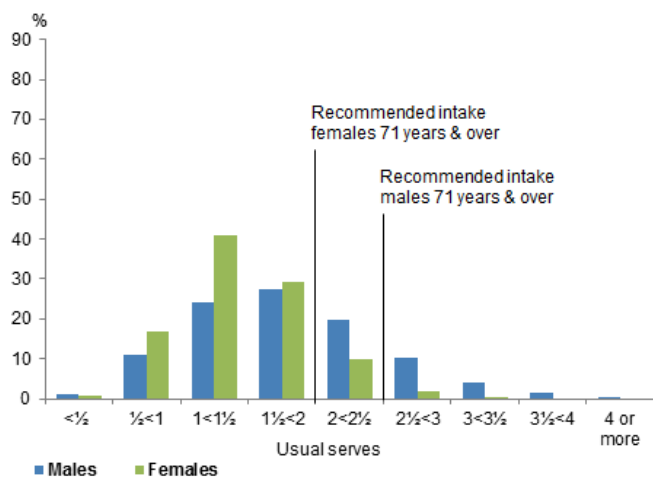
Persons 19-50 years - Usual serves consumed per day of lean meats and alternatives(a)(b), 2011-12



Persons 51-70 years - Usual serves consumed per day of lean meats and alternatives(a)(b), 2011-12



Persons 71 years & over - Usual serves consumed per day of lean meats and alternatives(a)(b), 2011-12



(a) Usual intake. See Glossary for definition.

(b) From non-discretionary sources.

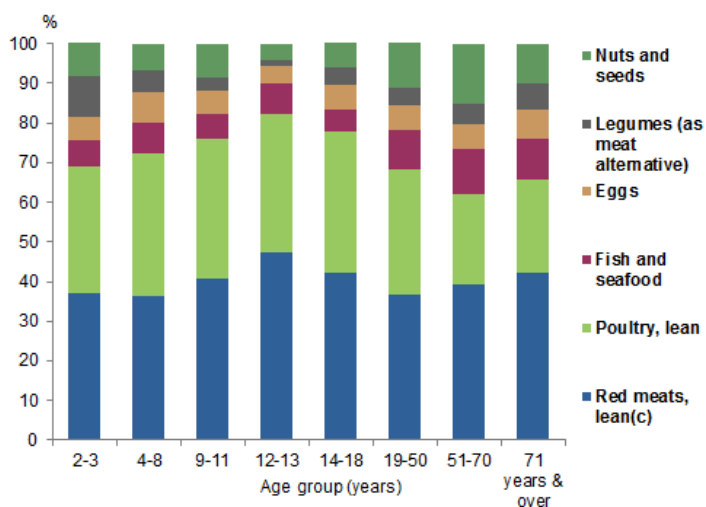
Source: National Nutrition and Physical Activity Survey, 2011-12.

TYPES OF LEAN MEAT AND ALTERNATIVES

Of the types of *lean meats and alternatives* that were consumed, red meats and poultry together made up two thirds (68%) of

consumption. Red meat including beef, veal, lamb, pork and kangaroo contributed the largest proportion (38%), with poultry making up 29%. This was followed by nuts and seeds (11%), fish and seafood (9.9%), eggs (6.2%) and legumes (4.8%).

Persons 2 years & over - Proportion of serves, types of lean meats and alternatives by age group(a)(b), 2011-12



(a) Based on Day 1. See Glossary for definition.

(b) From non-discretionary sources.

(c) Includes beef, veal, lamb, pork and kangaroo.

Source: National Nutrition and Physical Activity Survey, 2011-12.

CONSUMPTION OF NON-LEAN MEAT AND PROCESSED MEAT

The Australian Dietary Guidelines emphasise that meat consumption should be limited to the lean and unprocessed types. Processed meats are excluded due to the more direct link to cancer outcomes, high sodium content and lower nutritional value.^{1,2} The estimates of usual number of serves of *lean meat and alternatives* included foods defined as lean and unprocessed from the AHS ADG Classification system³ which used:

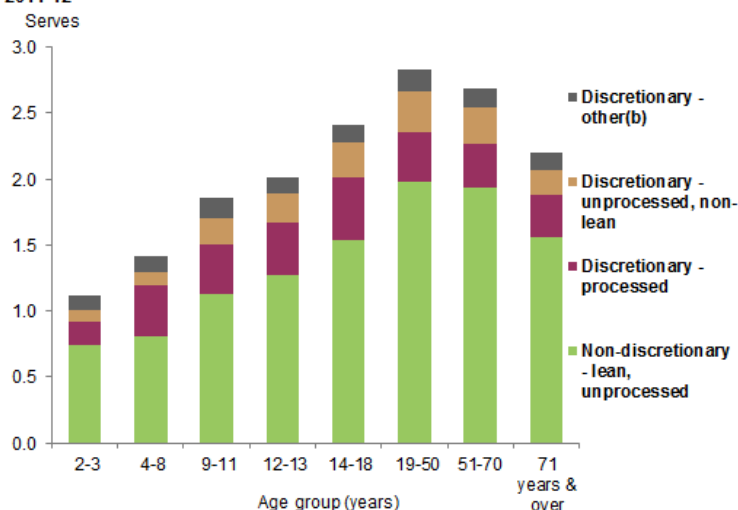
- <10% fat as the criteria for 'lean meat' (e.g. lower fat mince)
- the 'unprocessed' sub-classification only, in order to exclude meats such as ham, bacon, salami, and poultry luncheon meats.

In addition to these criteria, as for the other food groups, any sources of meats from foods that have been classified as discretionary (such as battered, deep-fried fish) were excluded.

The amount of consumption of non-lean meat was 0.5 serves per day, while an average 0.4 serves of processed meat was consumed. The largest amounts of processed meat were consumed by 14-18 year old males who had an average of 0.6 serves on a given day. Overall, the inclusion of higher fat and processed meats and all other discretionary sources of *lean meat and alternatives*, would add 0.8 serves of meat to the ADG average of 1.7 serves per day.

The most common sources of discretionary meats were higher fat sausages, contributing 14% of total discretionary meat. Lamb and mutton (of higher fat varieties⁵) was the next highest, making up 8%. Ham was the third highest, contributing 7%.

Persons 2 years & over - Mean serves lean meats and alternatives from discretionary and non-discretionary sources(a), 2011-12



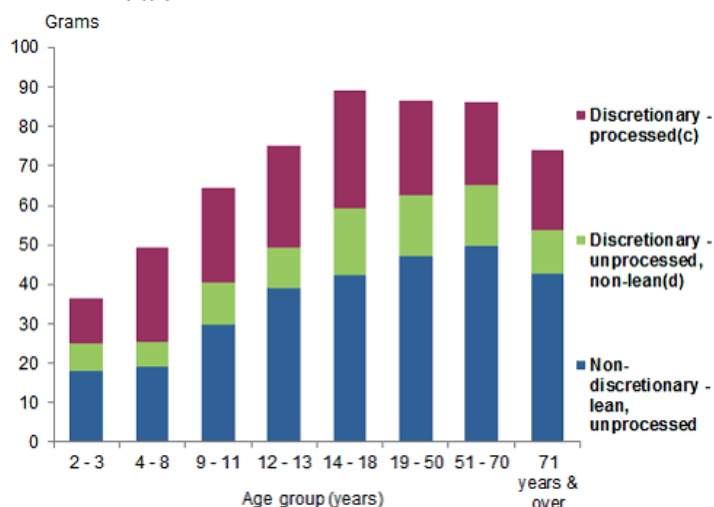
(a) Based on Day 1. See Glossary for definition.

(b) Includes foods such as battered fish and lean chicken in a spring roll.

Source: National Nutrition and Physical Activity Survey.

The Guidelines provide a further caveat around red meat consumption, recommending that the weekly consumption of red meat be limited to no more than 455 g due to the association of red meat to certain cancers when consumed in large amounts.^{1,2} Taking account of all red meat (including all non-discretionary, lean, discretionary, higher fat and processed varieties), the weekly consumption of red meat by Australians was estimated at an average 565 g – 24% higher on average than maximum suggested by the Guidelines. The age group with the highest total consumption of red meat was 14-18 year olds who averaged 625 g per week.

Persons 2 years & over - Mean grams of red meat consumed(a)(b), 2011-12



(a) Based on Day 1. See Glossary for definition.

(b) Includes beef, veal, lamb, pork and kangaroo.

(c) Includes meats such as ham, bacon and sausages made from red meat.

(d) Includes high fat unprocessed red meat plus lean unprocessed red meat found in discretionary dishes.

Source: National Nutrition and Physical Activity Survey, 2011-12.

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ENDNOTES

- National Health and Medical Research Council, 2011, A modelling system to inform the revision of the Australian guide to healthy eating, Canberra: Australian Government
<https://www.eatforhealth.gov.au/sites/default/files/files/public_consultation/n55a_dietary_guidelines_food_modelling_111216.pdf> Last accessed 05/05/2016
- Bouvard, V., Loomis, D., Guyton, K.Z., Grosse, Y., Ghissassi, F.E...Strauf, K. (2015). Carcinogenicity of consumption of red and processed meat. *The Lancet Oncology*, 16(16), 1599-1600. <[http://www.thelancet.com/journals/lanonc/article/PIIS1470-2045\(15\)00444-1/fulltext](http://www.thelancet.com/journals/lanonc/article/PIIS1470-2045(15)00444-1/fulltext)>, Last accessed 05/05/2016.
- Food Standards Australia New Zealand, 2016, *Assessing the 2011-13 AHS against the Australian Dietary Guidelines - Classification System and Database Development Explanatory notes*. Canberra: Australian Government
<<http://www.foodstandards.gov.au/science/monitoringnutrients/ausnut/>>, Last accessed 05/05/2016

4. Weekly consumption was calculated by multiplying Day 1 mean intake by 7. It includes all respondents, consumers and non-consumers.
5. Lamb and mutton from non-lean varieties with a fat content $\geq 10\%$.

