Australian Bureau of Statistics

FOOD STANDARDS Australia New Zealand
Te Mana Kounga Kai – Ahitereiria me Aotearoa

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Australian Health Survey: Usual Nutrient Intakes, 2011–12

Contents

This publication is the second release of nutrition results from the 2011-13 Australian Health Survey (AHS). It presents national level information on the usual intake of selected nutrients by the Australian population. Information collected in the 2011-13 AHS about the population's eating patterns has been modelled to enable estimates of the proportions of the population with excessive, adequate and inadequate nutrient intakes to be determined. The information in this publication is intended to complement the first release of 2011-13 AHS nutrition results which included average intakes of foods and nutrients.

This publication was jointly prepared and released by the Australian Bureau of Statistics (ABS) and Food Standards Australia New Zealand (FSANZ).

David W. Kalisch
Australian Statistician

KEY FINDINGS

This publication is the second release of nutrition data from the 2011-12 National Nutrition and Physical Activity Survey (NNPAS). It presents a comparison of usual intakes of nutrients from foods with the current Nutrient Reference Values (NRVs) for Australia and New Zealand. The NRVs are a set of recommendations made by the Australian National Health and Medical Research Council and the New Zealand Ministry of Health for nutritional intake, based on currently available scientific knowledge.[1]

Usual nutrient intakes are an estimate of what people 'usually' eat, as opposed to what they reported eating on the particular days they were surveyed in the 2011-12 NNPAS. As NRVs are set on the basis of long term (i.e. usual) nutrient requirements, usual nutrient intakes have been used for comparison in this publication.

KEY RESULTS

- Nearly three quarters of females (73%) and half of all males (51%) aged two years and over did not meet their calcium requirements based on their intakes from food.
- Females were much more likely to have inadequate iron intakes from foods than males, with one in four (23%) not meeting their requirements compared with one in thirty males (3%).
- Three in four males (76%) and two in five females (42%) aged two years and over exceeded the Upper Level of Intake (UL) for sodium (this does not include sodium added at the table or during cooking).
- Almost all Australians met their nutritional needs for protein, vitamin C, vitamin B12, phosphorus and selenium. For each of these nutrients approximately 95% or more of all males and females had an adequate usual intake. 95% or more of males also met their requirements for folate, iodine and iron.
- Almost all (approximately 95% or more) 2-3 year olds met their requirements for all nutrients except iron.
- Almost all (approximately 95% or more) 4-8 year olds met their requirements for all nutrients except calcium and iron.

FOCUS ON FOLATES, THIAMIN AND IODINE

In Australia, most wheat flour for bread making is required to be fortified (enriched) with folic acid (a form of folate) and thiamin. If salt is used in bread making it is required to be iodised for the majority of bread types.[2]

- Approximately one in twelve (9%) adult females (aged 19 and over) did not meet their requirements for folate (dietary folate equivalents) based on their intakes from foods.
- Approximately 7% of males and 16% of females had inadequate thiamin intakes. This was consistently higher for females than for males across all age groups over 19 years.
- 2% of males and 8% of females did not meet their iodine requirements.

- Some young children exceeded the UL for iodine (13% of males and 6% of females aged 2-3 years).

DIFFERENCES ACROSS AGES

- Males aged 71 years and over were less likely than younger males to meet their requirements for protein, riboflavin, vitamin B6, calcium, selenium and zinc. Around one in seven (14%) males aged 71 years and over did not meet their requirements for protein.
- Females aged 71 years and over were less likely than younger females to meet their requirements for protein, riboflavin and vitamin B6.
- Young children were more likely than older age groups to exceed the ULs for zinc and iodine.

ENDNOTES

1 National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <http://www.nrv.gov.au/nutrients>, last accessed 4/2/2015
2 Food Standards Australia New Zealand, 2013, *Australia New Zealand Food Standards Code*, <http://www.foodstandards.gov.au/code/Pages/default.aspx>, last accessed 13/2/2015

ABOUT THE NATIONAL NUTRITION AND PHYSICAL ACTIVITY SURVEY

The 2011–13 Australian Health Survey (AHS) is the largest and most comprehensive health survey ever held 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. The 2011–13 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 two years and over) conducted in over 15 years.

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

This publication is jointly released by the Australian Bureau of Statistics (ABS) and Food Standards Australia New Zealand (FSANZ). It is the second release of information from the nutrition component of the NNPAS, and presents information on the usual intake of nutrients from foods as modelled from data collected in both first and second day interviews.

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) will provide nutrition and physical activity results for Aboriginal and Torres Strait Islander people at the population level and provides an opportunity to compare results with the non-Indigenous population. Results for the nutrition component of the NATSINPAS will be released in the first half of 2015.

ACKNOWLEDGEMENTS

The NNPAS has been made possible by additional funding from the Australian Government Department of Health 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.

In addition to being jointly responsible for the preparation and release of this publication, Food

Standards Australia New Zealand (FSANZ) was contracted to provide advice throughout the survey development, processing and collection phases of the 2011-12 NNPAS, and to provide a nutrient database for the coding of foods and dietary supplements consumed. The ABS would like to acknowledge and thank FSANZ for providing their support, advice and expertise to the 2011-12 NNPAS.

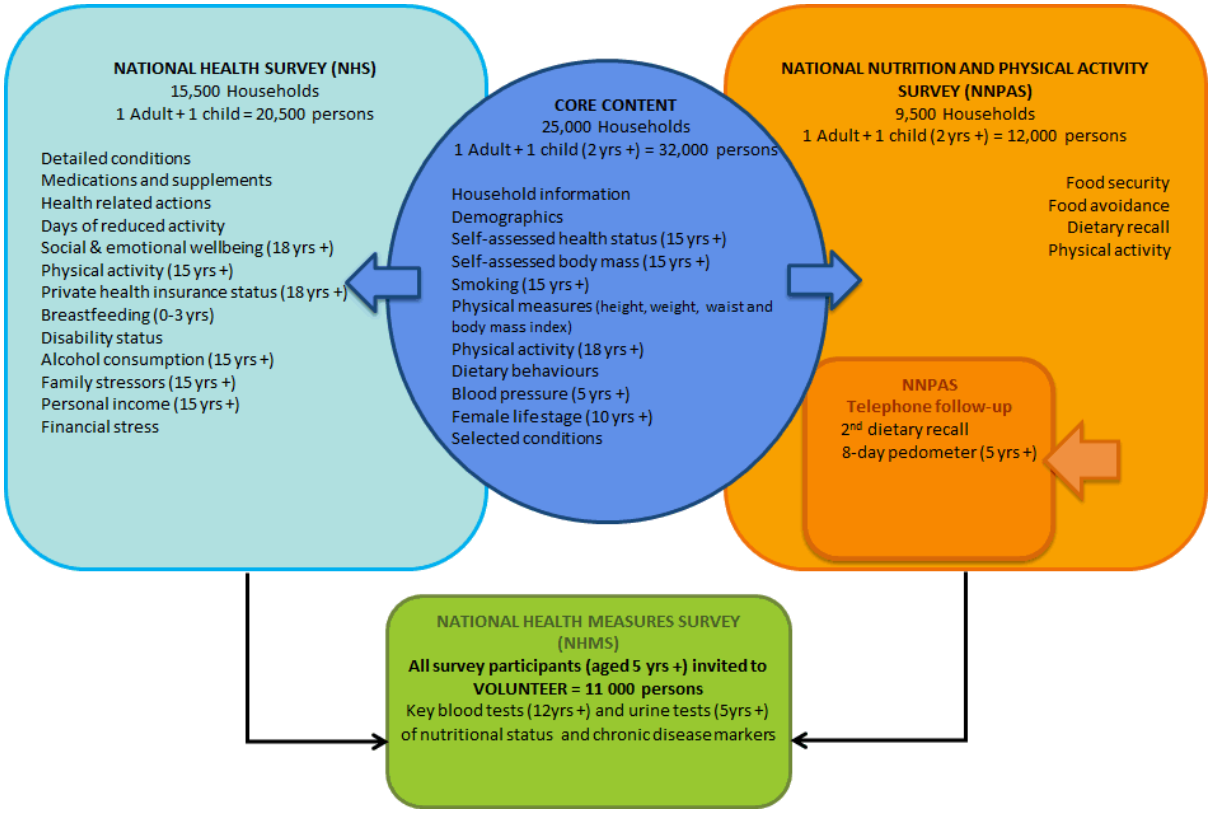
The ABS gratefully acknowledges and thanks the Agricultural Research Service of the United States Department Agriculture for giving permission to adapt and use their Dietary Intake Data System, including the Automated Multiple-Pass Method for collecting dietary intake information, as well as other processing systems and associated materials. The ABS also 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.

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.

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.



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.

For more information on future releases see Release schedule.

RELEASE SCHEDULE

Results from the Australian Health Survey have been released progressively from October 2012 and will continue into 2015. Please see the Australian Health Survey: Users' Guide, 2011-13 (cat. no. 4363.0.55.001) and the Australian Aboriginal and Torres Strait Islander Health Survey: Users' Guide, 2012-13 (cat. no .4727.0.55.002) for more information on the release schedule.

IN THIS RELEASE

This publication is the second release of nutrition results from the 2011-13 Australian Health Survey (AHS). It is intended to complement the first release of nutrition information relating to intakes of foods and nutrients reported for the first day of the survey and the results of biomedical tests of nutrient status.

This publication presents national level information on usual intake of selected nutrients from foods. Information is presented by population characteristics (age and sex). Other population characteristics may be relevant to these results, but have not been included in this publication.

USUAL NUTRIENT INTAKES

Usual intakes are an estimate of what people 'usually' eat, as opposed to what they reported eating on the particular days they were surveyed. Usual intakes of nutrients in the Australian population (aged two years and over) are presented here, based on the results of a mathematical statistical model (the National Cancer Institute (NCI) method) applied to the two days of reported dietary intakes from the 2011-12 National Nutrition and Physical Activity Survey (NNPAS), a component of the 2011-13 AHS. This model uses the two days of dietary intake data for all people in an age and sex group to estimate the distribution of long-term or usual intakes for that age and sex group. The method is used to produce group usual intake distributions, not usual intakes of individuals in the nutrition survey. In most cases, the group mean usual intake will be similar to the group mean for a single day intake. However, usual intake information, derived from two days of dietary intake data, gives a more accurate estimate of the proportion of people whose intake of a nutrient is above or below the guideline value for their age and sex. The distribution of usual intakes gives a picture of how much people vary in what they usually eat, within a group. Information on this distribution is presented as percentiles of usual nutrient intakes in Excel data cubes via the Downloads page.

In this publication, usual nutrient intakes have been estimated based on food consumption, and do not include the contribution of supplements to nutrient intakes. For information on consumption of supplements in the 2011-12 NNPAS, see the Nutrition First Results: Supplements.

COMPARISONS WITH GUIDELINES

In this publication, usual nutrient intakes are compared with Nutrient Reference Values (NRVs) for each age and sex group. The proportion of people consuming less than the Estimated Average Requirement (EAR) for each nutrient, where relevant, is presented. The proportion of a group that has usual nutrient intakes below that group's EAR is taken to be the prevalence of inadequacy (i.e. the proportion of the group not meeting their requirements for the nutrient). This method of deriving the prevalence of inadequacy is referred to as the 'EAR cut-point' method. The exception to this is iron where a different method of calculating the prevalence of inadequate intakes (the full probability method) must be used, due to the way in which iron requirements vary within age and sex groups.[1] Comparisons with EARs are presented for the following nutrients: protein, vitamin A (retinol

equivalents), thiamin (vitamin B1), riboflavin (vitamin B2), niacin equivalents (vitamin B3), vitamin B6, vitamin B12, dietary folate equivalents, vitamin C, calcium, iodine, iron, magnesium, phosphorus, selenium and zinc. For more information on the use of nutrient reference values to measure the prevalence of inadequate intakes for groups of people, see Chapter 4 of *Dietary Reference Intakes: Applications in Dietary Assessment, 2000*.

Inadequate intakes of specific nutrients will have different effects on health within different age and sex groups. For example, if children and adolescents have inadequate intakes of calcium it reduces their ability to develop strong, healthy bones. In general, inadequate intake of a nutrient is likely to increase the risk of adverse health effects, by negatively affecting the normal functions of the body. More information on the scientific basis for the NRVs and likely health effects of not meeting requirements for each nutrient is available at Nutrient Reference Values.

Usual nutrient intakes of an age-sex group are also compared with the Upper Level of Intake (UL) for that group, where relevant. The proportion of the group with a usual intake of a nutrient above the UL is the proportion of the group that is at risk of adverse effects from excess intake. Comparisons with ULs are presented for the following nutrients: calcium, iodine, iron, phosphorus, selenium, zinc, preformed vitamin A (retinol), folic acid, vitamin E, sodium and long-chain omega 3 fatty acids. Note that the proportions exceeding the UL could potentially be underestimates for some nutrients, as they do not include the contribution from dietary supplements.

When usual nutrient intakes are close to the EAR or UL, it does not imply an adverse effect will occur. However, as usual nutrient intakes become more extreme (i.e. further below the EAR or further above the UL) then the risk of an adverse effect occurring will increase.

Although there are no applicable EARs or ULs, usual intakes for some other nutrients included in the 2011-12 NNPAS are also available in the data cubes of this publication (pro vitamin A, natural folate, vitamin E, potassium, caffeine, total fat, saturated fat, monounsaturated fat, polyunsaturated fat, linoleic acid, alpha-linolenic acid, trans fatty acids, cholesterol, carbohydrate, total sugars, dietary fibre, moisture, alcohol and caffeine).