Grains

GRAIN (CEREALS)

Grain (cereal) foods include products such as bread, breakfast cereals, pasta and tortilla which are mostly made from wheat, oats, rice, rye, barley, millet, quinoa and corn.

The Australian Dietary Guidelines recommend that Australians consume more wholegrain or high fibre products and less refined foods and that Australians should consume these *grain (cereal)* foods in preference to discretionary choices (such as cakes, muffins, pastries and biscuits that have high amounts of added saturated fats, added sugars and/or salt).¹

Eating grain foods, mostly wholegrain or high fibre, can help protect against heart disease, type 2-diabetes and excessive weight gain and may help reduce risk of some cancers.¹

How much is a serve of grain (cereal) foods*?¹

A standard serve is (500 kJ) or:

- 1 slice (40 g) of bread
- ½ cup (75-120 g) cooked rice, pasta, noodles, barley, buckwheat, semolina, polenta, bulgur or quinoa
- ¼ cup (30 g) muesli
- 3 (35 g) crispbreads

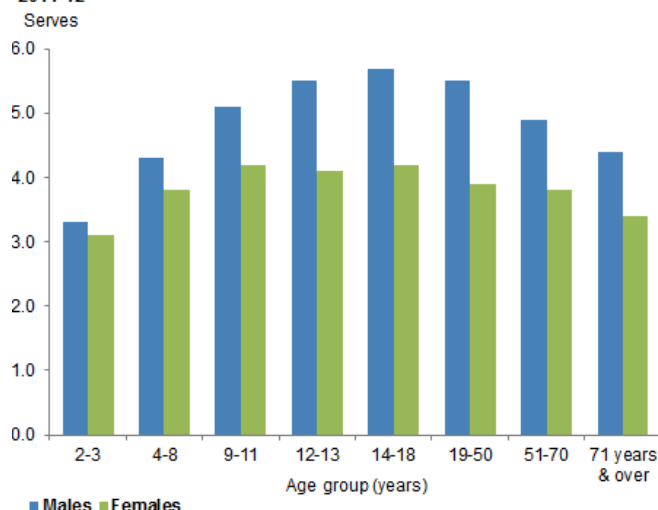
*Grain (cereal) foods, mostly wholegrain and/or high cereal fibre varieties

HOW MANY SERVES OF GRAIN (CEREAL) FOODS WERE CONSUMED?

In 2011-12, Australians aged two years and over consumed an average 4.5 serves of *grain (cereal)* foods from non-discretionary sources per day. On average, males consumed more of serves of *grain (cereal)* foods than females (5.1 serves compared with 3.8 serves).

The average number of serves consumed remained relatively stable for females aged 4 years and over (ranging from 3.8 to 4.2), with slightly less (3.4) consumed by females aged 71 years and over. There was a more steady increase across male age groups with the broad peak ranging from 5.5 to 5.7 serves for the males aged in age groups between 12 and 50 years.

Persons 2 years & over - Mean serves of grains (cereals)(a)(b), 2011-12



(a) Based on Day 1. See Glossary for definition.
 (b) From non-discretionary sources.

Source: National Nutrition and Physical Activity Survey, 2011-12.

HOW MANY PEOPLE MET THE RECOMMENDED NUMBER OF GRAIN (CEREALS) SERVES?

Comparing the usual number of serves consumed against the recommendations shows that around three in ten (30%) Australians consumed sufficient *grain (cereal)* foods to meet the recommendations.

Overall, males were more likely to meet the recommended number of serves of *grain (cereal)* foods than females (35% compared with 25%). The male groups with the higher proportion meeting recommendations were those aged 4-8, 9-11 and 71 years and

over with 58%, 49% and 52% respectively. Of females, those aged 9-11 years and 71 years and over had the highest proportion meeting recommendations, with 50% and 63%, respectively. In contrast, one in twenty females (4.6%) aged 14-18 usually consume 7 serves or more of *grain (cereal)* foods and meet the guidelines.

Grains (cereals): recommended number of usual serves, median serves consumed and proportion meeting recommendation

Age group (years)	Recommended minimum (a) Serves		Median (b) Serves		Proportion meeting recommendation (b) %	
	Males	Females	Males	Females	Males	Females
2-3	4	4	3.4	2.9	26.0	13.5
4-8	4	4	4.2	3.7	58.4	40.0
9-11	5	4	5.0	4.0	49.3	49.6
12-13	6	5	5.2	4.0	34.9	26.7
14-18	7	7*	5.5	4.0	22.8	4.6
19-50	6	6*	5.2	3.7	34.7	8.5
51-70	6	4	4.7	3.6	24.5	38.9
71 +	4½	3	4.6	3.4	51.8	62.7

(a) National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*

https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf

(b) From non-discretionary sources.

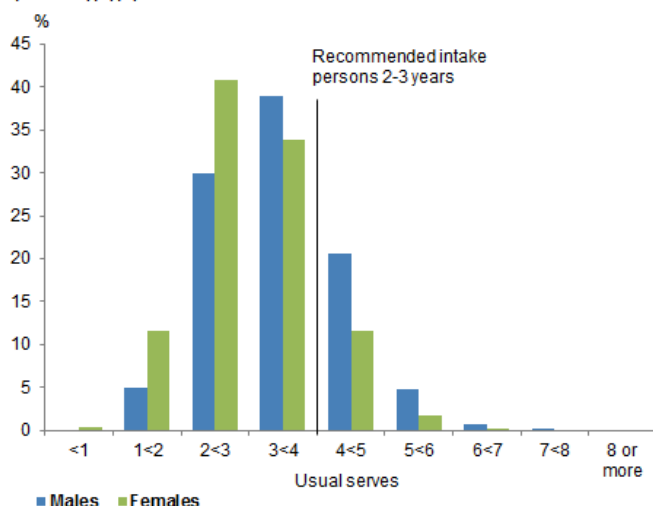
Source: National Nutrition and Physical Activity Survey, 2011-12.

* For breastfeeding women 14-50 years, the recommended usual intake of *grains (cereals)* is 9 serves and 8½ serves for pregnant women aged 19-50 years and 8 serves for pregnant women aged 14-18. However, both pregnant and breastfeeding populations have been excluded from this analysis.

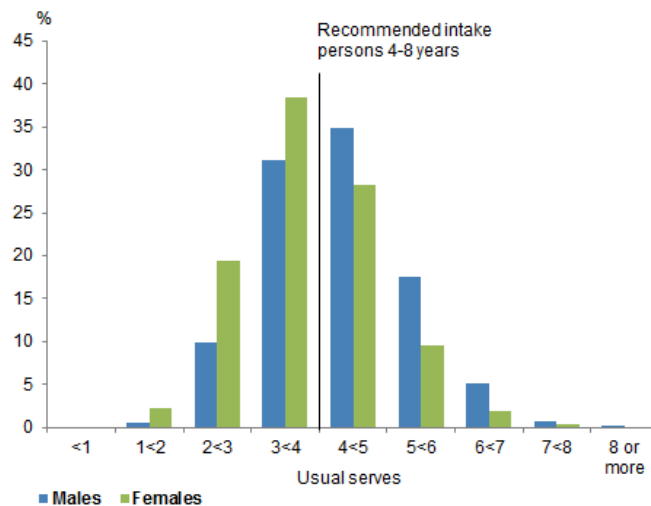
...Young children 2-8 years

The recommendation for all children aged 2-8 years is 4 serves of grains per day. However, reflecting the lower volume of food consumed in younger ages, children aged 2-3 years were less likely to meet the guidelines (20%) than those aged 4-8 years (49%). Males aged 2-8 years, were more likely than females to meet the guidelines (49% compared with 32%).

Persons 2-3 years- Usual serves consumed per day of grains (cereals)(a)(b), 2011-12



Persons 4-8 years- Usual serves consumed per day of grains (cereals)(a)(b), 2011-12



(a) Usual intake. See Glossary for definition.

(b) From non-discretionary sources.

Source: National Nutrition and Physical Activity Survey, 2011-12.

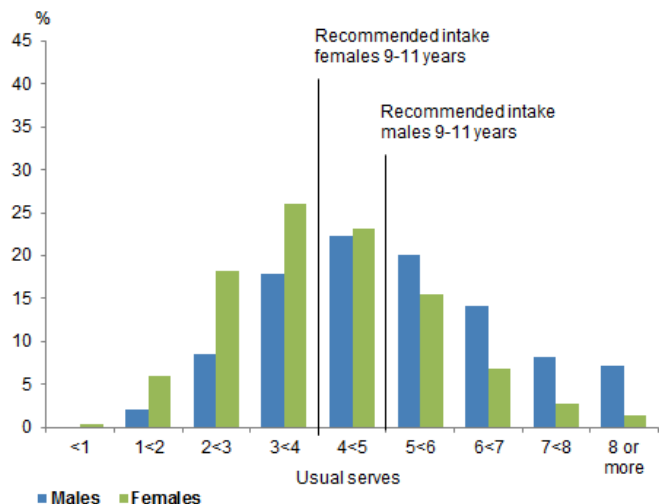
... Children and adolescents 9-18 years

Half of children aged 9-11 years met their recommended number of serves (4 for females and 5 for males) of *grain (cereals)* foods on a usual basis.