DATA QUALITY

The accuracy of estimated usual nutrient intakes in this publication will be influenced by both the quality of the reported dietary intakes in the underlying dataset (the 2011-12 NNPAS), and the accuracy of the modelling process. Sampling errors in the tables do not measure all forms of error that may occur in this data, although every effort is made to minimise these other sources of error (including prediction and simulation error from the use of a model, and any non-sampling errors in the original collection of the dietary intake information). Where comparisons with guideline values (Nutrient Reference Values or NRVs) have been made, any results outside of these guideline values need to be considered along with how the guideline values were established in order to appropriately interpret the resulting estimates. Information on interpreting the sampling error tables in this publication and other potential sources of error is available in the Data quality page of the Users'

Guide. 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. For more information on under-reporting in this survey, see Under-reporting in Nutrition Surveys in the Users' Guide.

For more information on the way in which these usual nutrient intakes have been calculated using the NCI method, the approach used in comparing usual nutrient intakes with NRVs, and the population groups to whom these results apply, see Usual Nutrient Intakes in the Users' Guide.

The Australian Bureau of Statistics and Food Standards Australia New Zealand have taken great care to ensure the information in this publication is as correct and accurate as possible. However, the Australian Bureau of Statistics and Food Standards Australia New Zealand do not guarantee, and accepts no legal liability whatsoever arising from, or connected to, the use of any material contained in this publication. It is recommended that users exercise their own skill and care with respect to their use of information in this publication, and that users carefully evaluate the accuracy, currency, completeness and relevance of the material for their purposes.

ENDNOTES

1 Food and Nutrition Board: Institute of Medicine, 2000, *Dietary Reference Intakes: Applications in dietary assessment*, National Academy Press, Washington, D.C., p. 80

MACRONUTRIENTS

This section contains information about usual intakes of protein, carbohydrate (specifically total sugars) and fat, and information on the prevalence of inadequate intakes of protein (based on the EAR). There are no EARs for other macronutrients.

In addition to measuring total macronutrient intake (by the EAR), the balance of macronutrients in the diet is also assessed using the Acceptable Macronutrient Distribution Range (AMDR). Although both an EAR and an AMDR apply to protein, the results of comparison with the EAR and the AMDR are interpreted differently. Comparisons with AMDRs are available at Acceptable Maconutrient Distribution Ranges.

PROTEIN

Inadequate intakes of protein (based on the EAR) indicate insufficient intake of protein to support the body's normal tissue maintenance and/or growth, potentially leading to protein energy malnutrition.

Animal and plant foods provide protein, including meat, poultry, fish and seafood, eggs, tofu, legumes, beans, nuts and seeds.[1] EARs have been set for protein based on the minimum amounts needed for the body to maintain itself and to allow for normal growth. Almost all Australians (99%) met their requirements for protein based on the EAR. However, approximately one in seven males (14%) and one in twenty-five females (4%) aged 71 years and over did not meet their requirements for protein.[2]

CARBOHYDRATES

Carbohydrates, comprising mainly of sugars and starch, produce energy for the body to use, and are especially important for brain function. Carbohydrates usually provide the major part of energy in human diets.

Sugars are naturally present in foods such as fruit and milk products as well as added to a range of processed foods and beverages.[3] In the NNPAS, naturally occurring sugars cannot be differentiated from those that are added (see AUSNUT 2011-13 for more information on the measurement of sugar in this data).

The top 25% of the population had a usual intake of at least 100 grams of total sugars per day. This is equivalent to at least 23 teaspoons of naturally present or added sugars. Some examples of foods that have 100 grams of naturally present or added sugars are:

- three cans of soft drink OR
- two medium sized banana cupcakes OR
- five apples.

Mean and median usual intake of total sugars was higher among adolescents (aged 9-18 years) than adults over 30 years of age. Overall, males had higher mean and median usual intakes of total sugars

compared with females across most age groups.

FAT

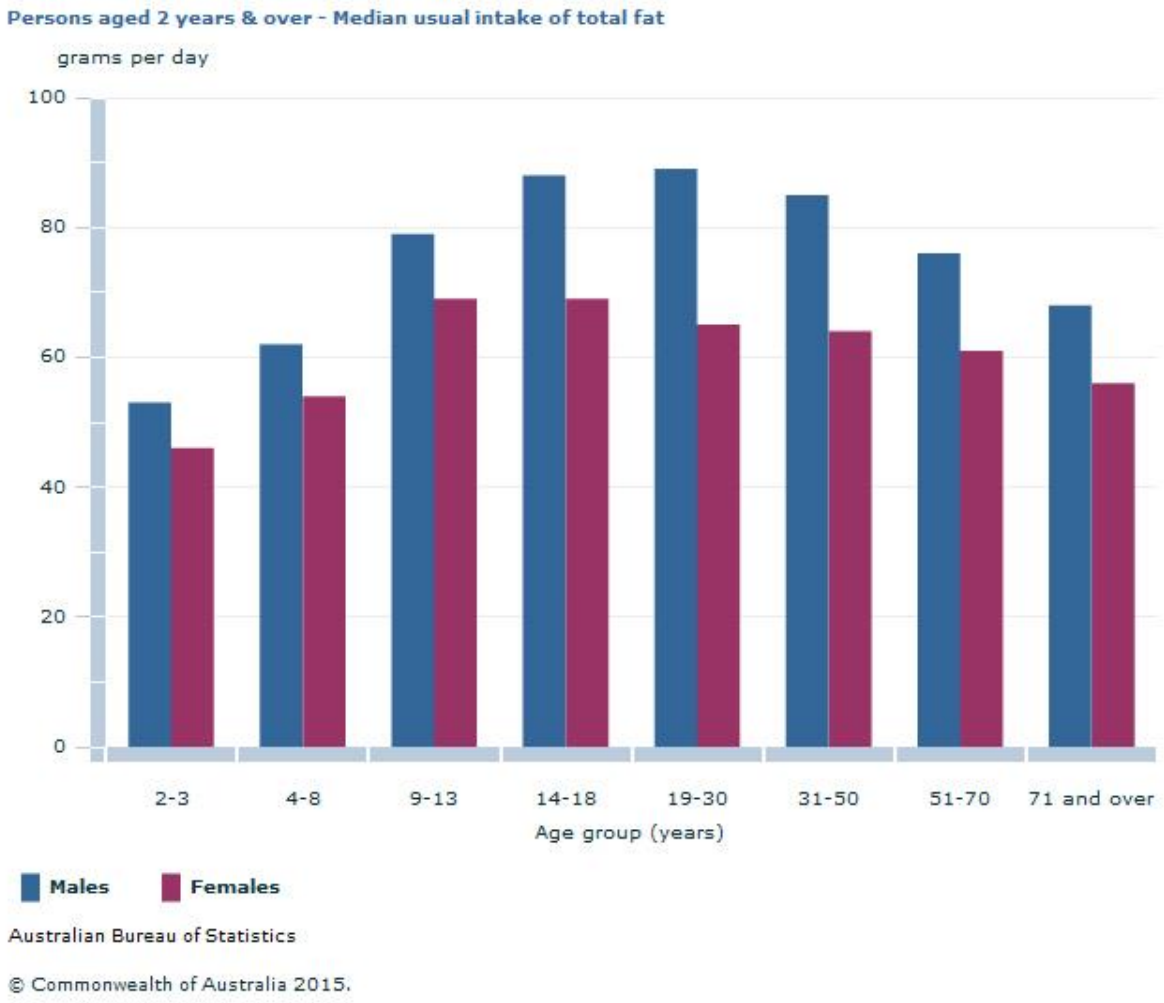
Fat has the highest energy density of the macronutrients. In addition to being a concentrated form of energy, fats help the body absorb fat-soluble vitamins, such as vitamin A. Dietary fats may be saturated, monounsaturated, or polyunsaturated, depending on their chemical structure. In general, saturated fats are found in animal-based foods, while monounsaturated and polyunsaturated fats are found in plant-based foods, although there are exceptions.[1]

Males aged 9 to 50 years had a median usual intake of total fats ranging from 79 to 89 grams per day. The top 25% of the male population aged 9 to 50 years had a usual intake of at least 94 grams of total fats per day. This is equivalent to the following foods:

- 7 tablespoons of spreads such as butter, margarine and dairy blend.
- 5 tablespoons of oil.

Females aged 9 to 50 years had a lower median usual intake of total fats than males (ranging from 64 to 69 grams per day). The top 25% of the female population aged 9 to 50 years had a usual intake of at least 76 grams of total fats per day. This is equivalent to the following foods:

- 6 tablespoons of spreads such as butter, margarine and dairy blend.
- 4 tablespoons of oil.



Source(s): Australian Health Survey: Usual Nutrient Intakes, 2011-12

ENDNOTES

1 National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <http://www.nrv.gov.au/nutrients>, last accessed 4/2/2015

2 This figure does not include residents of aged-care facilities, hospitals, or other non-private dwellings. For more information on the scope of this survey please see the Scope chapter of the AHS: Users' Guide, 2011-13 (cat. no. 4363.0.55.001).

3 National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*. Canberra: National Health and Medical Research Council, <https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf>, last accessed 4/2/2015

ACCEPTABLE MACRONUTRIENT DISTRIBUTION RANGES

Dietary energy is derived from the macronutrient content of foods. The energy-yielding macronutrients are: protein, fat, carbohydrate and alcohol, with small amounts of additional energy provided by dietary fibre and organic acids.

Imbalances in the proportion of energy derived from macronutrients are associated with increased risk of chronic diseases. Reference ranges known as Acceptable Macronutrient Distribution Ranges (AMDR) form part of the recommendations for optimising the balance of intake of each of the macronutrients to lower chronic disease risk while allowing for adequate micronutrient intakes. AMDRs are set for healthy people who are maintaining their body weight, and are not necessarily appropriate for weight loss or the management of specific health conditions. Usual intakes outside of the AMDR indicate imbalance in the contribution of energy from each of the macronutrients, and an increased risk of chronic disease over time.

Proportion of energy from macronutrients - Acceptable Macronutrient Distribution Range (AMDR)

	Lower limit of AMDR (%) [(a)]	Upper limit of AMDR (%) [(a)]
Carbohydrate	45	65
Fat	20	35
Protein	15	25

Source:
(a) National Health and Medical Research Council and New Zealand Ministry of Health, Nutrient Reference Values for Australia and New Zealand, 2006 <https://www.nrv.gov.au/chronic-disease/macronutrient-balance>

Approximately half of all Australians aged two years and over (51%) had a usual intake of carbohydrate as a proportion of total energy below the lower limit of the AMDR. More than two in three 51-70 year olds (70% of males and 68% of females) had an intake less than this lower limit of energy from carbohydrate. Almost no Australians (0.1%) aged two years and over had a usual intake of carbohydrates as a proportion of total energy above the upper limit of the AMDR.

Approximately one in eight males (13%) and one in six females (16%) had a usual intake of fat above the upper end of the recommended range of the proportion of total energy from fat. Amongst 14-18 year-olds, approximately one in five (22% of females and 19% of males) exceeded the upper boundary of the AMDR for the proportion of total energy from fat.

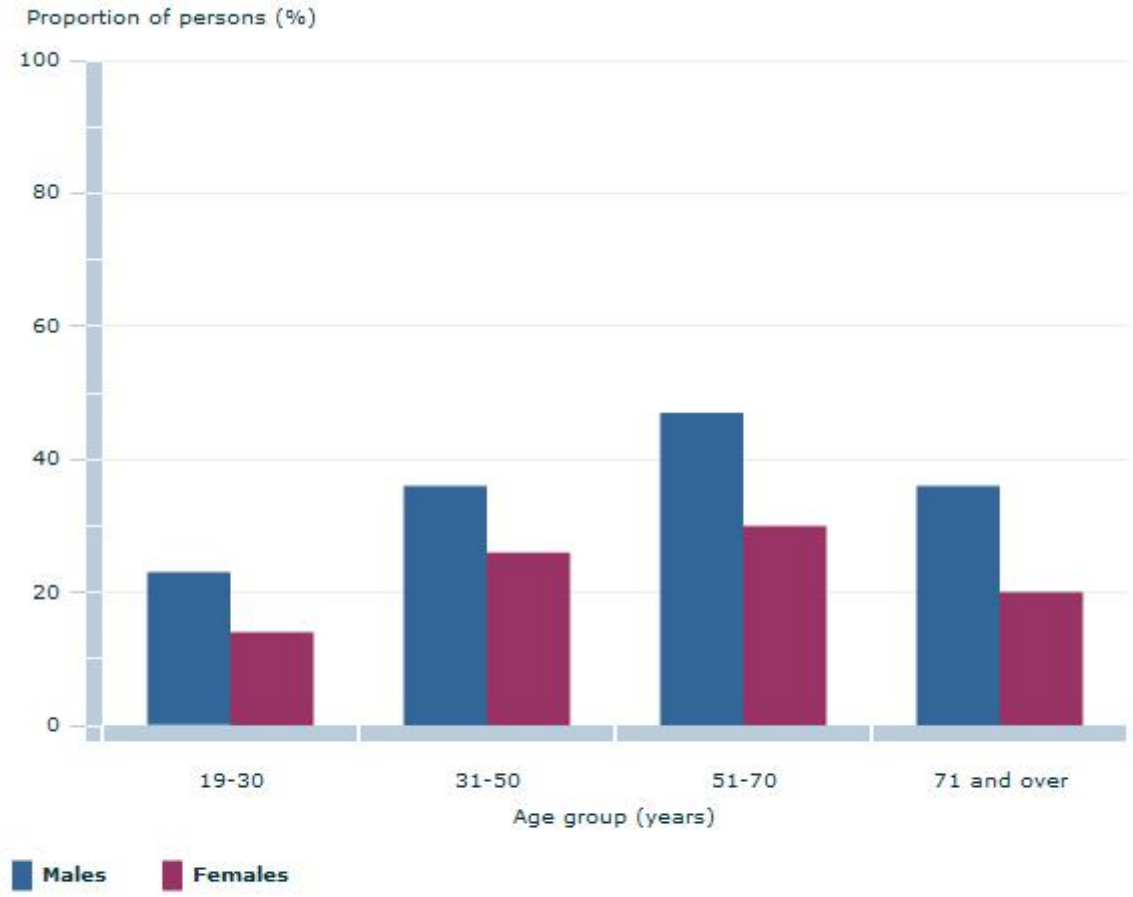
Approximately one in three children (30% of males and 33% of females) aged 2-18 years had a usual intake less than the lower end of the recommended intake of protein as a proportion of total energy, compared with approximately one in eight adults (13% of males and 11% of females).

ALCOHOL

Alcohol is a relatively energy-dense macronutrient and therefore can also contribute to dietary energy. There is no AMDR for alcohol. In terms of macronutrient balance, the general recommendation is that energy from alcohol should contribute less than 5% of total energy.[1]

Based on usual intakes, nearly half of all males (47%) and approximately one in three females (30%) aged 51-70 years consumed more than 5% of total energy from alcohol. Approximately one quarter of males (23%) aged 19-30 years consumed over 5% of total energy from alcohol.

Persons aged 19 years & over - Proportion consuming more than 5 % of total energy from alcohol



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***Source(s)**: Not available from published tables. Derived from full usual intake distribution.*

VITAMINS

Vitamins are chemical compounds essential to the proper functioning of the human body. They need to be obtained through diet as the body is unable to make them on its own. If they are not consumed for a period of time, deficiency symptoms may develop.

VITAMIN A

Vitamin A helps normal immune function, vision, and reproduction.[1] Vegetable products and dishes are the largest contributors to vitamin A intake in Australia followed by milk products.[2]

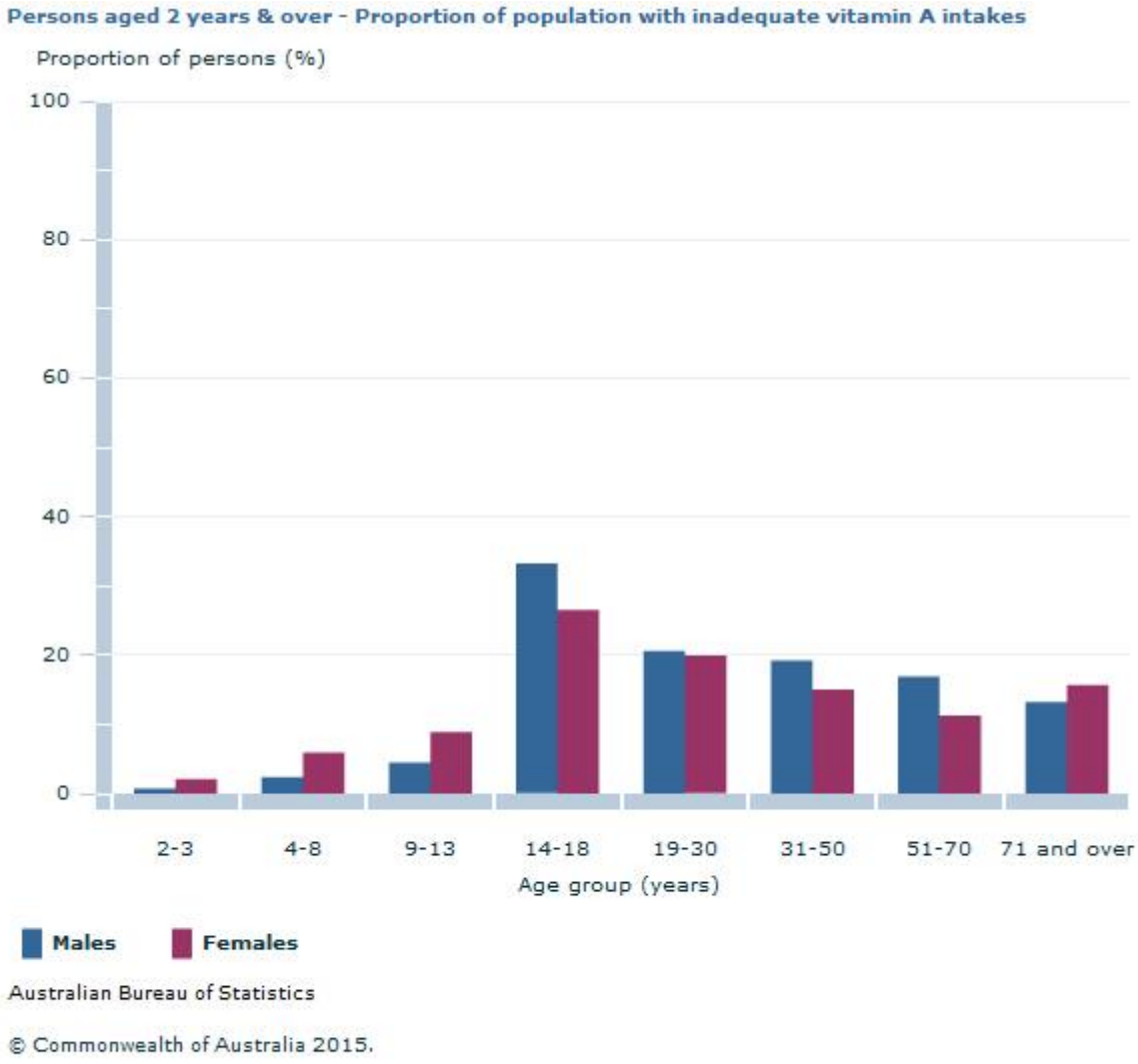
Approximately 17% of males and 14% of females had inadequate usual intakes of vitamin A (as retinol equivalents). For 14-18 year olds, 33% of males and 27% of females did not meet requirements, along with 21% of males and 20% of females aged 19-30 years.

Proportion of population with inadequate vitamin A intakes (estimated as % below the EAR), by age

Age (years)	EAR (µg)[(a)]		Prevalence of inadequacy (%)[(b)]	
	Males	Females	Males	Females
2-3	210	210	0.7	2.1
4-8	275	275	2.4	5.9
9-13	445	420	4.5	8.9
14-18	630	485	#33.2	26.5
19-30	625	500	20.6	19.9
31-50	625	500	19.2	15.0
51-70	625	500	16.9	11.3
71 and over	625	500	13.2	15.7

Source:
(a) National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <http://www.nrv.gov.au/nutrients/vitamin-a>
(b) Australian Health Survey: Usual Nutrient Intake, 2011-12

proportion has a margin of error >10 percentage points which should be considered when using this information.



Source(s): Australian Health Survey: Usual Nutrient Intakes, 2011-12

Less than 5% of the population exceeded the UL for preformed vitamin A (retinol).

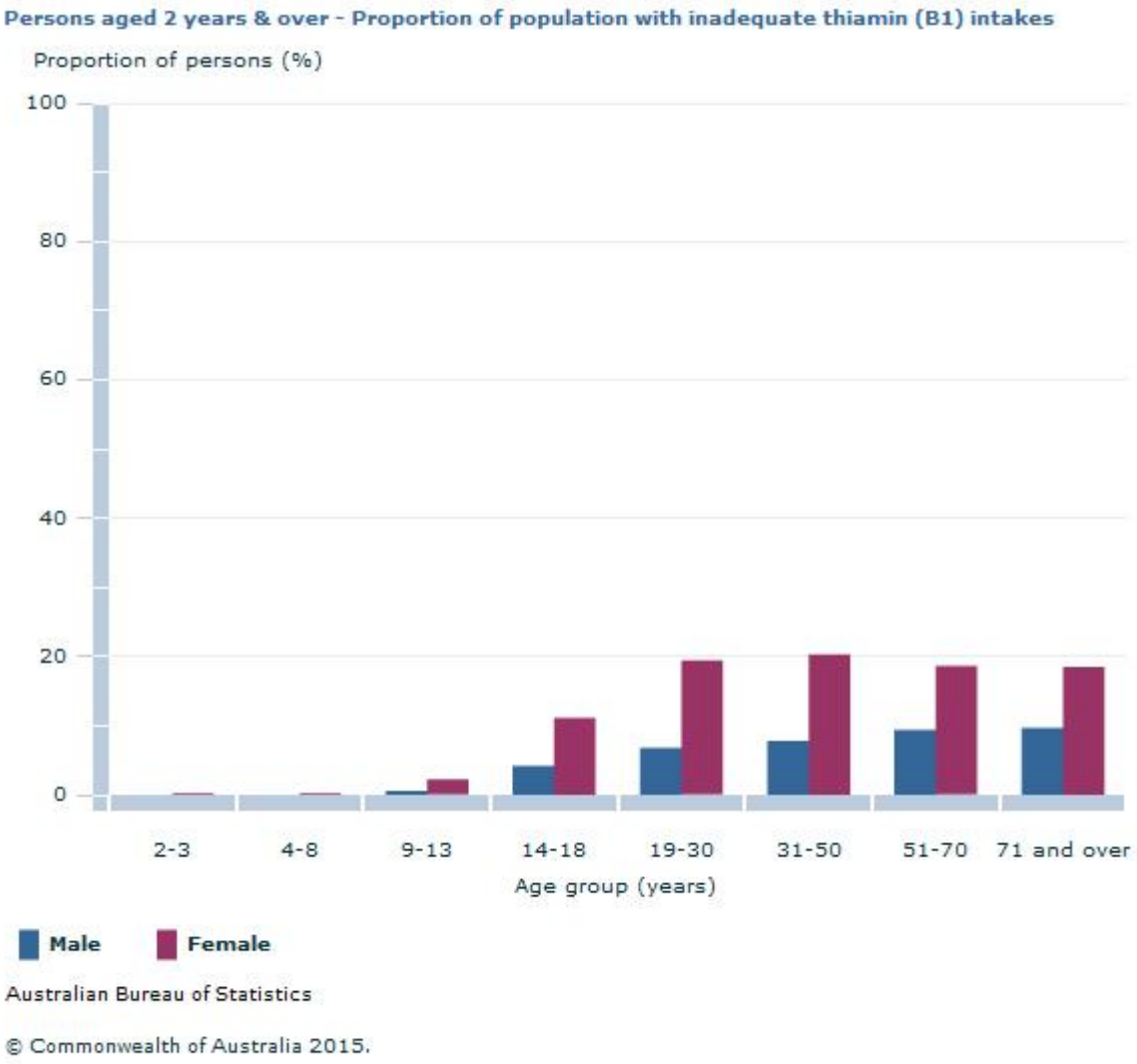
ENDNOTES

1 National Health and Medical Research Council and New Zealand Ministry of Health, 2006, Nutrient Reference Values for Australia and New Zealand, <http://www.nrv.gov.au/nutrients/vitamin-a>, last accessed 4/2/2015

2 Australian Bureau of Statistics, 2014, *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, 'Table 10: Proportion of Nutrients from food groups', data cube: Excel spreadsheet, cat. no. 4364.0.55.007

THIAMIN

Thiamin (or vitamin B1) helps the body convert food into energy for the brain, nervous system and muscles. Thiamin is found in small quantities in a range of foods, but the main source is cereal foods.[1] In Australia most wheat flour for bread making is fortified (enriched) with thiamin.[2]



Source(s): Australian Health Survey: Usual Nutrient Intakes, 2011-12

Approximately 7% of males and 16% of females had usual intakes of thiamin below their requirements. The proportion of persons with a usual intake not meeting their requirement was

consistently higher for females aged 19 and over than for males, despite females in this age group having a lower EAR than males (0.9 mg/day and 1.0 mg/day respectively). This is consistent with Nutrition First Results – Food and Nutrients, 2011-12, where males had a higher consumption of thiamin rich cereals and cereal products.[3]

ENDNOTES

1 Australian Bureau of Statistics, 2014, *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, 'Table 10: Proportion of Nutrients from food groups', data cube: Excel spreadsheet, cat. no. 4364.0.55.007
2 National Health and Medical Research Council and New Zealand Ministry of Health, 2006, Nutrient Reference Values for Australia and New Zealand, <http://www.nrv.gov.au/nutrients/thiamin>, last accessed 4/2/2015
3 Australian Bureau of Statistics, 2014, *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, 'Table 5: Mean daily food intake', data cube: Excel spreadsheet, cat. no. 4364.0.55.007

RIBOFLAVIN

Riboflavin (or vitamin B2) is important for activating (or converting) other nutrients into forms that can be used by the body (bioactive forms).[1] Milk and milk products are the primary source of riboflavin in the Australian diet, followed by cereal and cereal products,[2] some of which are fortified.

6% of males and 8% of females aged two years and over had inadequate intakes of riboflavin. Persons aged 71 years and over have a higher requirement for riboflavin,[1] and both males and females aged 71 and over were much less likely to meet the requirements (20% with inadequate intakes) than younger age groups (up to 9% with inadequate intakes). Almost all males and females up to 13 years of age met their riboflavin requirements.

Proportion of population with inadequate riboflavin (B2) intakes (estimated as % below the EAR), by age

Age (years)	EAR (mg)[(a)]		Prevalence of inadequacy (%)[(b)]	
	Males	Females	Males	Females
2-3	0.4	0.4	-	-
4-8	0.5	0.5	-	-
9-13	0.8	0.8	1.0	2.9
14-18	1.1	0.9	4.6	8.4
19-30	1.1	0.9	3.4	7.7
31-50	1.1	0.9	4.4	7.8
51-70	1.1	0.9	8.7	8.1
71 and over	1.3	1.1	20.3	20.3

Source:
(a) National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <http://www.nrv.gov.au/nutrients/riboflavin>, last accessed 4/2/2015
(b) Australian Health Survey: Usual Nutrient Intake, 2011-12

- nil or rounded to zero (including null cells)

ENDNOTES

1 National Health and Medical Research Council and New Zealand Ministry of Health, 2006, Nutrient Reference Values for Australia and New Zealand, <http://www.nrv.gov.au/nutrients/riboflavin>, last accessed 4/2/2015
2 Australian Bureau of Statistics, 2014, *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, 'Table 10: Proportion of Nutrients from food groups', data cube: Excel spreadsheet, cat. no. 4364.0.55.007

VITAMIN B6

Vitamin B6 is required for the metabolism of amino acids and other compounds. Meat, poultry and game products and dishes are the major dietary source of vitamin B6, while vegetable products and

dishes, milk products and dishes, fortified drinks, cereals and cereal based products are also dietary sources.[1]

Three in every ten people aged two years and over had an inadequate intake of vitamin B6. In general, females were twice as likely as males to have an inadequate intake of vitamin B6 (41% compared with 18%). Overall, adults were more likely than children to have an inadequate intake of vitamin B6, with 21% of males and 48% of females aged 19 years and over not meeting their requirements, compared with 8% of males and 17% of females aged 2-18 years.