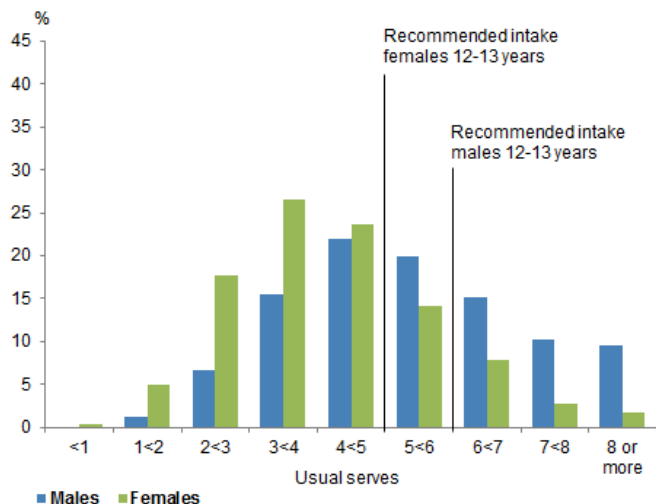
For those aged 12-13 years, the recommendation increases to 6 serves for males and 5 serves for females. In this age group, 35% of males and 27% of females met the guidelines. Over one fifth (21% of males and 24% of females aged 12-13 years) were within 1 serve of the recommendations.

The recommendation for adolescents aged 14-18 years is 7 serves per day, the most for any population group. Yet they were the least likely (14%) to meet their recommendation. Only one in twenty females aged 14-18 met the recommendation on a usual basis, with half of females (50%) aged 14-18 years consuming 4 or less serves. Whereas, almost a quarter of males (23%) aged 14-18 years consumed 7 or more serves of grains on a usual basis, with an additional 17% consuming 1 serve or less than the recommended number of serves.

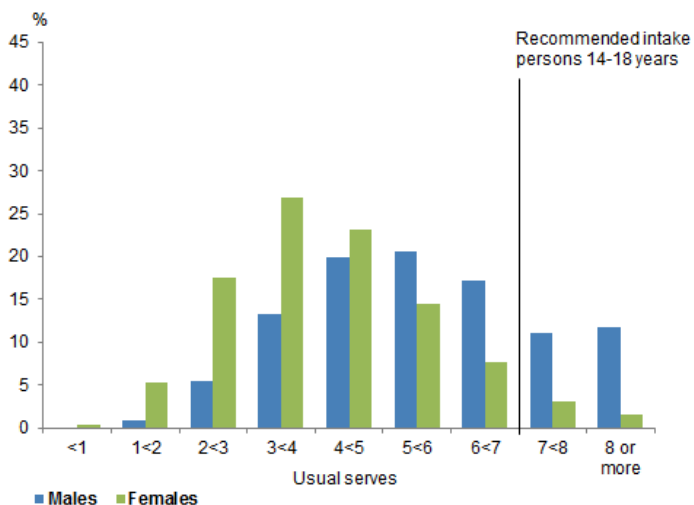
Persons 9-11 years- Usual serves - consumed per day of grains (cereals)(a)(b), 2011-12



Persons 12-13 years- Usual serves consumed per day of grains (cereals)(a)(b), 2011-12



Persons 14-18 years- Usual serves consumed per day of grains (cereals)(a)(b), 2011-12

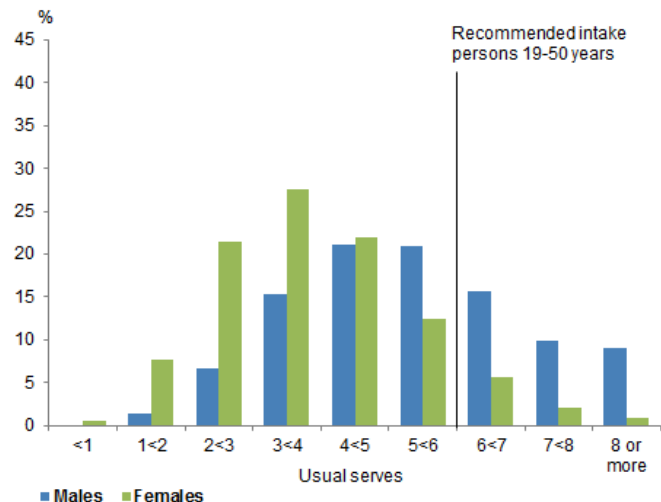


(a) Usual intake. See Glossary for definition.
 (b) From non-discretionary sources.
 Source: National Nutrition and Physical Activity Survey, 2011-12.

...Adults 19 years and over

The recommendation for both males and females aged 19-50 years is 6 serves of *grain (cereal)* per day. Over one in three (35%) males this age did consume 6 or more serves, which was four times the rate of females (8.5%) in the same age group.

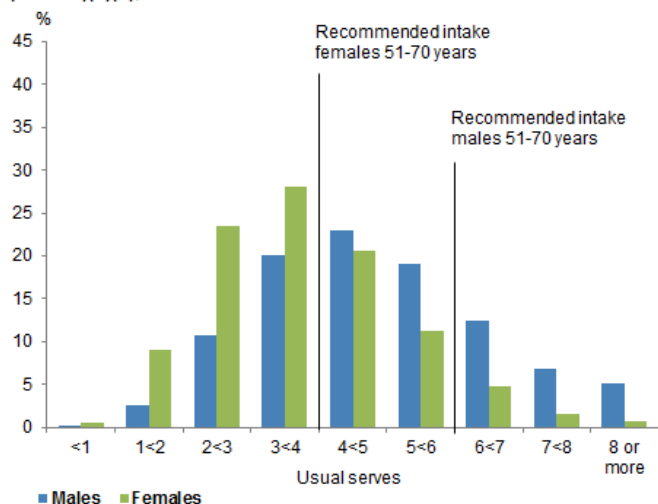
Persons 19-50 years - Usual serves consumed per day of grains (cereals)(a)(b), 2011-12



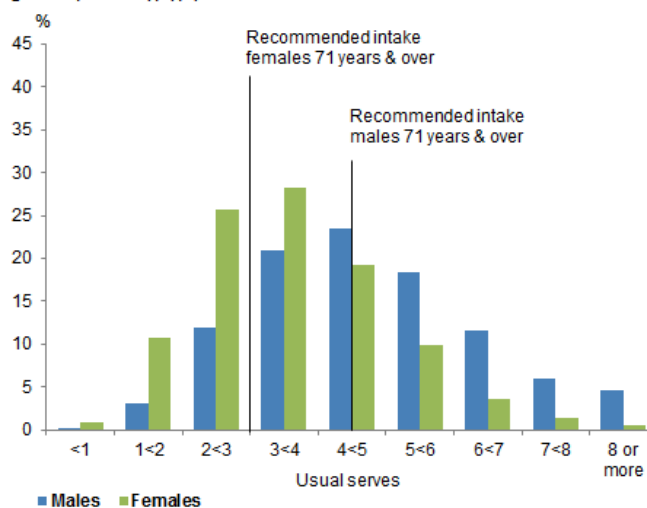
(a) Usual intake. See Glossary for definition.
 (b) From non-discretionary sources.
 Source: National Nutrition and Physical Activity Survey, 2011-12.

One-quarter of males (25%) aged 51-70 met the recommended 6 serves or more of grains, while 39% of females in the same age group meet their recommendation of 4 serves or more on a usual basis. The adult group most likely to meet the guidelines were females aged 71 years and over, where 62% met the recommended 3 serves or more of *grains (cereals)*. An additional 25% of females aged 71 years and over consumed more than 2 serves of grains on a usual basis but less than 3. Among males aged 71 years and over, around half (52%) usually consumed the recommended 4½ serves.

Persons 51-70 years - Usual serves consumed per day of grains (cereals)(a)(b), 2011-12



Persons 71 years & over - Usual serves consumed per day of grains (cereals)(a)(b), 2011-12



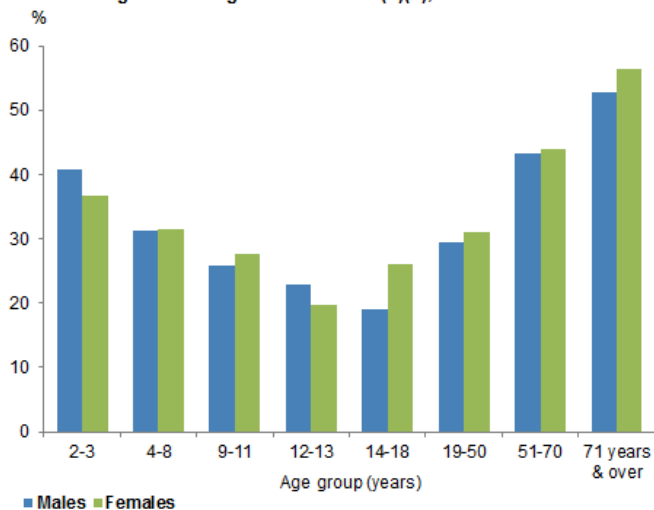
(a) Usual intake. See Glossary for definition.
 (b) From non-discretionary sources.
 Source: National Nutrition and Physical Activity Survey, 2011-12.

HOW MUCH IS WHOLEGRAIN OR HIGH FIBRE?

The Australian Dietary Guidelines recommend that at least two thirds of grain products should be wholegrain and/or higher fibre varieties.¹²

On a given day in 2011-12, around one-third (34%) of all *grain (cereal)* foods consumed by Australians were wholegrain or high fibre products. Wholegrains or high fibre made up over half of all grains (55%) consumed by persons aged 71 years and over which was double the proportion of wholegrains or high fibre consumed by adolescents aged 14-18 years (22% of total *grain (cereal)* foods).

Persons 2 years & over - Proportion of serves, grains (cereals) from wholegrain and high fibre varieties(a)(b), 2011-12



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

SOURCES OF GRAINS (CEREALS)

Regular breads, and bread rolls (plain/unfilled/untopped varieties) were the greatest source of grains with 36% coming from bread. Mixed dishes where cereal is the major ingredient (including non-discretionary savoury pasta/noodle or rice dishes, burgers and pizzas) was the second biggest contributor to the *grain (cereals)* food group (20% of total serves of grains). These were followed by ready to eat breakfast cereals (13%) and flours and other cereal grains and starches, such as rice and oats (11%).

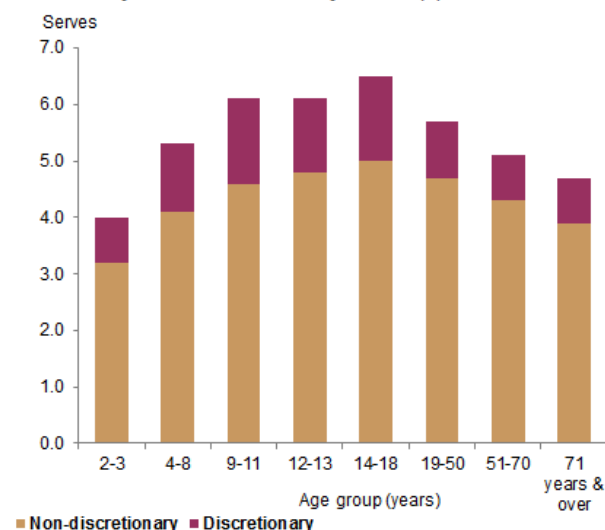
GRAIN (CEREALS) FOODS FROM DISCRETIONARY SOURCES

The ADG recommendation serves of grain (cereal) group does not include food sources flagged as discretionary. However, if such foods (e.g. the bun from a burger that is high in saturated fat) were accounted for in the grain (cereal) group, the average consumption would increase by around 1 serve from 4.5 to 5.5.

When discretionary foods are included, the average number of serves consumed would meet the relevant minimum recommended serves of *grain (cereal) foods* for all male age groups, with the exception of males aged 51-70 years where the recommendation is 6 serves.

The increase in serves from discretionary sources was twice as high for children aged 2-18 compared with adults (24% compared with 12%). The age group with highest potential contribution from discretionary sources of grains was females aged 9-11 years where the increase from discretionary sources would be 1.5 serves.

Persons 2 years & over - Mean serves grain (cereals) from discretionary and non-discretionary sources(a), 2011-12



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

Types of discretionary food sources contributing to grain (cereals) group

The most common type of grains consumed from discretionary sources was from the cereal based products and dishes group (69%). This includes foods such as pastries (such as sausage rolls and meat pies) which made up 21% of discretionary *grain (cereal)* serves, while cakes, muffins, scones and cake-type desserts contributed 16% followed by sweet biscuits (13%) and mixed dishes where cereal is the major ingredient (11%). These were followed by cereal and cereal products (9.3%) and snack foods at 7.4%.

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ENDNOTES

1. National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*. Canberra: Australian Government. <https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf>, Last accessed 05/05/2016
2. Wholegrain products are foods that use every part of the grain (cereal).

Water

WATER

Water is fundamental to life and consuming an adequate amount of water each day is essential for good health. Water is required in a range of physiological functions including digestion, absorption and transportation of nutrients, elimination of waste and regulation of body temperature.¹

Water can be derived from plain water, beverages (e.g. tea, coffees or alcoholic drinks etc.) and as moisture from food sources. But drinking plain water is the most effective way to stay hydrated without undesirable energy, stimulant or diuretic effects.

Because the amount of water required varies depending on individual factors including body size, diet, climate and levels of physical activity¹ the Australian Dietary Guidelines do not provide target amounts for consumption, but make the general recommendation that Australians “drink plenty of water”.

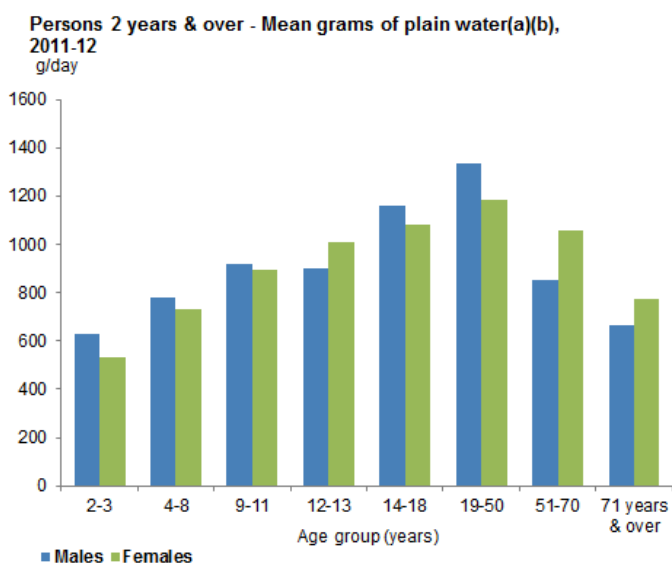
Definitions

Plain water	tap and unflavoured bottled water
Water from non-discretionary beverages	the water component of non-discretionary beverages, for instance water added to tea and coffee
Remaining beverages	everything else that makes up the difference between the above two categories and total beverages. This includes discretionary beverages (including alcohol), soft drinks, milk and milk beverages, fruit juice as well as the non-water components of non-discretionary beverages. Excludes water.
Total beverages	all beverages consumed, both water and non-water components

HOW MUCH PLAIN WATER WAS CONSUMED?

In 2011-12, the average amount of plain water, either tap or bottled, usually consumed by Australians was 1,064 ml. The average amount of consumption steadily increased with age, peaking at 1,264 ml among those aged 19-50 years, before a gradual decline in older age groups. Children aged 2-18 years, on average, consumed less plain water than adults aged 19 years and over (892 ml compared with 1,114 ml).

Overall, there was no difference in average plain water consumption between males and females. However, males aged 19-50 years had the highest average plain water consumption of 1,335 ml.



(a) Based on Day 1. See Glossary for definition.

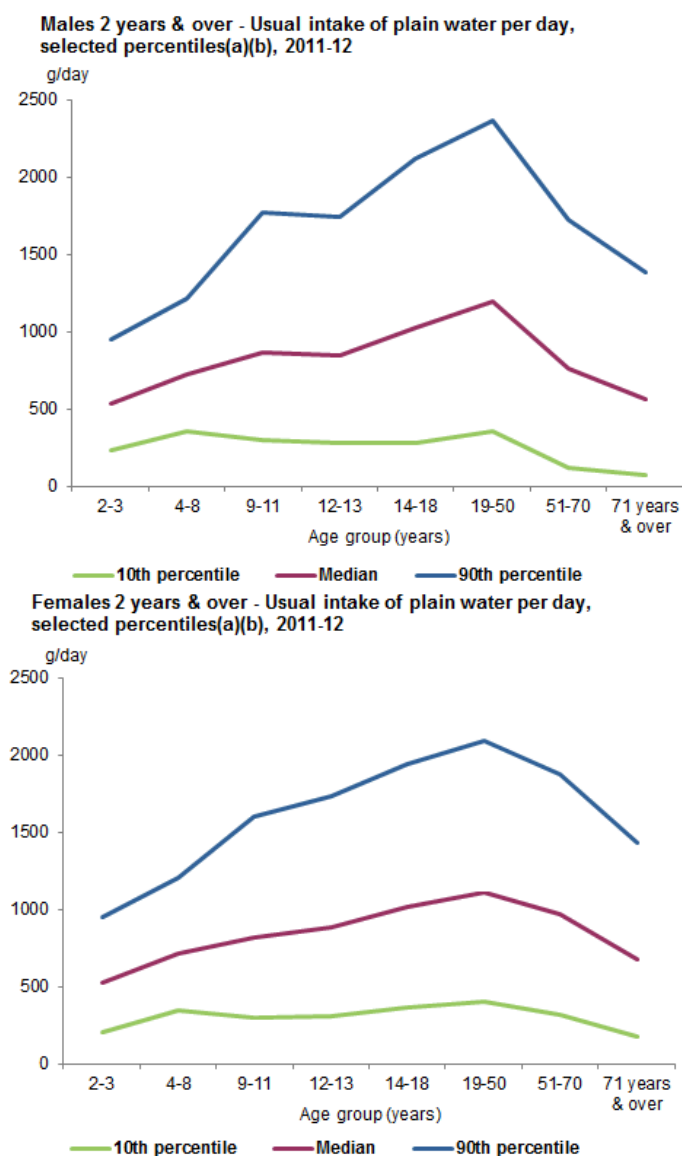
(b) Includes tap and unflavoured bottled water.

Source: National Nutrition and Physical Activity Survey, 2011-12.

On average, Australians consumed an additional 325 ml of water derived from non-discretionary beverages (mainly tea and coffee). This brought the average amount of plain water and water from non-discretionary beverages consumed to a total of 1,389 ml per day. The water from non-discretionary beverages provided a considerable source of water for adults, especially those aged 51 years and over reflecting a high level of consumption of tea and coffee.

WHAT WAS THE USUAL CONSUMPTION OF PLAIN WATER?

The amount of plain water usually consumed varied within, as well as between, age-sex groups. Overall, the bottom 10% of consumers aged 2 years and over consumed 304 ml or less of plain water on a usual basis, while the top 10% consumed at least 1,917 ml.



(a) Usual intake. See Glossary for definition.

(b) Includes tap and unflavoured bottled water.