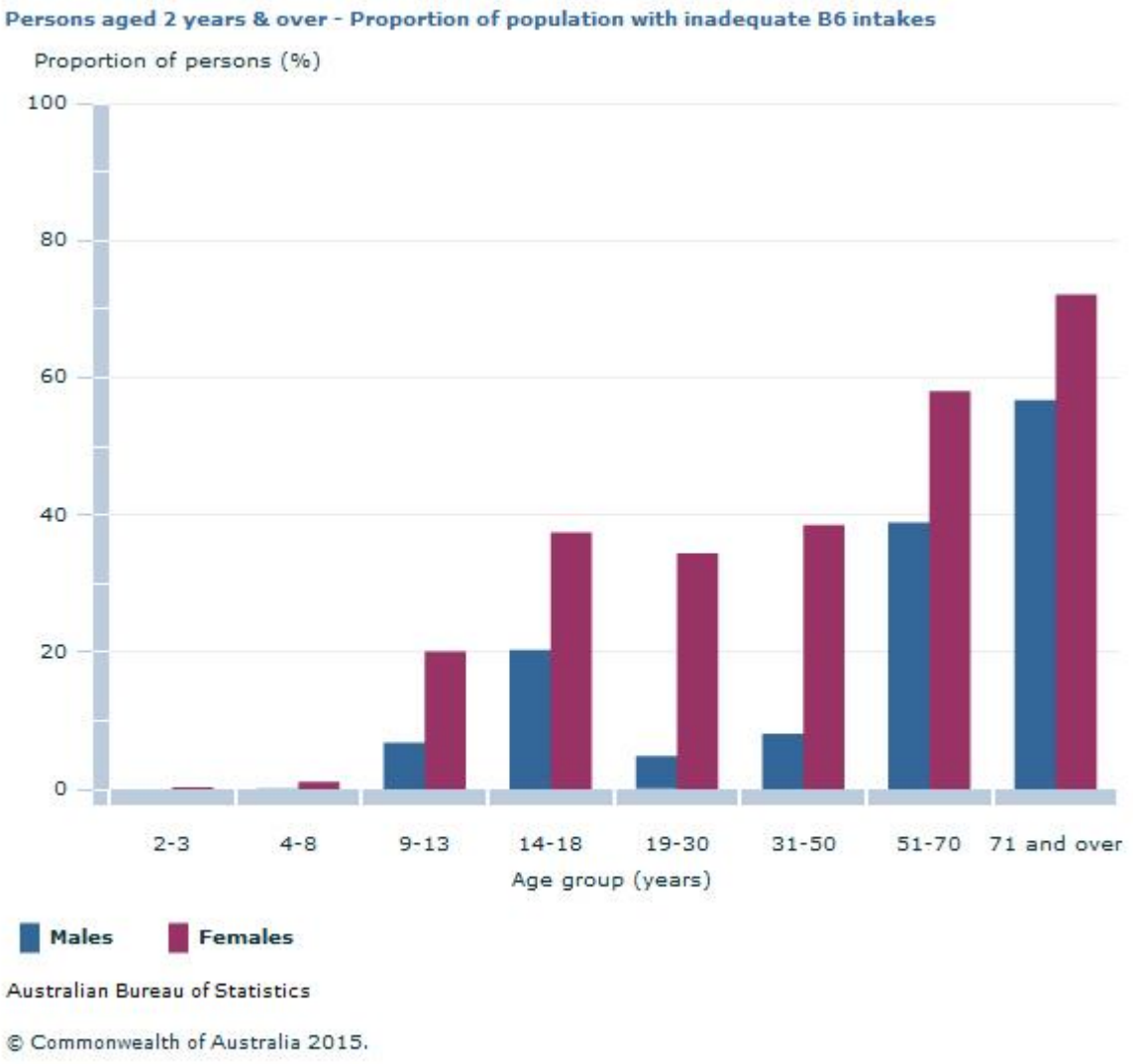
Females' usual intakes of vitamin B6 were lower than males', which is consistent with their lower mean daily consumption of meat and meat products.[2]

Proportion of population with inadequate vitamin B6 intakes (estimated as % below the EAR), by age

Age (years)	EAR (mg)[(a)]		Prevalence of inadequacy (%)[(b)]	
	Males	Females	Males	Females
2-3	0.4	0.4	-	0.3
4-8	0.5	0.5	0.1	1.1
9-13	0.8	0.8	6.8	20.1
14-18	1.1	1.0	20.3	#37.4
19-30	1.1	1.1	4.8	34.4
31-50	1.1	1.1	8.1	38.5
51-70	1.4	1.3	38.9	58.0
71 and over	1.4	1.3	56.7	72.1

Source:
(a) National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <http://www.nrv.gov.au/nutrients/vitamin-b6>
(b) Australian Health Survey: Usual Nutrient Intake, 2011-12

- nil or rounded to zero (including null cells)
proportion has a margin of error >10 percentage points which should be considered when using this information.



Source(s): Australian Health Survey: Usual Nutrient Intakes, 2011-12

ENDNOTES

1 Australian Bureau of Statistics, 2014, *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, 'Table 10: Proportion of Nutrients from food groups', data cube: Excel spreadsheet, cat. no. 4364.0.55.007

2 Australian Bureau of Statistics, 2014, *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, 'Table 5: Mean daily food intake', data cube: Excel spreadsheet, cat. no. 4364.0.55.007

FOLATE

Folate is a B group vitamin that is essential for healthy growth and development. Folate is found in foods such as green leafy vegetables, fruits and grains.[1] Cereals and cereal products, many of which are fortified, are a major contributor in the Australian diet.[2]

Proportion of population with inadequate dietary folate equivalents intakes (estimated as % below the EAR), by age

Age (years)	EAR (µg)[(a)]	Prevalence of inadequacy (%)[(b)]	
		Males	Females
2-3	120	-	-
4-8	160	-	-
9-13	250	0.4	1.2
14-18	330	1.2	7.9
19-30	320	2.8	10.9
31-50	320	2.3	10.6
51-70	320	2.5	7.6
71 and over	320	1.6	6.1

Source:
(a) National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <http://www.nrv.gov.au/nutrients/folate>, last accessed 4/2/2015
(b) Australian Health Survey: Usual Nutrient Intakes, 2011-12

- nil or rounded to zero (including null cells)

Folic acid is the form of folate used in dietary supplements and for food fortification, as it is more stable than the naturally-occurring forms in foods.[1] Mandatory fortification of wheat flour for bread making flour with folic acid was introduced in Australia in 2009 to help reduce the incidence of neural tube defects (NTDs) in babies, including spina bifida. Given the critical importance of folate in early growth and development, it is recommended that all women of childbearing age, even if they are not planning on becoming pregnant, also take extra folic acid.[3] Dietary folate equivalents are used to measure folate intakes to account for the differing bioavailability of natural folate and folic acid.

Approximately one in eleven (9%) adult females (aged 19 and over) did not meet their requirements

for folate (as dietary folate equivalents). Almost all males met their requirements for folate (2% with inadequate intakes).

The 2011–12 National Health Measures Survey (NHMS) included tests for folate. The NHMS showed that the vast majority of women of childbearing age had sufficient folate levels in 2011–12 based on their blood tests. Less than 1% had a red cell folate level which indicates an increased risk of NTDs and no women aged 16–44 years were in the range for high risk of NTDs (<453 nmol/L). For more information on folate levels of women of childbearing age see the Feature Article: Women of Childbearing Age from the NHMS. In making comparisons between the NHMS and the usual nutrient intakes, consideration should be given to the differences in the methods used to measure the prevalence of inadequate folate intakes, including the potential contribution of folic acid in dietary supplements to the results of the NHMS.

Less than 5% of the population exceeded the UL for folic acid.

ENDNOTES

1 National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <http://www.nrv.gov.au/nutrients/folate>, last accessed 4/2/2015
2 Australian Bureau of Statistics, 2014, *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, 'Table 10: Proportion of Nutrients from food groups', data cube: Excel spreadsheet, cat. no. 4364.0.55.007
3 World Health Organization, Daily iron and folic acid supplementation in pregnant women, 2012, <http://www.who.int/nutrition/publications/micronutrients/guidelines/daily_ifa_supp_pregnant_women/en/index.html>, last accessed 4/2/2015

VITAMIN B12

Vitamin B12 has a key role in the normal functioning of the brain and nervous system, and for the formation of blood. It helps keep the body's nerve and blood cells healthy and helps make DNA. Almost all vitamin B12 comes from animal foods, such as meat and dairy products. [1,2]

The proportion of females aged 14 years and over with inadequate usual intakes of vitamin B12 ranged from 5 to 8% for different age groups. The proportion of corresponding males was below 1%. This is consistent with Nutrition First Results – Food and Nutrients, 2011-12, that showed males consumed more meat than females.

For information on relevant biomedical results for women of childbearing age, see Feature Article: Women of Childbearing Age.

ENDNOTES

1 National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <https://www.nrv.gov.au/nutrients/vitamin-b12>, last accessed 4/2/2015
2 Australian Bureau of Statistics, 2014, *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, 'Table 10: Proportion of Nutrients from food groups', data cube: Excel spreadsheet, cat. no. 4364.0.55.007

OTHER VITAMINS

Remaining vitamins with an applicable Estimated Average Requirement (EAR) include niacin equivalents and vitamin C. Less than 5% of the population had inadequate intake of these nutrients based on the EAR.

Less than 5% of the population exceeded the UL for vitamin E.

ESSENTIAL MINERALS

Minerals are chemical elements required for a very wide variety of functions including cell function, muscle function, bone formation, hormone production and fluid balance. Some minerals are essential for health and are classified into major and trace elements according to the quantity required by the body.

CALCIUM

Calcium is a mineral required for the growth and maintenance of bones and teeth, as well as proper functioning of the muscular and cardiovascular systems. Milk and milk-based foods are the richest sources of calcium in the Australian diet, although it is also found in other products.[1] Calcium requirements are higher for adolescents undergoing bone mass growth. Bone mass stabilises for adults, until deteriorating after about age 50 for men and after menopause for women. Low calcium intake is linked to osteoporosis, a low bone density condition particularly affecting post-menopausal women.[2]

Proportion of population with inadequate calcium intakes (estimated as % below the EAR), by age

Age (years)	EAR (mg)[(a)]		Prevalence of inadequacy (%)[(b)]	
	Males	Females	Males	Females
2-3	360	360	0.7	2.4
4-8	520	520	11.0	20.8
9-11	800	800	#45.5	#54.1
12-13	1050	1050	#67.0	#84.4
14-18	1050	1050	71.0	90.3
19-30	840	840	44.2	71.3
31-50	840	840	43.2	67.2
51-70	840	1100	63.0	91.2
71 and over	1100	1100	89.5	94.3

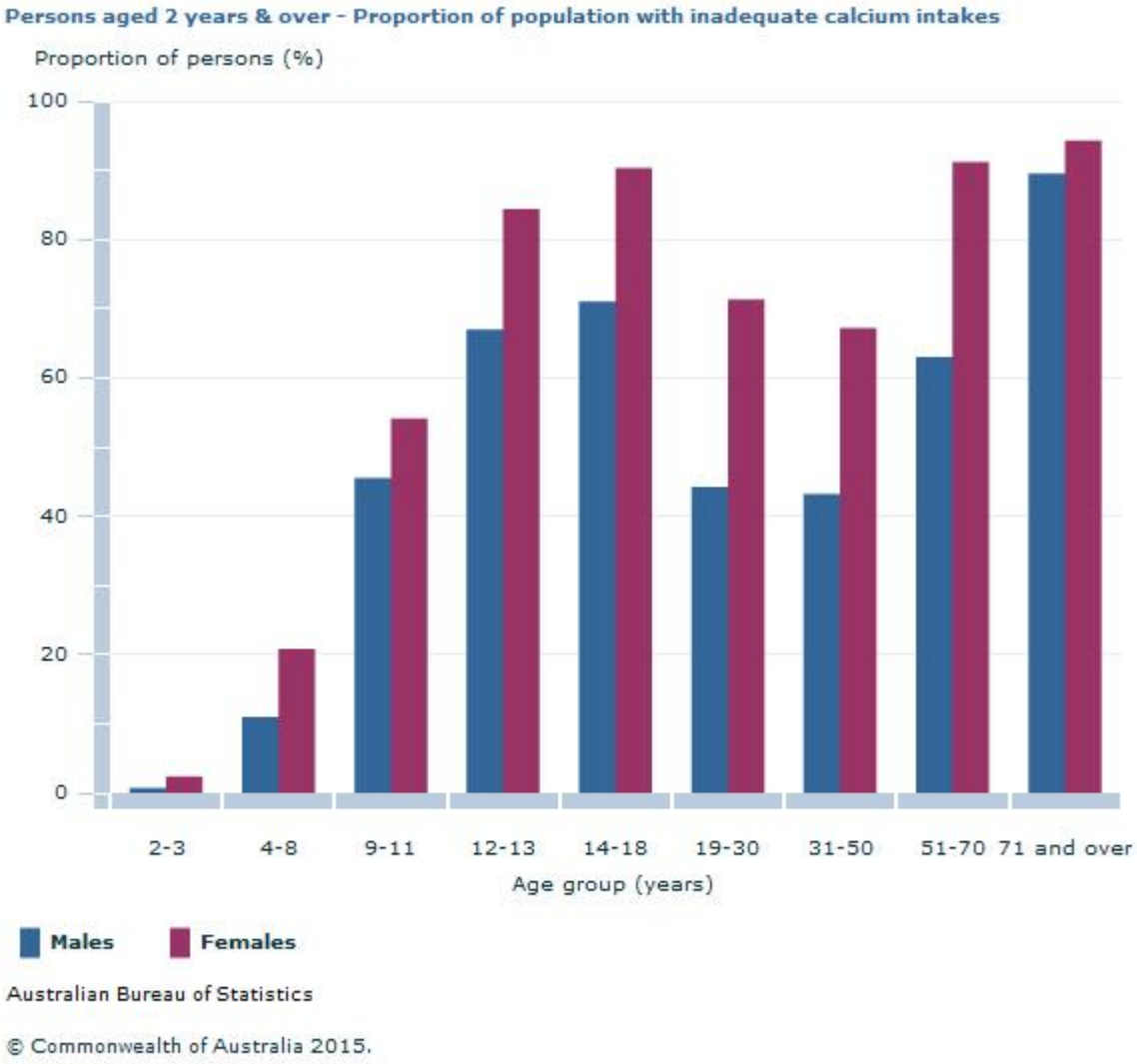
Source:
(a) National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <http://www.nrv.gov.au/nutrients/calcium>, last accessed 22/01/2015
(b) Australian Health Survey: Usual Nutrient Intake, 2011-12

proportion has a margin of error >10 percentage points which should be considered when using this information.