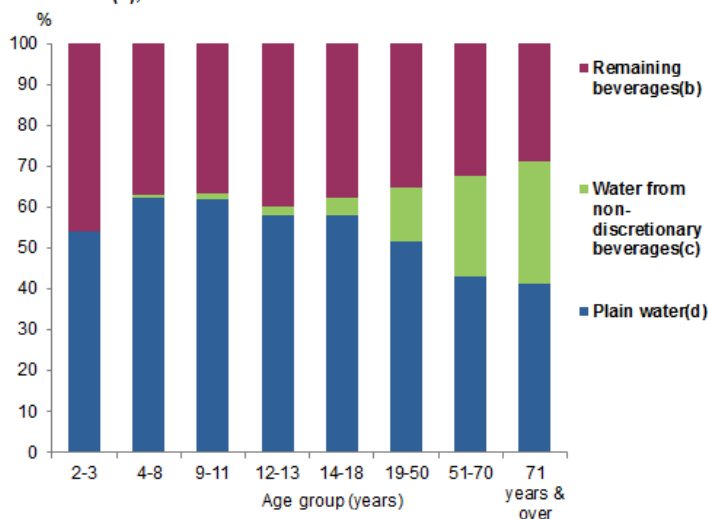
Source: National Nutrition and Physical Activity Survey, 2011-12.

PLAIN WATER AS A PROPORTION OF TOTAL BEVERAGE CONSUMPTION

On any given day in 2011-12, plain water contributed to half (50%) of Australians' total beverage consumption, with 21% from discretionary beverages (mainly soft drinks, alcohol and cordial) and 15% from water within non-discretionary beverages (mainly tea and coffee). The balance (13%) was made up of non-water based non-discretionary beverages such as juice and milk drinks.

The proportion of plain water from total beverages was significantly higher among children than adults (59% compared with 48%). The proportion of beverages that was plain water tended to decrease in age groups from 12-13 years and older, although the substitution was generally with tea and coffee rather than other beverages (either discretionary or not).

Persons 2 years & over - Proportion of plain water, water from non-discretionary beverages and remaining beverages consumed(a), 2011-12



(a) Based on Day 1. See Glossary for definition.

(b) Includes all discretionary non-alcoholic beverages, alcoholic beverages, fruit juice, milk and milk substitutes.

(c) Includes the water component of non-discretionary beverages such as tea and coffee.

(d) Includes tap and unflavoured bottled water.

Source: National Nutrition and Physical Activity Survey, 2011-12.

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ENDNOTES

1. National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*. Canberra: Australian Government. <https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf>, Last accessed 05/05/2016

Unsaturated spreads and oils

UNSATURATED SPREADS AND OILS

The Australian Dietary Guidelines recommend that Australians limit consumption of foods containing saturated fats because of the evidence linking their consumption with poorer blood lipid profiles and cardiovascular disease.¹ Previous results² from the 2011-12 NNPAS showed Australians derived an estimated 12.4% of their dietary energy from saturated and trans-fats, exceeding the 10% limit recommended to reduce chronic disease risk.³

In contrast to saturated fats, consumption of polyunsaturated and monounsaturated fats is an important part of a healthy dietary pattern, supplying essential fatty acids and carrying fat soluble vitamins.¹ These fats may be readily sourced from many foods within the five food groups such as nuts, legumes/beans, avocado, oats, fish, lean meats and eggs.¹ In addition to the health benefits of unsaturated fats, the Guidelines acknowledge the palatability role played by additional fat with certain foods. Therefore, the Guidelines recommend small allowances of unsaturated spreads and oils which keep the extra energy from these foods within the total energy constraints of the diet.

What is a serve of unsaturated spreads and oils?¹

A standard serve is (250 kJ):

- 10 g polyunsaturated spread
- 10 g monounsaturated spread
- 7 g monounsaturated or polyunsaturated oil (e.g. olive, canola or sunflower oil)
- 10 g tree nuts or peanuts or nut pastes/butters *

*Nuts/seeds also contribute to serves within the Lean meats and alternatives group, see Glossary and Appendix 2 for more information

The following analysis is based on the measurement of *unsaturated spreads and oils* in the 2011-12 NNPAS. The foods contributing to this group include margarines and oils made from polyunsaturated and monounsaturated oils, nuts and nut pastes and products containing any of these ingredients.⁴

HOW MANY SERVES OF UNSATURATED SPREADS AND OILS WERE CONSUMED FROM NON-DISCRETIONARY SOURCES?

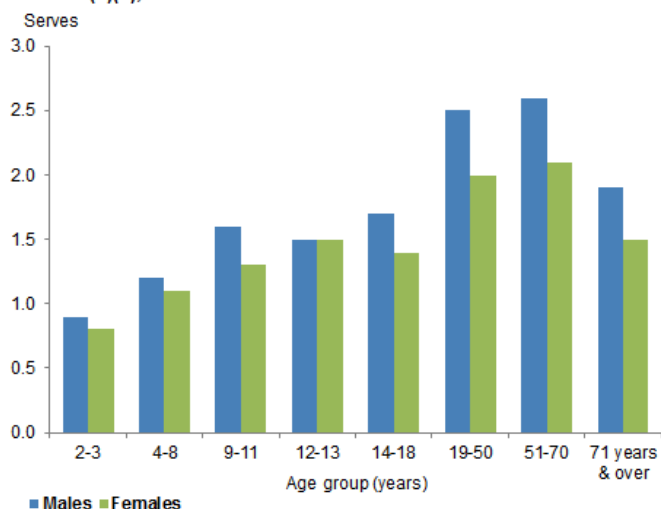
In 2011-12, Australians aged two years and over consumed an average 2 serves of *unsaturated spreads and oils* from non-discretionary sources per day. The average serves consumed increased with age; children consumed an average of 1.3 serves and adults 19 years and older had 2.2 serves. Males had a higher consumption of *unsaturated spreads and oils* than females (2.2 serves and 1.8 serves respectively).

HOW MANY EXCEEDED THE RECOMMENDED ALLOWANCE FOR UNSATURATED SPREADS AND OILS FROM NON-

DISCRETIONARY FOODS?

While the average consumption of *unsaturated spreads and oils* increased from childhood to adulthood in line with the greater volume of food consumed, the proportion of people who exceeded their allowance of unsaturated fats tended to decrease with age, reflecting the more generous allowance in adulthood and particularly for males aged 19-70 years where the allowance was up to 4 serves per day.

Persons 2 years & over - Mean serves of unsaturated spreads and oils(a)(b), 2011-12



(a) Based on Day 1. See Glossary for definition.
(b) From non-discretionary sources,

Source: National Nutrition and Physical Activity Survey, 2011-12.

Overall, one third (34%) of the population exceeded their allowance for *unsaturated spreads and oils* on a usual basis from non-discretionary foods with females were more likely to exceed their allowance compared to males (43% compared with 25%). Children were also more likely to exceed the allowance than adults, in particular 86% of children aged 2-3 years exceeded their allowance.

Unsaturated spreads and oils: recommended allowance, median usual serves consumed and proportion meeting/exceeding allowance

Age group (years)	Recommended minimum (a) Serves		Median (b) Serves		Proportion meeting recommendation (b) %	
	Males	Females	Males	Females	Males	Females
2-3	½	½	0.9	0.8	89.1	82.0
4-8	1	1	1.2	1.0	61.8	49.4
9-11	1	1	1.5	1.1	73.1	57.7
12-13	1½	1½	1.4	1.4	44.8	46.1
14-18	2	2*	1.7	1.4	37.5	22.6
19-50	4	2*	2.2	1.8	11.5	41.7
51-70	4	2	2.2	1.9	11.6	47.8
71 +	2	2	1.9	1.5	45.4	25.7

(a) National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*

https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf

(b) From non-discretionary sources.

Source: National Nutrition and Physical Activity Survey, 2011-12.

*For pregnant and breastfeeding women, the recommended allowance for unsaturated fats is 2 serves. However, both the pregnant and breastfeeding populations have been excluded from this analysis

SOURCES OF UNSATURATED SPREADS AND OILS

Unsaturated spreads and oils come from a wide range of 'non-discretionary' food sources, although main food sources can be categorised into five groups:

- One quarter of *unsaturated spreads and oils* consumption came from seeds and nuts, with adults more likely than children to consume food from this group (26% and 15% respectively).
- Mixed dishes where meat or poultry is a major component made up 21%.
- Fats and oils (mostly margarine and table spreads) contributed 17% of *unsaturated spreads and oils* consumption.
- Mixed dishes where cereal is a major ingredient (e.g. non-discretionary pasta, pizzas and burgers) contributed 13%.
- 12% from dishes where vegetables are the main component and potato foods.

Discretionary sources

Consistent with the advice within the Guidelines around which foods are considered part of healthy dietary pattern, the above

comparisons against the recommendations were limited to those foods classed as 'non-discretionary'. However, previous analysis⁵ has shown that around one-third of dietary energy comes from the discretionary foods which are characterised as nutrient poor and energy dense and often high in saturated fat, salt or added sugars.

When the 'discretionary' food sources are included, the average consumption of *unsaturated spreads and oils* increased by 61% (1.2 serves) from 2 to 3.2 across the population.

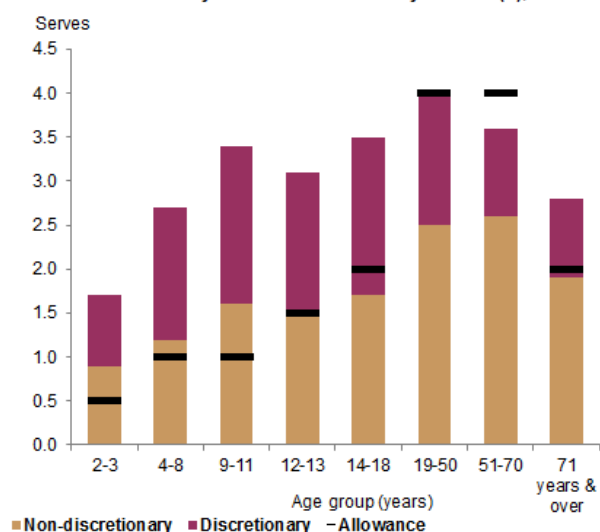
For children 2-18 years, when discretionary sources are included, the consumption of *unsaturated spreads and oils* increased by 108% (1.4 serves, from 1.3 to 2.8).⁶ In particular, the average consumption of unsaturated fats for children aged 2-3 years was around three times higher than their daily allowance.

Adults over 19 years consumed less serves of *unsaturated spreads and oils* from discretionary sources than children 2-18 years on average.

When discretionary sources are included, the average consumption for males aged 19-50 years increased to 4 serves, reaching their allowance. Males 51-70 years were the only age group that did not exceed their allowance on average when discretionary foods were included.

Females aged 19 years and over have a daily allowance of 2 serves of *unsaturated spreads and oils*. On average, women 19-70 years exceeded the allowance with the consumption of unsaturated fats from non-discretionary sources only. When discretionary sources are included these contributed around an additional 1 serve.

Males 2 years & over - Mean serves unsaturated spreads and oils from discretionary and non-discretionary sources(a), 2011-12

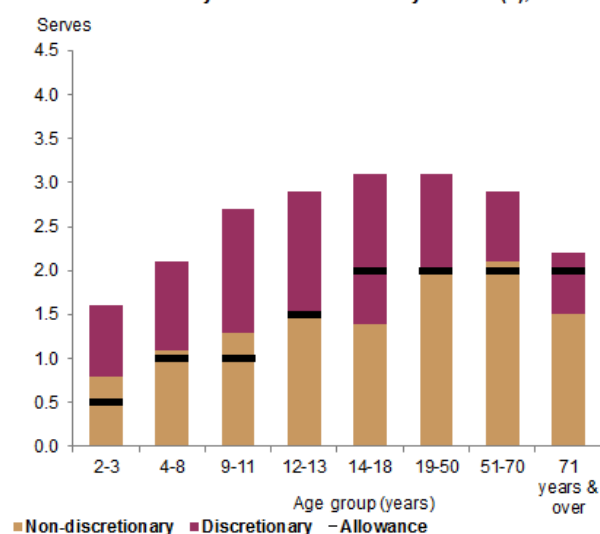


(a) Based on Day 1. See Glossary for definition.

(-) The black bar indicates daily allowance of unsaturated fats and oils for the respective age group according to the ADG.

Source: National Nutrition and Physical Activity Survey, 2011-12.

Females 2 years & over - Mean serves unsaturated spreads and oils from discretionary and non-discretionary sources(a), 2011-12



(a) Based on Day 1. See Glossary for definition.

(-) The black bar indicates daily allowance of unsaturated fats and oils for the respective age group according to the ADG.

Source: National Nutrition and Physical Activity Survey, 2011-12.

Cereal based products (such as high saturated fat pizzas and burgers) were the most common source of discretionary *unsaturated fats and oils*, contributing 29%. This was followed by 19% from snack foods and a further 17% from vegetable products and dishes (such as potato chips). Savoury sauces and condiments contributed 11% and seafood products 10% of discretionary *unsaturated fats and oils*.

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ENDNOTES

1. National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*. Canberra: Australian Government. <https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf>, Last accessed 05/05/2016
2. See Table 2 within Data Cubes from Downloads within 4364.0.55.007 - *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, <<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4364.0.55.0072011-12?OpenDocument>>
3. National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, Canberra: Australian Government. <<http://www.nrv.gov.au/nutrients>>, Last accessed 05/05/2016
4. 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/ausnut/>
5. See discussion of Discretionary foods from 4364.0.55.007 - *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, < <http://www.abs.gov.au/ausstats/abs@.nsf/PrimaryMainFeatures/4364.0.55.007?OpenDocument> >
6. May not necessarily add to total due to rounding.

In This Release

IN THIS RELEASE

This publication is the sixth release of information from the nutrition component of the 2011-12 National Nutrition and Physical Activity Survey (NNPAS). It is intended to complement the Nutrition First Results and Usual Nutrient Intakes publications with newly developed information from Food Standards Australia New Zealand (FSANZ) about consumption of the Five Food Groups, based on the 2013 Australian Dietary Guidelines (ADG) from the National Health and Medical Research Council (NHMRC). It compares usual consumption with ADG recommendations of servings for specific age-sex groups. Additionally, it describes the contribution of food sub-groupings to the total number of serves of the five food groups as well as the most common food/beverage sources for each food group.

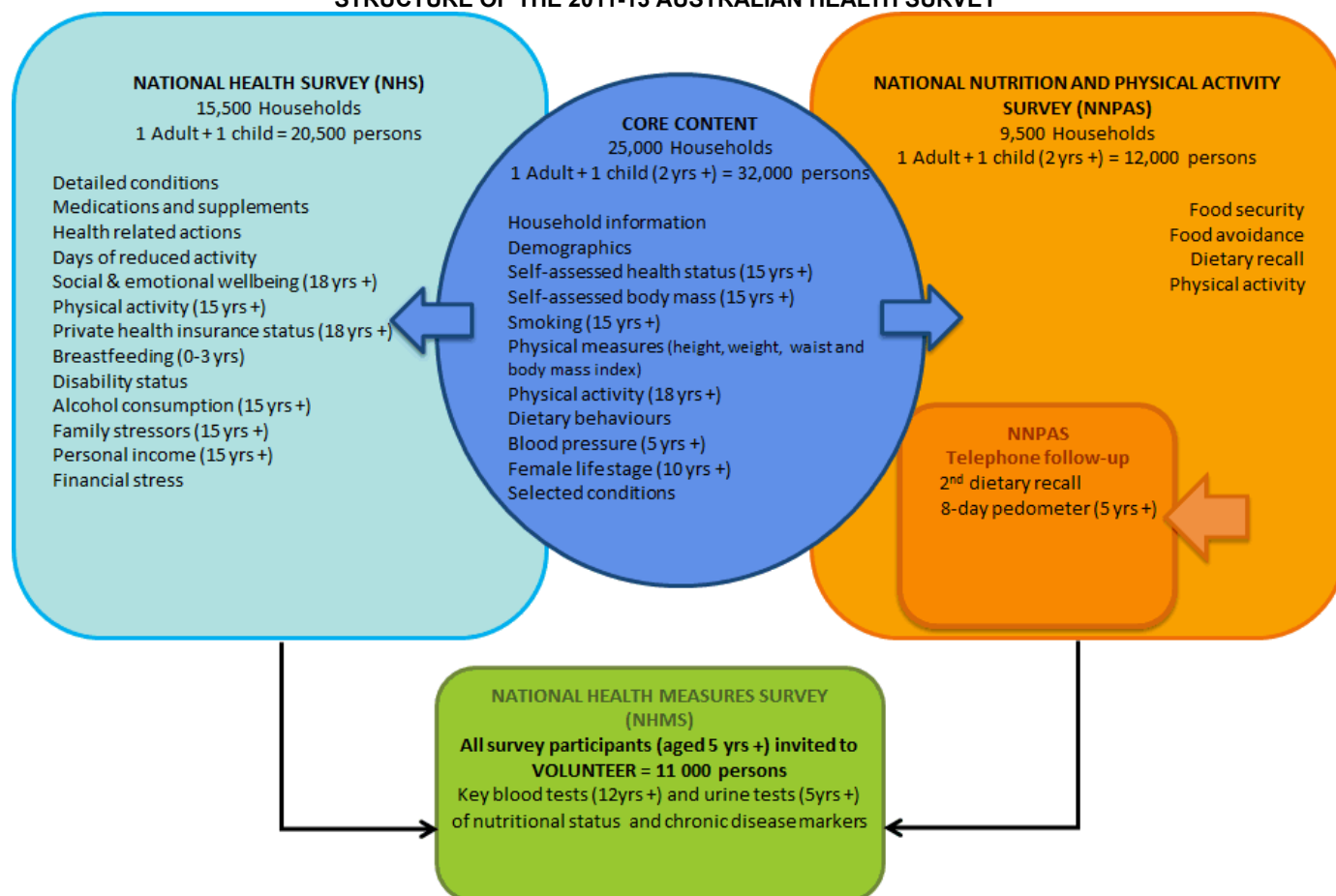
The Structure of the Australian Health Survey

THE STRUCTURE OF THE AUSTRALIAN HEALTH SURVEY

This publication is one of several ABS releases of results from the 2011-13 Australian Health Survey (AHS). The AHS is the largest, most comprehensive health survey ever conducted in Australia. It combines the existing ABS National Health Survey (NHS) and the National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) together with two new elements - a National Nutrition and Physical Activity Survey (NNPAS) and a National Health Measures Survey (NHMS).

The following diagram shows how the various elements combine to provide comprehensive health information for the overall Australian population. The content for each component survey is listed along with the ages of respondents for which topics were collected.

STRUCTURE OF THE 2011-13 AUSTRALIAN HEALTH SURVEY



As shown in the above diagram, the AHS is made up of three components:

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

All people selected in the AHS were selected in either the NHS or the NNPAS, however data items in the core were common to both surveys and therefore information for these data items is available for all persons in the AHS. All people were then invited to participate in the voluntary NHMS.

As indicated in the diagram, 20,500 people participated in the NHS, answering questions about items such as detailed health conditions, health risk factors and medications as well as all items in the core content. For the NHS component (those items collected only in the NHS and not the core), the sample size is similar to that of previous National Health Surveys and therefore the results are comparable. However for those items collected in the core, the sample size (32,000 people) is approximately 1.5 times that in the past and therefore the estimates for core items such as smoking and Body Mass Index are expected to be more accurate in particular at finer disaggregates than in previous surveys.