Over half of the Australian population aged two years and over had inadequate usual intakes of calcium. Males and females have the same requirements (EAR) in all age groups except the 51-70 years. However, the prevalence of inadequate calcium intakes was higher amongst females than males, with almost three in four aged two years and over (73%) not meeting their calcium requirements compared with one in two males of the same age group (51%).

Females aged 12 to 18 years and 51 years and over have higher requirements than other ages, and were most likely (nine in ten) to have inadequate intakes. Similarly, males aged 12-18 years and 51 years and over were more likely to have inadequate intakes. About two in three 12-18 and 51-70 year old males had usual intakes that were below their requirements (67% of 12-13 year olds, 71% of 14-18 year olds and 63% of 51-70 year olds), as did 90% of males aged 71 years and over.

Children aged 2-3 years were much more likely to meet their calcium requirements (1% of males and 2% of females with usual intakes below their requirements). This is likely to be a result of lower requirements for calcium and higher consumption of milk products amongst children aged 2-3 years (dairy foods being a rich source of calcium).[3]



***Source(s)**: Australian Health Survey: Usual Nutrient Intakes, 2011-12*

These results do not consider the contribution of dietary supplements to calcium intakes. In the 2011-12 NNPAS, 21% of females had some intake of calcium from dietary supplements on a given day (9% of 2-18 year olds, 21% of 19-50 year olds and 28% of those aged 51 years and over). For males, 14% consumed some supplemental calcium (9% of 2-18 year olds, 15% of 19-50 year olds and 15% of those aged 51 years and over). The amount of calcium that was present in these supplements varied. A future ABS feature article will provide further information on intakes of supplemental calcium in the 2011-12 NNPAS.

Less than 5% of the population exceeded the UL for calcium.

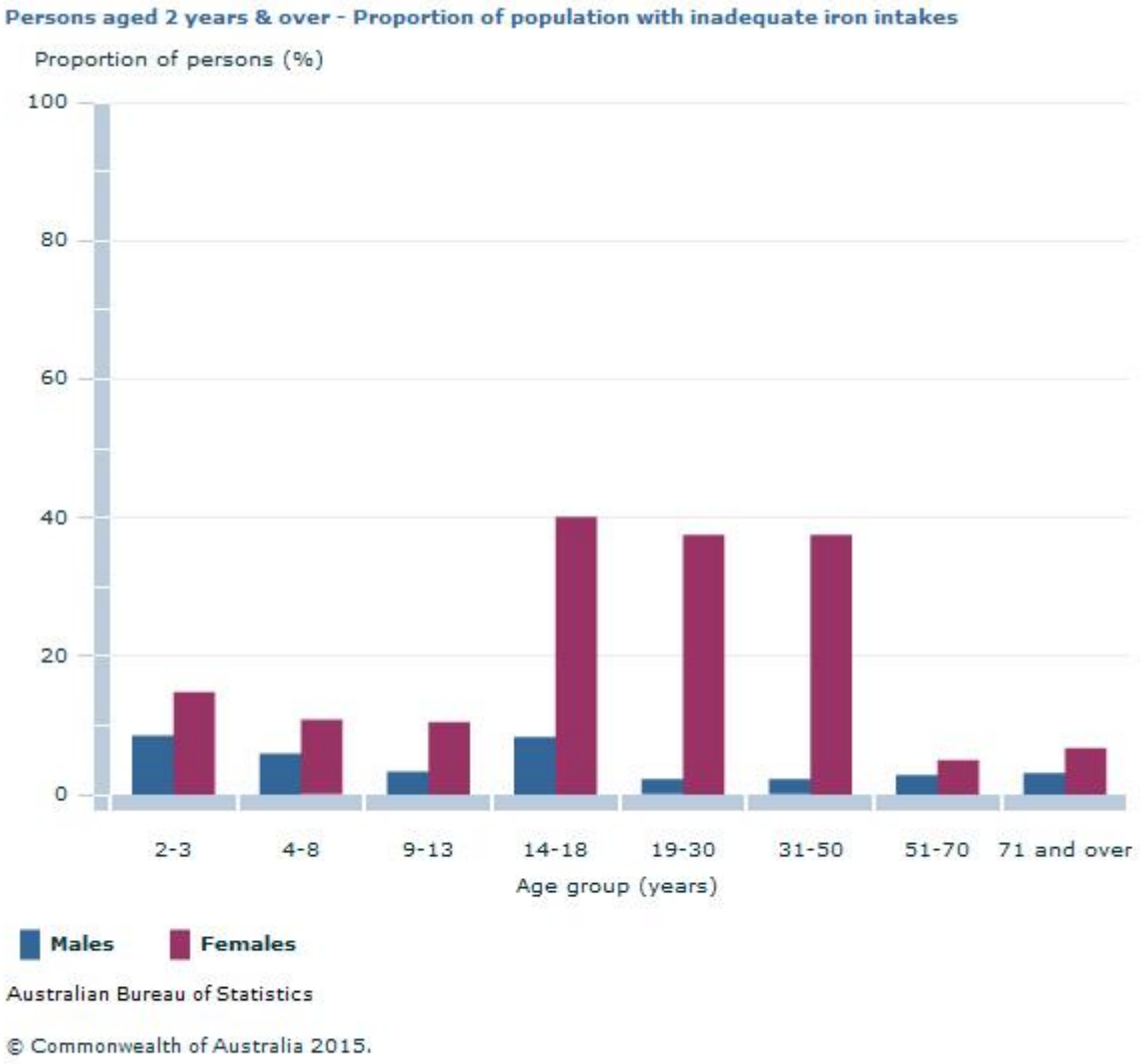
ENDNOTES

1 Australian Bureau of Statistics, 2014, *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, 'Table 10: Proportion of Nutrients from food groups', data cube: Excel spreadsheet, cat. no. 4364.0.55.007
2 National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <https://www.nrv.gov.au/nutrients/calcium>, last accessed 4/2/2015.
3 National Health and Medical Research Council, 2013, *Australian Dietary Guidelines*. Canberra: National Health and Medical Research Council, <https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/n55_australian_dietary_guidelines_130530.pdf>, last accessed 4/2/2015.

IRON

Iron is responsible for transporting oxygen in the blood to tissues throughout the body. It is also involved in the immune system, muscle function and cognitive functioning. Iron is found in a range of food sources, with cereal products, and meat, poultry and game products and dishes being the primary sources in the Australian food supply.[1] Females have greater iron requirements than males in many age groups.[2]

One in eight people aged two years and over had inadequate usual intakes of iron. Females were more likely than males to have inadequate iron intakes, with 23% not meeting the requirements compared with 3% of males. The prevalence of inadequate intakes was highest amongst females aged 14-50 years, with nearly two in five having inadequate iron intakes (40% of 14-18 year old females and 38% of 19-50 year-old females). These groups also have higher requirements for iron.[2]



***Source(s):** Australian Health Survey: Usual Nutrient Intakes, 2011-12*

These results do not consider the contribution of dietary supplements to iron intakes. On a given day in 2011-12, 14% of females had some intake of iron from dietary supplements (8% of 2-18 year olds, 17% of 19-50 year olds, and 14% of those aged 51 years and over). For males, 9% consumed some supplemental iron (8% of 2-18 year olds, 10% of 19-50 year olds, and 8% of those aged 51 years and over). The amount of iron that was present in these supplements varied. A future ABS feature article will provide further information on intakes of supplemental iron in the 2011-12 NNPAS.

The 2011-12 National Health Measures Survey (NHMS), a component of the 2011-13 AHS, included tests for ferritin (a measure of iron stores in the body) and anaemia (Feature Article: Anaemia). For

more information on ferritin levels for women of childbearing age see Feature Article: Women of Childbearing Age. Overall conclusions about the iron status of the Australian population should take into account the results of the NHMS.

Less than 5% of the population exceeded the UL for iron.

ENDNOTES

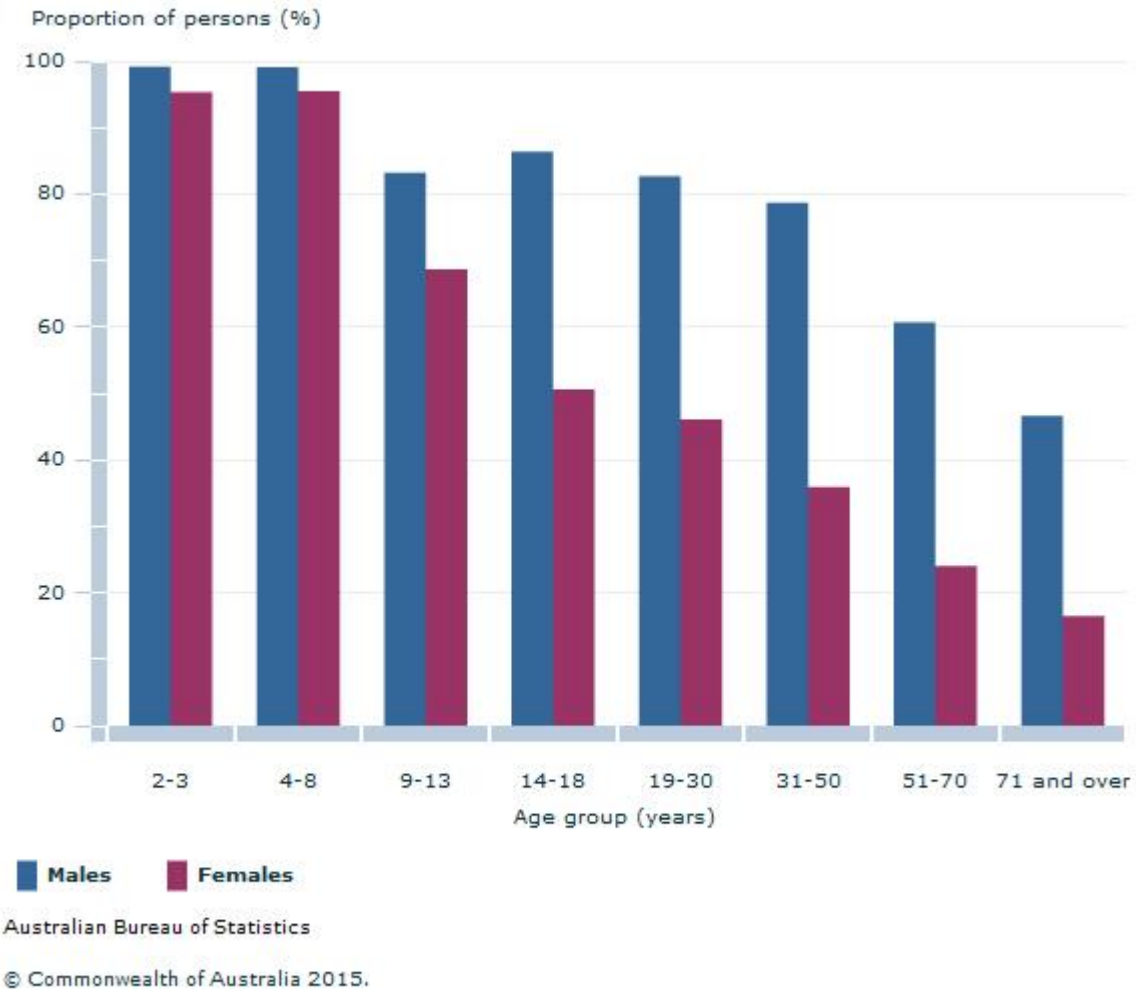
1 Australian Bureau of Statistics, 2014, *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, 'Table 10: Proportion of Nutrients from food groups', data cube: Excel spreadsheet, cat. no. 4364.0.55.007
2 National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <https://www.nrv.gov.au/nutrients/iron>, last accessed 4/2/2015

SODIUM

Sodium occurs in a number of different forms but is generally consumed as sodium chloride (commonly known as 'salt'). Sodium is found naturally in foods such as milk, cream, eggs, meat and shellfish. Sodium is also added to foods to enhance flavours, to act as a preservative and as part of some food additives. Processed foods, such as snack foods, bacon, and condiments, generally have high levels of sodium added during processing. High intakes of sodium can increase blood pressure, and high blood pressure can increase the risk of developing heart and kidney problems.[1]

Nearly two in every three people aged two years and over had a usual intake that exceeded the UL for sodium (76% of males and 42% of females). Intakes of sodium were consistently higher for males than females. Males were more likely to exceed the UL than females, a difference that was more pronounced for every age group over nine years. Children were more likely than adults to exceed the UL for sodium, with 91% of males and 74% of females aged 2-18 years compared with 71% of males and 32% of females aged 19 years and over exceeding the UL. This was particularly pronounced amongst children aged 2-8 years with nearly 100% of males and 95% of females exceeding the UL for sodium.