INFORMATION FOR ABORIGINAL AND TORRES STRAIT ISLANDER PEOPLE

The AHS does not exclude Aboriginal and Torres Strait Islander people where they are randomly selected in the general population sample. However, the AHS also includes an additional representative sample of around 13,000 Aboriginal and Torres Strait Islander people for which first results were released in November 2013. This is a separate collection of Aboriginal and Torres Strait Islander people living in remote and non-remote areas, including discrete communities. The structure is the same as outlined above, comprised of the National Aboriginal and Torres Strait Islander Health Survey component, the National Aboriginal and Torres Strait Islander Nutrition and Physical Activity component and the National Aboriginal and Torres Strait Islander Health Measures Survey component.

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About the National Nutrition and Physical Activity Survey

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 2011–13, 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.

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.

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 valuable 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.

About this Release

This publication includes distributions of usual intakes (in serves per day) for each of the five food groups from the 2013 Australian Dietary Guidelines (ADG). Data will be presented alongside the recommended numbers of servings for each of the reference age/sex groups specified in the ADG

Australians failing to meet dietary guidelines (Media Release)

MEDIA RELEASE

11 May 2016

Embargoed: 11.30 am (Canberra time)

61/2016

Australians failing to meet dietary guidelines

Most Australians do not meet the minimum recommended serves for the five major food groups, according to new figures released by the Australian Bureau of Statistics (ABS) today.

The report shows that Australian diets are not in line with the 2013 Australian Dietary Guidelines, which recommend minimum serves for vegetables, fruit, dairy products, lean meats and alternatives, and grain-based foods.

ABS Director of Health, Louise Gates said that adults and children over eight consumed an average of 2.7 serves of vegetables, rather than the 5 serves recommended by the Australian Dietary Guidelines, according to the latest results from the 2011-12 National Nutrition and Physical Activity Survey.

"Less than 4 per cent of the population consumed enough vegetables and legumes or beans each day," said Ms Gates.

"One in 10 was meeting the guidelines for dairy products, while one in seven consumed the minimum number of serves of lean meats and alternatives per day."

"Among the five food groups, fruits and grains had the best compliance, with nearly one in three people consuming the minimum recommended number of serves for each group. However, one-third of the fruit serves was from juice and dried fruit, and two-thirds of the grains and cereals were from refined grains rather than whole grain or high fibre sources," said Ms Gates.

The report also found that over one-third of the population's total daily energy intake came from energy-dense, nutrient-poor

'discretionary foods' (such as sweetened beverages, alcohol, cakes, confectionary and pastry products).

More details are available in Australian Health Survey: Consumption of food groups from Australian Dietary Guidelines (cat. no. 4364.0.55.012), available for free download from the ABS website, <http://www.abs.gov.au>.

Media Note:

- When reporting on ABS data you must attribute the Australian Bureau of Statistics (or the ABS) as the source.
- Media requests and interviews - contact the ABS Communications Section on 1300 175 070 (8.30am - 5pm Mon-Fri).
- Subscribe to our media release notification service to notify you of ABS media releases or publications upon their release.

Explanatory Notes

Explanatory Notes

EXPLANATORY NOTES

INTRODUCTION

1 The Consumption of food groups from the Australian Dietary Guidelines is the sixth release of nutrition data from the 2011-12 National Nutrition and Physical Activity Survey (NNPAS). 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). The first nutrition results were published in May 2014.

2 The Consumption of food groups from the Australian Dietary Guidelines uses estimates of food group consumption with modelled estimates of the usual (long term) consumption of those food groups from two 24-hour dietary recalls 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).

3 The estimation of ADG food group consumption has required the development of a database by FSANZ, which specifies the amounts of each ADG food group contained within each AUSNUT food consumed in the NNPAS. 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>

4 Usual intakes of the food groups are provided by age groups and sex at the national level, including comparison with the National Health and Medical Research Council (NHMRC) 2013 Australian Dietary Guidelines (ADG) recommended intakes, expressed as serves of the five food groups. More information on the Australian Dietary Guidelines is available on the NHMRC website.

5 The statistics presented in this publication are only a selection of the information collected in the NNPAS. Further publications from the Australian Health Survey are outlined in the Release Schedule, while the list of data items currently available from the survey are available in the AHS: Users' Guide, 2011-13 (cat. no. 4363.0.55.001).

SCOPE OF THE SURVEY

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

7 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).

NATIONAL NUTRITION AND PHYSICAL ACTIVITY SURVEY 2011-12, 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. Indications of the level of sampling error are given by the Relative Standard Error (RSE) and 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 Model Implementation below and Data Quality in the Users' Guide.

27 Where comparisons with ADG recommended intake have been made, any error in these guideline values will affect the quality of the resulting estimates. The ADG recommend a minimum number of serves of the five food groups, and daily allowance of unsaturated fats each day, depending on age and sex, for optimum nutrition and health. For more information see the Appendix of this publication and ADG on the NHMRC website.

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 two-part model was used when 5% or more of intakes had zero amounts. It was therefore used for fresh or canned fruits, unsaturated fats, plain water, proportion of plain water over total beverages and most ADG food groups including, vegetables, fruits, lean meat and alternatives, and milk, cheese, yoghurt and alternatives. The correlated (rather than uncorrelated) two-part model was used for these food groups because there was evidence of correlation between probability and amount for these food groups in the 2011-12 NNPAS. The exception to this was vegetable intakes for children under nine years. For this group, the simpler uncorrelated form of the two-part model was used. This was because the correlated form could not run (failed to converge) for the main weight as well as certain replicate groups.

35 Other food types including grains, plain water and water from non-discretionary beverages and proportion of plain water and water from non-discretionary beverages over total beverages were modelled using the one-part model. The exception to this was plain water and water from non-discretionary beverages for children under nine years. For this group, the two-part correlated model

form was used because their intake of plain water and water from non-discretionary beverages was similar to their plain water intake. Accordingly, the two-part correlated method was used for proportion of plain water and water from non-discretionary beverages over total beverages for children under nine years.

36 Proportion of plain water over total beverages and proportion of plain water and water from non-discretionary beverages over total beverages are distributions of usual ratios. For this publication, these ratios have been first calculated on an individual basis as the total plain water intake or total plain water and water from non-discretionary beverages divided by total beverage intake. 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 distributions 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.

37 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

38 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

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

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

ACKNOWLEDGEMENTS

41 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*.

42 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.

43 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 including additional breakdowns to enable the ADG comparisons and the added sugars work. The ABS would like to acknowledge and thank FSANZ for providing their support, advice and expertise to the 2011-12 NNPAS.

44 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

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

46 Because the NCI method produces estimates of usual food intakes for groups and not individuals, usual intake data is not available at the unit record level.

47 Summary tables containing aggregated estimates of the prevalence of intakes below the NHMRC 2013 Australian Dietary Guidelines 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

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

49 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.

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Glossary

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).

Alcoholic beverages

The 'Alcoholic beverages' food group includes beers, wines, spirits, cider and other alcoholic beverages.

Australian Dietary Guidelines (ADG)

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.

Calcium

Calcium is a mineral required for the growth and maintenance of the bones and teeth, as well as the proper functioning of the muscular and cardiovascular systems

Cereal based products and dishes

The 'Cereal based products and dishes' food group contains biscuits, cakes, pastries, pies, dumplings, pizza, hamburgers, hot dogs, and pasta and rice mixed dishes.

Cereals and cereal products

The 'Cereals and Cereal Products' food group includes grains, flours, bread and bread rolls, plain pasta, noodles and rice, and breakfast cereals.

Cholesterol

Cholesterol is a type of fat and a component of cell membrane.

Dairy and alternatives

See Milk, yoghurt, cheese and alternatives.

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.

Dietary energy

Dietary energy consists of energy provided by protein, fat, carbohydrate and alcohol. Small amounts of additional energy are from dietary fibre and organic acids.

Dietary fibre

Dietary fibre is generally found in edible plants or their extracts but can also come from synthetic analogues. It refers to the fractions of the plant or analogue that are resistant to digestion and absorption, which usually undergo fermentation in the large intestine. It comes in the form of polysaccharides, oligosaccharides and lignins.

Discretionary foods

The 2013 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".

The Australian Dietary Guidelines Summary lists examples of discretionary choices as including: "cakes, biscuits; confectionary, chocolate; pastries, pies; ice confections, butter, cream, and spreads which contain predominantly saturated fats; potato chips, crisps and other fatty or salty snack foods; sugar-sweetened soft drinks and cordials, sports and energy drinks and alcoholic drinks." Based on these definitions and the supporting documents which underpin the Australian Dietary Guidelines, foods reported within the NNPAS have been categorised as discretionary or non-discretionary. For more information, see the Discretionary Foods chapter of the AHS: Users' Guide, 2011-13 (cat. no. 4363.0.55.001).

Fat

Fat provides a significant amount of dietary energy and is also a carrier for fat-soluble vitamins and the source of essential fatty acids. It is the most energy dense of the macronutrients. The three fatty acid subtotals (mono-, poly-, and saturated fatty acids) do not add up to total fat because total fat includes a contribution from the non-fatty acid components.

Fats and Oils

The 'Fats and Oils' group includes butters, dairy blends, margarines, coconut and palm oil, and other fats, such as animal-based fats.

Five Food Groups

The Five Food Groups make up the Australian Guide to Healthy Eating. Foods are grouped by their type and contribution of nutrients to the Australian diet. See Australian Dietary Guidelines Summary.

Fruit

The fruit group is one of the five food groups that make up the Australian Guide to Healthy Eating. This food group includes fresh, dried and canned fruits plus fruit juices (no added sugar).

Grain (cereals)

The grain (cereals) group is one of the five food groups that make up the Australian Guide to Healthy Eating. This group includes foods that are made from grains such as wheat, rice, barley, millet, oats, rye, corn and quinoa.

Iodine

Iodine is a nutrient essential for the production of thyroid hormones, which are essential for normal growth and development, particularly of the brain. Since October 2009, regulations have required that salt with added iodine (iodised salt) be used in all bread (except organic bread and bread mixes for making bread at home) in Australia.

Iron

Iron is an essential mineral for the oxygen carrying ability of red blood cells.

Lean meats and alternatives

See lean meats and poultry, fish, eggs, tofu, nuts and seeds and legumes/beans.

Lean meats and poultry, fish, eggs, tofu, nuts and seeds and legumes/beans

The lean meats and poultry, fish, eggs, tofu, nuts and seeds and legumes/beans group is one of the five food groups that make up the Australian Guide to Healthy Eating. This group includes lean meats, poultry, fish eggs, nuts, seeds, legumes and beans. Foods in this group are high in protein.

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.

Meat, poultry and game products and dishes

The 'Meat, poultry and game products and dishes' food group includes beef, sheep, pork, poultry, sausages, processed meat (e.g. salami) and mixed dishes where meat or poultry is the major component e.g. casseroles, curried sausages and chicken stir-fry.

Milk products and dishes

The 'Milk products and dishes' food group includes milk, yoghurt, cream, cheese, custards, ice cream, milk shakes, smoothies and dishes where milk is the major component e.g. cheesecake, rice pudding and creme brulee.

Milk, yoghurt, cheese and alternatives

The milk, yoghurt, cheese and alternatives group is one of the five food groups that make up the Australian Guide to Healthy Eating. This group includes milk, yoghurt and cheese products, plus alternative products that are calcium-enriched, such as soy and rice drinks.

Minerals

Minerals are inorganic elements which are essential nutrients required in small amounts from the diet for normal growth and metabolic processes.

Moisture

Moisture, as measured in the NNPAS, is the water from all food and beverage sources.

Monounsaturated Fat

Monounsaturated fat or monounsaturated fatty acids are a type of fat predominantly found in plant-based foods, although there are exceptions.

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 mathematical 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).

Non-alcoholic beverages

The 'Non-alcoholic beverages' food group includes tea, coffee, juices, cordials, soft drinks, energy drinks and water.

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 in the Australian diet are available in AHS: Nutrition First Results - Foods and Nutrients, 2011-12 (cat. no. 4364.0.55.007).

Nutrient Database

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.

Nuts and seeds

Any large, oily kernel found within a shell and used in food may be regarded as a nut. Nuts are often also grouped with seeds which are botanically distinct from nuts. These may include cape seed, caraway, chia, flaxseed, linseed, passionfruit, poppy seed, pepita or pumpkin seed, sesame seed and sunflower seed.

Nuts and seeds contribute to two ADG food groups – lean meats and alternatives as well as unsaturated spreads and oils.

Plain water

Plain water includes bottled water and tap water with no flavourings.

Polyunsaturated Fat

Polyunsaturated fat or polyunsaturated fatty acids are a type of fat predominantly found in plant-based foods, although there are exceptions. Linoleic acid, alpha-linolenic acid, long-chain omega 3 fatty acids, and other polyunsaturated fatty acids are included in the polyunsaturated fatty acid total.

Processed meats

Processed meats are meats that have been transformed through salting, curing, fermentation, smoking or other processes to enhance the flavour or improve preservation. Examples of processed meats are: sausages, ham, bacon and salami. All processed meats have been flagged as 'discretionary' for this publication.

Protein

Protein supplies essential amino acids and is also a source of energy. Protein can be supplied from animal or vegetable matter, though individual vegetable proteins do not contain all the essential amino acids required by the body – they may be limited in one of these essential amino acids.

Recommended daily serves

The National Health and Medical Research Council 2013 Australian Dietary Guidelines recommend a minimum number of serves of foods from each of the five food groups, depending on age and sex. This is the recommended daily consumption for foods from the five food groups.

Refined grains

Refined grains are grains (cereals) that no longer have the outer layer of the grain due to processing. Refined grain foods have lower fibre content than wholegrain foods.

Saturated Fat

Saturated fat or saturated fatty acids are a type of fat predominantly found in animal-based foods, although there are exceptions. Saturated fat is the total of all saturated fatty acids, that is, all fatty acids without any double bonds.

Sodium

Sodium is a mineral which occurs in a number of different forms but is generally consumed as sodium chloride (commonly known as 'salt').

The Guidelines

See Australian Dietary Guidelines

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. For more information see Under-reporting in the AHS: Nutrition First Results – Foods and Nutrients, 2011-12 (cat. no. 4364.0.55.007).

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.

Vegetables and legumes/beans

The vegetables and legumes/beans group is one of the five food groups that make up the Australian Guide to Healthy Eating. There are a wide variety of vegetables but they can be generally grouped into green and brassica vegetables, orange vegetables, starchy vegetables, other vegetables and legumes as vegetables.

Vegetable products and dishes

The 'Vegetable products and dishes' food group includes vegetables and dishes where vegetables are the major component, for example salad or vegetable casserole.

Vitamins

Vitamins are organic compounds required in small amounts from the diet for normal growth and metabolic processes.

Vitamin B12

Vitamin B12, also known as cobalamin, has a key role in the normal functioning of the brain and nervous system, and the formation of blood. Almost all vitamin B12 comes from animal foods, such as meat and dairy products, although some is added to some plant-based foods such as vegetarian meat replacements.

Wholegrain

Wholegrain foods contain the entire three layers of the grain. Wholegrains provide more fibre, vitamins and minerals than refined grains.

Wholegrain or high fibre

Wholegrain or higher fibre cereals/grains include all wholegrain or higher fibre breads, grains, oats, breakfast cereal flakes, savoury crackers/crispbreads, crumpets, English muffins and scones and flour. See AUSNUT 2011-13.

Zinc

Zinc is a mineral required for the function of many enzymes and has a role in protein and DNA synthesis.

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Abbreviations

ABBREVIATIONS

The following symbols and abbreviations are used in this publication:

ABS	Australian Bureau of Statistics
ADG	Australian Dietary Guidelines
AHS	Australian Health Survey
FSANZ	Food Standards Australia New Zealand
g/day	grams per day
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
WHO	World Health Organisation

Australian Dietary Guidelines (Appendix)

APPENDIX 1: Australian Dietary Guidelines¹

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

c. Limit intake of foods and drinks containing added sugars such as confectionary, sugar-sweetened soft drinks and cordials, fruit drinks, vitamin waters, energy and sports drinks.

d. If you choose to drink alcohol, limit intake. For women who are pregnant, planning a pregnancy or breastfeeding, not drinking alcohol is the safest option.

Guideline 4 Encourage, support and promote breastfeeding.

Guideline 5 Care for your food; prepare and store it safely.

ENDNOTES

1. National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*. Canberra: Australian Government.

<https://www.nhmrc.gov.au/files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf>. Last accessed 05/05/2016

Example foods in ADG food groups (Appendix)

APPENDIX 2 : Example Foods in ADG Food Groups

ADG food group	Examples
Grain (cereal) foods	Wholegrain: Wholemeal or wholegrain bread, brown rice, wholemeal pasta, wholegrain or wholemeal crackers, whole oats, buckwheat pancakes
	Refined grain: White bread, white rice, savoury crackers, white flour, couscous cornflakes
Vegetables and legumes/beans	Green and brassica: Broccoli, spinach, cabbage, cauliflower, peas, beans, lettuce, fresh herbs
	Orange vegetables: carrots, pumpkin
	Starchy vegetables: potato, white and orange sweet potato, taro, cassava, sweetcorn, parsnip
	Other vegetables: tomato, capsicum, mushroom, zucchini, cucumber, onion, vegetable juice
	Legumes as vegetables: Dried peas, beans, lentils and chickpeas
Fruit	Fresh/canned fruit: apples, pears, oranges, peaches, bananas, melons
	Dried fruit: sultanas, raisins, dried apricots, dates
	Fruit juice: 100% fruit juice
Milk, yoghurt, cheese and/or alternatives	Milk: dairy milk (all fat varieties), milk powder, buttermilk, evaporated milk
	Yoghurt: Greek yoghurt, natural yoghurt, flavoured yoghurt, fromage frais
	Cheese: cheddar, haloumi, processed cheese, cream cheese, ricotta, cottage cheese
	Alternatives: calcium enriched soy, rice or other cereal drink
Lean meats and poultry, fish, eggs, tofu, nuts and seeds and legumes/beans	Lean red meat: unprocessed beef, lamb, pork, goat, kangaroo
	Lean poultry: chicken, turkey, duck, quail
	Fish: fish fillets, canned fish, shellfish, prawns
	Eggs
	Tofu: tofu, tempeh, vegetarian sausages and meat
	Nuts and seeds: nuts and seeds, nut and seed butters/pastes, tahini
	Legumes/beans: baked beans, vegetable patties, lentils, chickpeas
Unsaturated spreads and oils	Polyunsaturated and monounsaturated margarines, olive oil spreads, nut and seed pastes/butters
Water	Tap, tank or rain water, bottled spring water (still or sparkling), bottled plain mineral water

Technical Note

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 males aged 14-18 years who usually consumed 1<1½ serves of fruit is +/- 3.6 percentage points. The SE is calculated by:

$$\begin{aligned} SE \text{ of estimate} &= \left(\frac{MoE}{1.96} \right) \\ &= \left(\frac{3.6}{1.96} \right) \\ &= 1.8 \end{aligned}$$

11 There are about 19 chances in 20 that the estimate of the proportion of males aged 14-18 years who usually consumed 1<1½ serves of fruit is +/- 3.6 percentage points from the population value.

12 Similarly, there are about 19 chances in 20 that the proportion of males aged 14-18 years who usually consumed 1<1½ serves of fruit is within the confidence interval of 13.1% to 20.3%.

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.

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