Persons aged 2 years & over - Proportion of population with usual intakes of sodium exceeding upper level



***Source(s)**: Australian Health Survey: Usual Nutrient Intakes, 2011-12*

These figures underestimate total sodium intakes, as they are based on sodium naturally present in foods as well as sodium added during processing, but exclude the 'discretionary salt' added by consumers when preparing foods in the home or 'at the table'. Almost two in three (64%) of Australians reported that they add salt very often or occasionally either during meal preparation or at the table. For more information, see the Interpretation paragraph of Nutrient Intake in the Users' Guide.

ENDNOTES

1 National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <https://www.nrv.gov.au/nutrients/sodium>, last accessed 4/2/2015

IODINE

Iodine is an essential nutrient required for the production of thyroid hormones, important for normal growth and development, particularly of the brain. The major dietary sources of iodine include bread and milk.[1] Inadequate amounts of iodine may lead to a range of conditions, including goitres, hypothyroidism, and in severe cases, intellectual disability.[2] Since October 2009, food regulations in Australia require that iodine is added to the salt used for making bread, except for organic bread and bread mixes for making bread at home.[3]

2% of males and 8% of females aged two years and over had inadequate intakes of iodine. Females aged 19 years and over were more than four times as likely as males to have inadequate intakes. In general, the prevalence of inadequate intake of iodine for Australian adults aged 19 years and over (2% of males and 10% of females) was higher than amongst children aged 2-18 years (0.4% of males and 2% of females).

Overall, these results were consistent with the biomedical test results from the 2011-12 National Measures Health Survey (NHMS), where around 1 in 10 Australian (13%) aged 5 years and over had a median urinary iodine concentration (UIC) less than 50 µg/L. This is within the World Health Organization recommendation of no more than 20% of the population with a UIC less than 50 µg/L. The NHMS results also showed women were more likely to be iodine deficient, with a higher proportion having a UIC less than 50 µg/L(16% compared with 10% of men). The prevalence of iodine deficiency was also lowest among young children (5-11 years), with only 6% having iodine levels under 50 µg/L compared with around 15% of those aged 35–54 years. For more information on iodine biomedical test results, see Feature Article: Iodine. In making comparisons between the NHMS and the usual nutrient intakes, consideration should be given to the differences in the methods used to measure the prevalence of inadequate iodine intakes, including the potential contribution of intakes of iodised discretionary salt to the results of the NHMS.

Almost one in ten children aged 2-3 years (13% of males and 6% of females) had a usual intake from food exceeding the UL for iodine. The proportion exceeding the UL could potentially be higher if the iodine intake from consuming iodised discretionary salt was included, however this could not be quantified from this survey.

Age-specific ULs for iodine are based on data from adults that are extrapolated to children using reference body weights. The UL for iodine is based on sub-clinical hypothyroidism which is an adaptive response of the thyroid to increased levels of iodine and is reversible.[4] In a separate

previous evaluation of iodine intake by FSANZ, a detailed toxicological review of the UL was undertaken and FSANZ considered that intakes up to 300 µg/day should be well tolerated by young children.[5,6] Usual nutrient intakes from this publication were compared with this value of 300 µg/day and it was found that less than 1% of 2-3 year olds (both males and females) exceeded it.[7]

Although it is generally not desirable to exceed a UL, the iodine intakes for young children were below a level at which adverse effects may be observed, though a reduced margin of safety exists.

Proportion of population with inadequate iodine intakes (estimated as % below the EAR), by age

Age (years)	EAR (µg)[(a)]	Proportion below EAR (%)[(b)]	
		Males	Females
2-3	65	0.1	0.5
4-8	65	0.1	0.3
9-13	75	0.3	0.5
14-18	95	0.8	6.4
19-30	100	1.5	11.7
31-50	100	1.6	9.0
51-70	100	3.5	10.5
71 and over	100	4.2	9.2

Source:
(a) National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <http://www.nrv.gov.au/nutrients/iodine>, last accessed 4/2/2015
(b) Australian Health Survey: Usual Nutrient Intakes, 2011-12

For more information on iodine biomedical test results, see Feature article: Iodine.

ENDNOTES

1 Australian Bureau of Statistics, 2014, *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, 'Table 10: Proportion of Nutrients from food groups', data cube: Excel spreadsheet, cat. no. 4364.0.55.007
2 World Health Organization, UNICEF, ICCIDD, 2007, *Assessment of iodine deficiency disorders and monitoring their elimination*,

<http://www.who.int/nutrition/publications/micronutrients/iodine_deficiency/9789241595827/en/>, last accessed 5/12/2014

3 Food Standards Australia New Zealand, 2012, *Iodine fortification*, <http://www.foodstandards.gov.au/consumer/nutrition/iodinefort/Pages/default.aspx>, last accessed 05/12/2014

4 National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <https://www.nrv.gov.au/nutrients/iodine>, last accessed 4/2/2015

5 Food Standards Australia New Zealand, 2007, *Proposal P1003 Mandatory Iodine Fortification for Australia, Supporting Document 9, Consideration of mandatory fortification with iodine, Safety Assessment and Risk Characterisation Report, December 2007*, <http://www.foodstandards.gov.au/code/proposals/documents/P1003%20SD9%20-%20Safety%20Assessment.pdf>, last accessed 20/2/2015

6 Food Standards Australia New Zealand, 2008, *Proposal P1003, Consideration of Mandatory Fortification with Iodine for Australia and New Zealand, Supporting Document 10, Dietary Intake Assessment Report, Main Report, April 2008*, <http://www.foodstandards.gov.au/code/proposals/documents/P1003%20SD10%20-%20Dietary%20Intake%20Assessment.pdf>, last accessed 20/2/2015

7 Not available from published tables. Derived from full usual intake distribution.

PHOSPHORUS

Phosphorus is the second most abundant mineral in the body. It plays an important role in the formation of bones and teeth, protein production and energy-producing activities in cells. Phosphorus is widely distributed in foods.[1] Major food sources of phosphorus are foods containing protein such as meat and milk products.[2]

Proportion of population with inadequate phosphorus intakes (estimated as % below the EAR), by age

Age (years)	EAR (µg)[a]	Prevalence of inadequacy (%)[b]	
		Males	Females
2-3	380	-	-
4-8	405	-	-
9-13	1055	11.7	27.6
14-18	1055	4.6	#29.8
19-30	580	-	0.5
31-50	580	-	0.3
51-70	580	-	0.3
71 and over	580	0.1	0.6

Source:
(a) National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <http://www.nrv.gov.au/nutrients/phosphorus>, last accessed 4/2/2015
(b) Australian Health Survey: Usual Nutrient Intakes, 2011-12

- nil or rounded to zero (including null cells)
proportion has a margin of error >10 percentage points which should be considered when using this information.

Around one in thirty people aged two years and over (1% of males and 4% of females) had a usual intake of phosphorus below their requirements. Children aged 9-18 years have the highest requirements for phosphorus at nearly double that of adults, and this age group had the highest proportions with inadequate intakes. Nearly one in three females aged 9-18 years had inadequate intakes of phosphorus (28% of those aged 9-13 years and 30% of those aged 14-18 years). Females aged 2-18 years were three times as likely as males of the same age to not meet their requirements (17% compared with 5%).

Less than 5% of the population exceeded the UL for phosphorus.

ENDNOTES

1 National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient*

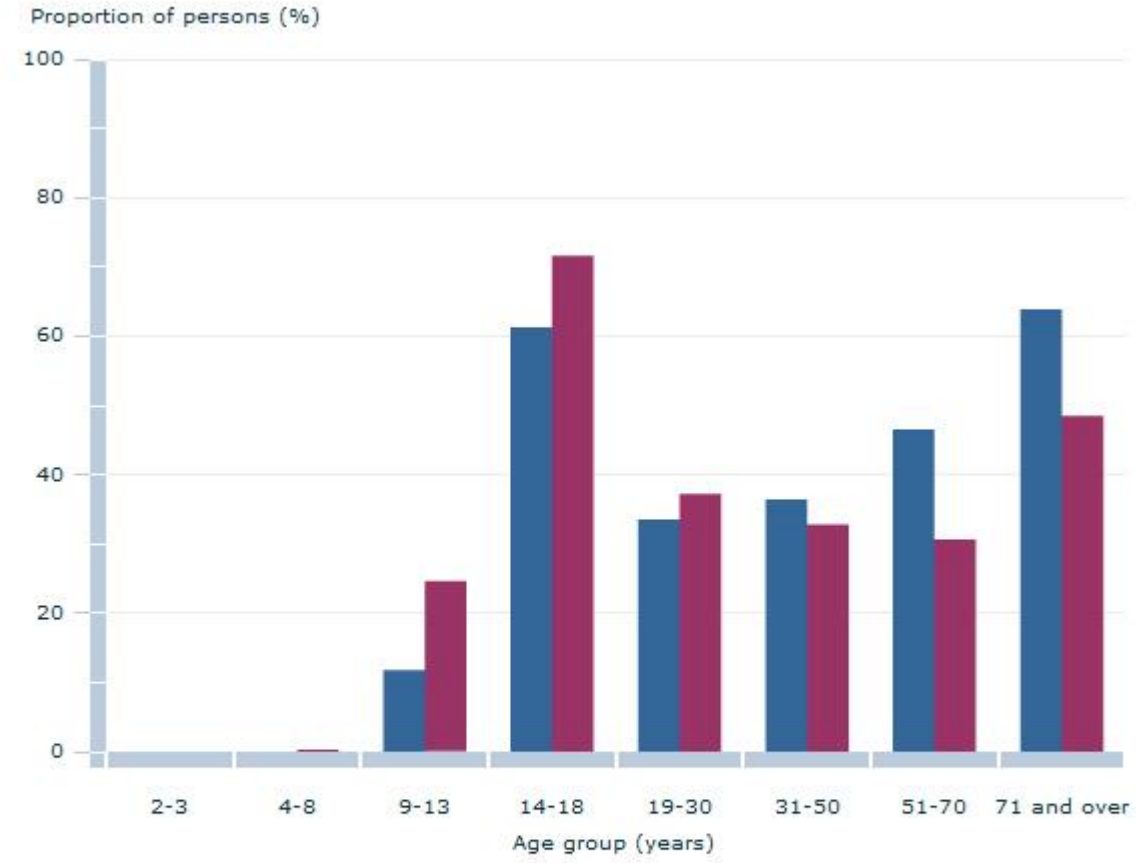
Reference Values for Australia and New Zealand, <https://www.nrv.gov.au/nutrients/phosphorus>, last accessed 4/2/2015
2 Australian Bureau of Statistics, 2014, *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, 'Table 10: Proportion of Nutrients from food groups', data cube: Excel spreadsheet, cat. no. 4364.0.55.007

MAGNESIUM

Magnesium is an essential mineral required for a range of biochemical activities in the human body. These include protein production, muscle and nerve function, blood glucose control and bone development. Magnesium is widely distributed in both animal and plant foods, such as vegetables, fruits and whole grains.[1] Major food sources of magnesium in Australia include cereals and cereal based products and dishes, along with non-alcoholic beverages (such as coffee and water).[2]

In 2011-12, one in three people aged two years and over (37% of males and 34% of females) did not meet their requirements for magnesium. Inadequate intakes of magnesium were more common in those aged nine years and over, with 61% of males aged 14 to 18 years consuming less than their requirements for magnesium, and 72% of females of the same age. In contrast, almost all children aged 2-8 years met their magnesium requirements. Males aged 19 years and over were more likely than females of the same age group to have inadequate intakes (41% compared with 35%).

Persons aged 2 years & over - Proportion of population with inadequate magnesium intakes



Australian Bureau of Statistics

***Source(s):** Australian Health Survey: Usual Nutrient Intakes, 2011-12*

Proportion of population with inadequate magnesium intakes (estimated as % below the EAR), by age

Age (years)	EAR (mg)[(a)]		Prevalence of inadequacy (%)[(b)]	
	Males	Females	Males	Females
2-3	65	65	-	-
4-8	110	110	-	0.3
9-13	200	200	11.8	24.6
14-18	340	300	61.3	71.6
19-30	330	255	33.5	37.2
31-50	350	265	36.4	32.8
51-70	350	265	46.5	30.6
71 and over	350	265	63.9	48.5

Source:
(a) National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <http://www.nrv.gov.au/nutrients/magnesium>
(b) Australian Health Survey: Usual Nutrient Intake, 2011-12

- nil or rounded to zero (including null cells)

ENDNOTES

1 National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <https://www.nrv.gov.au/nutrients/magnesium>, last accessed 4/2/2015
2 Australian Bureau of Statistics, 2014, *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, 'Table 10: Proportion of Nutrients from food groups', data cube: Excel spreadsheet, cat. no. 4364.0.55.007

SELENIUM

Selenium functions as an antioxidant and in thyroid metabolism.[1] The main sources of selenium in Australia are meat, poultry and game products and dishes; cereal based products and dishes; cereals

and cereal products; and fish and seafood products and dishes.[2] Soil concentration of selenium ranges widely and affects levels in plant food.[1]

3% of males and 6% of females aged two years and over did not meet their requirements for selenium intake. Amongst those 71 years and over, approximately one in ten had inadequate selenium intakes (12% of males and 10% of females).

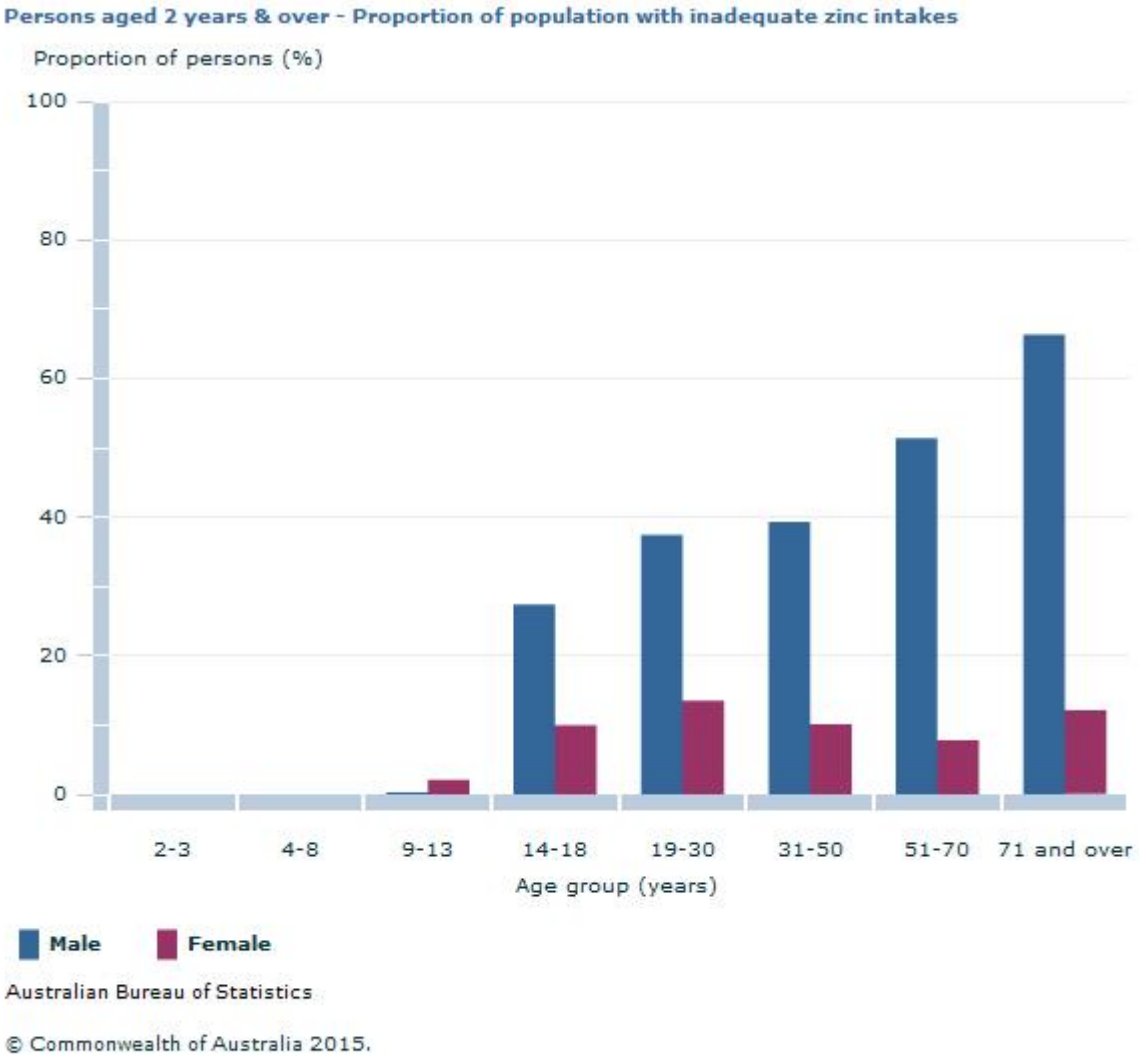
Less than 5% of the population exceeded the UL for selenium.

ENDNOTES

1 National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <https://www.nrv.gov.au/nutrients/selenium>, last accessed 4/2/2015
2 Australian Bureau of Statistics, 2014, *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, 'Table 10: Proportion of Nutrients from food groups', data cube: Excel spreadsheet, cat. no. 4364.0.55.007

ZINC

Zinc is a mineral involved in a variety of body processes and found in a broad range of foods. Zinc's biological functions range from helping maintain the structural integrity of proteins to regulation of gene expression. Sources of zinc in the Australian diet include meat, cereals and dairy.[1] There are numerous factors that can affect the absorption of zinc in the human body, for example the presence of protein and iron in the food consumed. The former increases absorption, particularly for proteins from animal sources, and the latter decreases it when present in high levels – such as those found in some dietary supplements.[2]



Source(s): *Australian Health Survey: Usual Nutrient Intakes, 2011-12*

Proportion of population with inadequate zinc intakes (estimated as % below the EAR), by age

Age (years)	EAR (mg)[(a)]		Prevalence of inadequacy (%)[(b)]	
	Males	Females	Males	Females
2-3	2.5	2.5	-	-
4-8	3.0	3.0	-	-
9-13	5.0	5.0	0.3	2.1
14-18	11.0	6.0	27.4	10.0
19-30	12.0	6.5	37.4	13.5
31-50	12.0	6.5	39.3	10.1
51-70	12.0	6.5	51.4	7.8
71 and over	12.0	6.5	66.3	12.1

Source:
(a) National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <http://www.nrv.gov.au/nutrients/zinc>
(b) Australian Health Survey: Usual Nutrient Intake, 2011-12

- nil or rounded to zero (including null cells)

More than one in three males (37%) and one in ten females (9%) had inadequate usual zinc intakes. From age 14, male requirements (EARs) for zinc are nearly twice those for females of the same age group. This corresponds with more males having inadequate intakes of zinc than females, despite males' median intake of zinc being higher than females' for every age group. The greatest prevalence of inadequacy was among males 71 years and over, where 66% had inadequate zinc intakes.

In contrast to the considerable proportion of adult males who had zinc intakes below the EAR, toddlers of both sexes were much more likely to exceed the UL for zinc. 63% of 2-3 year old males and 40% of 2-3 year old females exceeded their applicable UL.

The National Health and Medical Research Council and New Zealand Ministry of Health noted that there was no evidence of adverse effects from naturally occurring zinc in food.[3] FSANZ considers that the usual zinc intakes for young children are not excessive and are unlikely to represent a health and safety risk to young children. Another way of assessing whether zinc intakes are excessive is to

compare them with the Provisional Tolerable Daily Intake (1 mg/kg bw/day), an alternative health based guidance value. In a separate analysis conducted by FSANZ, zinc intakes in young Australian children were found to be within this health based guidance value.[4]

ENDNOTES

1 Australian Bureau of Statistics, 2014, *Australian Health Survey: Nutrition First Results - Foods and Nutrients, 2011-12*, 'Table 10: Proportion of Nutrients from food groups', data cube: Excel spreadsheet, cat. no. 4364.0.55.007
2 National Health and Medical Research Council and New Zealand Ministry of Health, 2006, *Nutrient Reference Values for Australia and New Zealand*, <https://www.nrv.gov.au/nutrients/zinc>, last accessed 4/2/2015
3 National Health and Medical Research Council and New Zealand Ministry of Health, 2005, *Nutrient Reference Values for Australia and New Zealand, Evidence Appendix*, Commonwealth of Australia, Canberra
4 Food Standards Australia New Zealand, 2011, *23rd Australian Total Diet Study*, <http://www.foodstandards.gov.au/publications/pages/23rdaustraliantotald5367.aspx>, last accessed 20/2/2015

CAFFEINE

Caffeine is a natural stimulant found in coffee, tea, and chocolate and a common additive to some drinks and powders.

Males and females had similar intakes of caffeine for each age group. Both males and females over 30 years consumed more caffeine than younger age groups on average, with daily median intakes of over 150 mg and daily mean intakes of over 170 mg for age groups 31-50 and 51-70 years. This is the equivalent of over four cups of black tea, or one and a half espresso shots of coffee. Approximately one quarter of 51-70 year olds consumed the equivalent of six to seven cups of tea or two to three espresso shots of coffee each day (75th percentile of caffeine intakes of 259 mg for males and 238 mg for females aged 51-70 years).

EXPLANATORY NOTES

INTRODUCTION

1 This publication is the second release of nutrition data from the 2011-12 National Nutrition and Physical Activity Survey (NNPAS). The first release was published in May 2014.

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

3 The Australian Health Survey: Usual Nutrient Intakes publication contains usual (long term) nutrient intake information modelled from two days of 24-hour dietary recall data. Usual intakes of nutrients are provided by age groups and sex at the national level, including comparison with nutrient requirements, where relevant.

4 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

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

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

7 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).

8 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.

9 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

10 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).

11 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

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

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

NNPAS, APPROACHED SAMPLE, FINAL SAMPLE AND RESPONSE RATES

	New South Wales	Victoria	Queensland	South Australia	Western Australia	Tasmania	Northern Territory	Australian Capital Territory	Australia
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

13 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.

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

15 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

16 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.

17 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.

18 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.

19 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.

20 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

21 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.

22 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).

23 In this publication, RSEs are provided for all count estimates. Estimates with an RSE of 25% to 50% are preceded by an asterisk (e.g. *3.4) to indicate that the estimate has a high level of sampling error relative to the size of the estimate, and should be used with caution. Estimates with an RSE over 50% are indicated by a double asterisk (e.g. **0.6) and are generally considered too unreliable for most purposes.

24 MoEs are provided for all proportion estimates to assist users in assessing the reliability of these types of estimates. 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 Validation and Error Estimation </ausstats/abs@.nsf/lookup/4363.0.55.001Chapter651032011-13> in the Users' Guide.

27 Where comparisons with guideline values (nutrient reference values or NRVs) have been made, any error in these guideline values will affect the quality of the resulting estimates. The NRVs are a set of recommendations made by the Australian National Health and Medical Research Council and the New Zealand Ministry of Health for nutritional intake, based on currently available scientific knowledge. More information on the methods used to derive the NRVs for each nutrient is available on the Nutrient Reference Values for Australia and New Zealand 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 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 specifically for the survey. A complete nutrient profile of 44 nutrients was created based on FSANZ's latest available data, however, not all data was based on directly analysed foods. Some data was borrowed from overseas food composition tables, food label information, imputed data from similar foods, or data 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.

COMPARISONS WITH 1995 NNS

34 Comparisons of this publication with 1995 NNS usual nutrient intakes are not recommended due to changes in usual intake adjustment methodology and different survey methodology. See the Comparisons with 1995 NNS chapter of the AHS: Users' guide 2011-13 (cat. no. 4363.0.55.001) for more details.

CONFIDENTIALITY

35 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.

36 In this publication, confidentiality is protected due to modelling of age and sex groups only. No data is presented for small groups or individual respondents.

ROUNDING

37 Estimates presented in this publication have been rounded. As a result, sums of components may not add exactly to totals. Estimates of zero or rounded to zero and their corresponding measures of error have been represented by a dash.

38 All statistics relating to proportion of persons are rounded to one decimal place and all statistics

relating to number of persons are rounded to whole numbers (‘000). Percentiles of usual nutrient intakes and mean usual nutrient intakes are rounded to one decimal place or whole numbers, depending on the corresponding Nutrient Reference Value or the scale of the data.

ACKNOWLEDGEMENTS

39 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*.

40 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.

41 This publication is a joint release by the ABS and Food Standards Australia New Zealand (FSANZ). FSANZ and the ABS jointly investigated and validated the use of the NCI method with the 2011-12 NNPAS. FSANZ was contracted to provide advice throughout the survey development, processing, and collection phases of the 2011-12 NNPAS, and to provide a nutrient database for the coding of foods and dietary supplements consumed. The ABS would like to acknowledge and thank FSANZ for providing their support, advice and expertise to the 2011-12 NNPAS.

42 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

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

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

45 Summary tables containing aggregated estimates of the prevalence of inadequate intakes, intakes above the upper level and intakes outside of acceptable macronutrient distribution ranges are available in the ‘Downloads’ tab in this release. Information on how to aggregate estimates for different age and sex groups is in the Summary Tables page </ausstats/abs@.nsf/lookup/4363.0.55.001Chapter651042011-13> of the Users’ Guide.

RELATED PUBLICATIONS

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

47 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.

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).

Acceptable Macronutrient Distribution Range (AMDR)

The Acceptable Macronutrient Distribution Range (AMDR) is an estimate of the range of intake for each macronutrient for individuals (expressed as percent contribution to energy), which would allow for an adequate intake of all the other nutrients whilst maximising general health outcomes. AMDRs are available for energy from the following nutrients: carbohydrate, fat and protein. See Nutrient Reference Values for Australia and New Zealand.

Alcohol

The term 'alcohol' is commonly used to refer to alcoholic beverages. However, in the 2011-12 NNPAS alcohol refers to pure alcohol (or ethanol), which, as a macronutrient, contributes 29 kJ per gram.

Alpha-linolenic acid

Alpha-linolenic acid is a plant-based omega-3 polyunsaturated fatty acid which is considered a small but important component of dietary intake in relation to helping reduce coronary heart disease risk.

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.

Caffeine

Caffeine is a natural stimulant.

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.

Carbohydrate

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

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.

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. Dietary fibre plays a beneficial role in laxation, blood cholesterol levels, and blood glucose modulation. It comes in the form of polysaccharides, oligosaccharides and lignins.

Dietary guidelines

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

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

The Guidelines are for use by health professionals, policy makers, educators, food manufacturers, food retailers and researchers.
The content of the Australian Dietary Guidelines applies to all healthy Australians, as well as those with common diet-related risk factors such as being overweight. They do not apply to people who need special dietary advice for a medical condition, or to the frail elderly.

Dietary supplement

For the purpose of the AHS, dietary supplements refer to products defined as Complementary Medicines under the Therapeutic Goods Regulations 1990 and that are not intended for inhalation or use on the skin. They include products containing ingredients that are nutrients, such as multivitamin or fish oil products.

Estimated Average Requirement (EAR)

The Estimated Average Requirement (EAR) is the daily nutrient level estimated to meet the requirements of half the healthy individuals in a particular life stage and gender group. EARs are available for the following nutrients: protein, vitamin A (as retinol equivalents), thiamin (B1), riboflavin (B2), niacin equivalents, vitamin B6, vitamin B12, folate equivalents, vitamin C, calcium, iodine, iron, magnesium, phosphorous, selenium and zinc. See Nutrient Reference Values for Australia and New Zealand.

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 do not add up to total fat because total fat includes a contribution from the non-fatty acid components.

Fatty acids

Fatty acids are units of carbon, hydrogen and oxygen which combine with glycerine to form fat. Most foods contain a mixture of monounsaturated, polyunsaturated and saturated fatty acids.

Fish and seafood products and dishes

The 'Fish and seafood products and dishes' food group includes fresh and tinned seafood, shellfish and mixed dishes with fish or seafood as the main component e.g. salmon mornay, fish curry and prawn cocktail.

Folate

In this publication, folate refers specifically to the naturally-occurring form of folate (tetrahydrofolate or THF).

Folate equivalents

Folate is a B group vitamin that is essential for healthy growth and development, which is important during pregnancy to help prevent the incidence of neural tube defects (such as spina bifida) in babies. Folate intake is measured in folate equivalents to take into account the higher bioavailability of folic acid (pteroyl glutamic acid, or PGA, the form used in food fortification and dietary supplements) than natural folate (tetrahydrofolate, or THF, the form found in foods and in the body). Folate equivalents = 1.67*folic acid + natural folate.

Folate, natural

See folate.

Folic acid

Folic acid (pteroyl glutamic acid, or PGA) is the form of folate used in dietary supplements and for food fortification as it is more stable and bioavailable than the naturally-occurring forms in foods. As of September 2009, in Australia wheat flour for making bread is required to be fortified with folic acid, with the exception of wheat flour for making bread which is represented as organic. See Standard 2.2.1 of the FSANZ Food Standards Code.

Fortification

Fortification refers to adding vitamins and minerals to food. When there is determined to be a significant public health need, food manufacturers may be required to add certain vitamins or minerals to specified foods (mandatory fortification). In Australia, mandatory fortification of foods includes requirements for salt used in bread to be iodised, thiamin and folic acid to be added to wheat flour for making bread, and vitamin D added to edible oil spreads such as margarine. See Food Standards Australia New Zealand: Vitamins and minerals added to food.

Full probability method

The full probability method is a statistical method for finding the proportion of people within a group with inadequate intakes of a nutrient. It involves determining the probability that each observed usual intake of a nutrient will be below requirements for that nutrient. For a population group, the overall proportion of people within the group likely to be consuming inadequate intakes is calculated as the average probability of inadequacy. For more information, see the Beaton's full probability of method for iron chapter of the AHS: Users' Guide, 2011-13 (cat. no. 4363.0.55.001).

Iodine

Iodine is a mineral essential for the production of thyroid hormones, which are essential for normal growth and development, particularly of the brain. Since October 2009, regulations in Australia and New Zealand require that iodine is added to salt used for making bread (except organic bread and bread mixes for making bread at home). See Standard 2.2.1 of the FSANZ Food Standards Code.

Iron

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

Linoleic Acid

Linoleic acid is a particular type of omega 6 polyunsaturated fatty acid associated with blood lipid profiles seen as having a lower risk of coronary heart disease.

Long-chain omega 3 fatty acids

Long-chain omega 3 fatty acids are a particular type of omega 3 fatty acid (eicosapentaenoic acid, docosapentanoic acid, and docosahaexanoic acid) with cardiovascular and anti-inflammatory benefits.

Macronutrient

Macronutrients are nutrients that provide energy and raw materials for body tissues and processes. They include protein, fats, carbohydrates and alcohol.

Magnesium

Magnesium is a mineral involved in a number of body processes, as a cofactor for more than 300 enzyme systems.

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.

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 Health Measures Survey

The National Health Measures Survey, which is sometimes referred to as the biomedical component of the AHS, focused on early lifestyle-related diseases through blood and urine testing. Information was collected on:

- cardiovascular disease
    - apolipoprotein B (Apo B)
    - high-density lipoprotein (HDL) cholesterol
    - low-density lipoproteins (LDL) cholesterol
    - total cholesterol
    - triglycerides
- diabetes
    - fasting plasma glucose
    - glycated haemoglobin (HbA1c)
- chronic kidney disease
    - estimated glomerular filtration rate (eGFR)
    - urinary albumin creatinine ratio (ACR)
- liver function
    - alanine aminotransferase (ALT)

    - gamma-glytamyl transferase (GGT)
- risk factors
    - serum cotinine
- nutrition status
    - haemoglobin (Hb)
    - serum ferritin
    - soluble transferrin receptor (sTfR)
    - serum folate
    - red cell folate (RCF)
    - serum vitamin B12
    - serum 25-hydroxyvitamin D [25(OH)D]
    - urinary sodium
    - urinary potassium
    - urinary iodine.

Participants were those people aged five years and over, who were selected for either NHS or NNPAS and agreed to also participate in the NHMS. Children aged 5 to 11 were only asked to provide urine samples. For more information about the tests, see Biomedical Measures.

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).

Niacin equivalents

Niacin intake requirements are expressed as niacin equivalents. 1 mg of niacin equivalents is equal to 1 mg of niacin or 60 mg of tryptophan. Niacin (vitamin B3) is a general term for nicotinic acid and nicotinamide. Tryptophan is an amino acid that is converted to nicotinamide. Niacin is involved in energy metabolism.

Nutrient

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

Nutrient Database

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.

Nutrient Reference Value (NRV)

The Nutrient Reference Values (NRVs) are a set of recommendations made by the National Health and Medical Research Council (NHMRC) and New Zealand Ministry of Health in 2006 for nutritional intake, based on currently available scientific knowledge. See Nutrient Reference Values for Australia and New Zealand.

Percentage contribution to energy intake

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

Phosphorus

Phosphorus is the second most abundant mineral in the body. It plays an important role in the formation of bones and teeth, protein production, and energy-producing activities in cells.

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.

Potassium

Potassium is a mineral which is the major positive ion of fluid within cells and is found at close to constant levels in lean body tissues.

Preformed Vitamin A

Preformed vitamin A, or retinol, is a form of vitamin A.

Prevalence of inadequacy

In this release, prevalence of inadequacy (from foods) for a particular nutrient is the estimate of persons who aren't meeting their requirements for a nutrient. For all nutrients except iron, this is estimated in this publication as the proportion of persons with an intake below the EAR. For iron, this has been estimated using the full probability method. See <link to reporting against NRVs> in the User's Guide for more details.

Pro Vitamin A

Pro vitamin A is a form of vitamin A. Where information on levels of carotenes other than beta carotene in foods was available, this has been included in the pro vitamin A total as beta carotene equivalents, according to the equation pro vitamin A = beta carotene + 0.5*alpha carotene + 0.5*cryptoxanthin. This equation takes into account the differing biological activities of the different forms of pro vitamin A.

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.

Relative Standard Error (RSE)

The relative standard error is the standard error expressed as a percentage of the estimate. For more information see Technical Note in this publication.

Riboflavin (vitamin B2)

Riboflavin is a B group vitamin important for converting other nutrients into bioactive forms.

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.

Selenium

Selenium is a mineral that functions as an antioxidant and in thyroid metabolism.

Sodium

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

Starch

See carbohydrate.

Supplement

See dietary supplement.

Thiamin (vitamin B1)

Thiamin is a B group vitamin that helps the body convert food to energy for the brain, nervous system and muscles. In Australia, wheat flour for making bread is required to be fortified with thiamin. See Standard 2.2.1 of the FSANZ Food Standards Code.

Total fat

Total fat includes the fatty acids reported on in this release as well as some fats not separately reported on, such as non-fatty acid components of triglycerides, phospholipids, sterols and waxes.

Total sugars

Total sugars are the sum of fructose, glucose, sucrose, maltose, lactose and galactose. In the NNPAS, naturally occurring sugars cannot be differentiated from those that are added.

Trans fatty acids

Trans fatty acids are produced from hydrogenating unsaturated oils during food processing, and are naturally occurring in ruminant animal foods. The food composition data used for the 2011-13 AHS include both monounsaturated and polyunsaturated trans fats.

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.

Upper Level of Intake (UL)

The Upper Level of Intake (UL) of a nutrient is the highest average daily intake level that is likely to pose no adverse health effects to almost all individuals in the general population. As intake increases above the UL, the potential risk of adverse effects increases. ULs are available for the following nutrients: calcium, iodine, iron, phosphorous, selenium, zinc, preformed vitamin A (retinol), folic acid, vitamin E, sodium, and long-chain omega 3 fatty acids. See Nutrient Reference Values for Australia and New Zealand.

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.

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 found naturally in food and are either fat or water soluble. They are required in small amounts. Vitamins enable the human body to function efficiently by regulating biochemical processes such as growth metabolism, cell reproduction, digestion, and oxidation of the blood.

Vitamin A retinol equivalents

Vitamin A is a fat soluble vitamin which helps maintain normal reproduction, vision, and immune function. Vitamin A intake is measured in retinol equivalents to reflect the contribution of pro vitamin A and preformed vitamin A, using the equation: vitamin A retinol equivalents = retinol + beta carotene/6 + alpha carotene/12 + cryptoxanthin/12. The equation takes into account the differing biological activities of the different forms of vitamin A.

Vitamin B6

Vitamin B6 is involved in the metabolism of amino acids, glycogen and sphingoid bases, where it functions as a coenzyme.

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.

Vitamin C

Vitamin C refers to compounds with antiscorbutic activity and antioxidant properties.

Vitamin E

Vitamin E refers to a group of compounds called tocopherols and tocotrienols. It prevents the oxidation of polyunsaturated fatty acids, acting as an antioxidant in the lipid phase of cell membranes.

Zinc

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

ABBREVIATIONS

The following symbols and abbreviations are used in this publication:

ABS	Australian Bureau of Statistics
AHS	Australian Health Survey
AMDR	Acceptable Macronutrient Distribution Range
DNA	deoxyribonucleic acid
EAR	Estimated Average Requirement
FSANZ	Food Standards Australia New Zealand
mg	milligram
mg/kg bw/day	milligram per kilogram of bodyweight per day

g	gram
kJ	kilojoule
MoE	Margin of Error
NCI	National Cancer Institute
NHMRC	National Health and Medical Research Council
NHMS	National Health Measures Survey
NHS	National Health Survey
NNPAS	National Nutrition and Physical Activity Survey
NRV	Nutrient Reference Value
NTD	neural tube defect
RSE	Relative Standard Error
µg	microgram
UL	Upper Level of Intake

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 the relative standard error (RSE), which is obtained by expressing the SE as a percentage of the estimate. The RSE is a useful measure in that it provides an immediate indication of the percentage errors likely to have occurred due to sampling, and thus avoids the need to refer also to the size of the estimate.

$$RSE\% = \left(\frac{SE}{estimate}\right) \times 100$$

3 RSEs for the published estimates and proportions are supplied in the Excel data tables, available via the Downloads page.

4 The smaller the estimate the higher is the RSE. Very small estimates are subject to such high SEs (relative to the size of the estimate) as to detract seriously from their value for most reasonable uses. In the tables in this publication, only estimates with RSEs less than 25% are considered sufficiently reliable for most purposes. However, estimates with larger RSEs, between 25% and less than 50% have been included and are preceded by an asterisk (e.g. *3.4) to indicate they are subject to high SEs and should be used with caution. Estimates with RSEs of 50% or more are preceded with a double asterisk (e.g. **0.6). Such estimates are considered unreliable for most purposes.

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 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.

STANDARD ERRORS OF PROPORTIONS AND PERCENTAGES

7 Proportions and percentages formed from the ratio of two estimates are also subject to sampling errors. The size of the error depends on the accuracy of both the numerator and the denominator. For proportions where the denominator is an estimate of the number of persons in a group and the numerator is the number of persons in a sub-group of the denominator group, the formula to approximate the RSE is given below. The formula is only valid when x is a subset of y.

$$RSE\left(\frac{X}{Y}\right) = \sqrt{RSE(X)^2 - RSE(Y)^2}$$

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.

10 Another measure is the Margin of Error (MoE), which describes the distance from the precision of the estimate at a given confidence level, 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 all dwellings had been enumerated). The 95% MoE is calculated as 1.96 multiplied by the SE.

11 The 95% MoE can also be calculated from the RSE by:

$$MOE(y) \approx \frac{RSE(y) * y}{100} * 1.96$$

12 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

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

13 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.

EXAMPLE OF INTERPRETATION OF SAMPLING ERROR

14 Standard errors can be calculated using the estimates and the corresponding RSEs. For example, for females aged 19-30 years, the mean usual intake of protein was 77 grams. The RSE for this estimate is 2%, and the SE is calculated by:

$$SE\ of\ estimate = \left(\frac{RSE}{100}\right) \times estimate$$

$$= 0.02 \text{ x } 77$$

$$= 1.54$$

15 Standard errors can also be calculated using the MoE. For example the MoE for the estimate of the proportion of females aged 71 years and over whose usual daily protein intake was below 46 grams is +/- 2.5 percentage points. The SE is calculated by:

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

$$= \left(\frac{2.5}{1.96}\right)$$

$$= 1.3$$

16 Note due to rounding the SE calculated from the RSE may be slightly different to the SE calculated from the MoE for the same estimate.

17 There are about 19 chances in 20 that the estimate of the proportion of females aged 71 years and over whose usual daily protein intake was below 46 grams is +/- 2.5 percentage points from the population value.

18 Similarly, there are about 19 chances in 20 that the proportions of females aged 71 years and over whose usual daily protein intake was below 46 grams is within the confidence interval of 1.3% to 6.3%.

SIGNIFICANCE TESTING

19 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:

$$\frac{|x-y|}{SE(x-y)}$$

20 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.