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# Fruit, Vegetables and Diet Score

A deep-dive into the self-reported fruit, vegetable and juice consumption of 145,000 Australian adults

**February 2017**

Horticulture Innovation Australia

## CITATION

Hendrie, G., Noakes, M. (2017). *Fruit, Vegetables and Diet Score*.





## ACKNOWLEDGMENTS

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CSIRO Healthy Diet Score is a collaboration between CSIRO and SP Health Co.




# Contents

# Executive summary

## Most adults aren't eating enough fruit and vegetables

Australians have easy access to high-quality fruit and vegetables but the majority of adults don't meet the *Australian Dietary Guidelines* for their age and gender. Only 24% of women and 15% of men are meeting both the fruit and vegetable guidelines.

## People may believe they're eating more than they truly are

This report describes a very large sample of Australian adults, 15 times larger than the Australian Health Survey. Self-reported intake of fruit and vegetables is higher in this sample which suggests that *people likely believe they eat better than they actually do*. This misconception was highlighted in *CSIRO Healthy Diet Score 2016* and is an important consideration for future population health campaigns.

## Certain groups need more help than others

Men, younger adults, obese adults and unemployed adults have been identified in this report as the key groups who need extra help increasing their intake of fruit and vegetables, although most adults have room to improve.

## Variety could be the key to boosting consumption

Fruit and vegetable intake increases with variety. Adults who eat several different types of fruit and vegetables have the highest levels of consumption. A consideration for future population health campaigns is to focus on increasing variety of fruit and vegetables. Increased consumption will likely follow.

## 3 types of vegetables at dinnertime could be a practical suggestion

A key finding of this report is that adults who always have at least 3 types of vegetables with their evening or main meal are most likely to meet the *Australian Dietary Guidelines*. Encouraging "1,2,3 @ tea", i.e. 3 types of vegetables at dinnertime, could be a practical suggestion for increasing intake of vegetables.

## Diet Score increases with fruit and vegetable intake

Fruit and vegetable intake is a proxy for good health. This report finds that the CSIRO Healthy Diet Score (which measures overall diet quality on a scale of zero to 100) is positively associated with fruit and vegetable intake. In other words, adults who have the highest levels of fruit and vegetable intake have the best Diet Scores.



# Background: CSIRO Healthy Diet Score

**FAST FACTS**

Australia's largest ever diet survey

Assesses eating habits against the *Australian Dietary Guidelines*

Provides a score out of 100

Includes 11 questions on fruit and vegetable consumption

# About the CSIRO Healthy Diet Score

**In May 2015, CSIRO and SP Health launched the CSIRO Healthy Diet Score survey and since then over 180,000 people have completed the survey. The survey is freely available to all Australians at the website www.csirodietscore.com.**

The CSIRO Healthy Diet Score is based on a scientifically validated online tool which assesses an individual's self-reported food intake against the *Australian Dietary Guidelines*. The unique tool provides individuals with a personalised Diet Score and feedback on how to improve their score.

An individual's score reflects their overall compliance with age and gender specific food group intake targets as described in the *Australian Dietary Guidelines* (see Appendix and definitions). Scores can range from 0-100, where 100 reflects greater compliance with the Guidelines and a higher diet quality.

The *Australian Dietary Guidelines* provide Australians with specific advice on the quantities of core and noncore foods to consume on a daily basis, based on their age and gender. To reflect these Guidelines as best as possible, the CSIRO Healthy Diet Score assesses the quantity, quality and variety of foods consumed.

## Quantity components

Total amount of fruit, vegetables, breads and cereals, meat and alternatives, dairy foods and discretionary foods is compared to age and gender specific recommendations (see Appendix and definitions for more details about the food groups and the specific questions for fruit and vegetables).

## Quality components

Frequency of wholegrains consumption, reduced fat dairy consumption, frequency of trimming meat, fat type of spreads and water consumption (as a proportion of total beverage intake) is assessed.

## Variety component

Variety of foods consumed within each core food group is scored.

## Objectives of this report

This report was commissioned by Horticulture Innovation Australia Limited and provides a comprehensive assessment of the self-reported fruit and vegetable intake of Australians who have completed the CSIRO Healthy Diet Score survey. In particular, this report highlights the:

- Relationship between fruit and vegetable intake and overall Diet Score;
- Proportion of respondents who meet the fruit and vegetable recommendations;
- Fruit and vegetable intake among different segments of the sample population;
- Variety of fruit and vegetables respondents report to consume.

# Data characteristics

This report describes a **sample of 145,975 Australian adults** who have visited the CSIRO Healthy Diet Score website **www.csirodietscore.com** from May 2015 through to October 2016.

Duplicates and outliers were removed, based on extreme age (less than 18 and older than 100 years removed), Body Mass Index (less than 13 and greater than 97 removed), height (less than 1m and greater than 3m), and weight (less than 13kg and greater than 250kg).

The majority of the sample is female (71%), with a relatively even distribution of people in the 18-30 (30.5% of the total sample), 31-50 (36.0%), 51-70 (30.2%) year age groups, but less than 4% of the sample is aged 71 years and older.

Using self-reported height and weight, it is estimated that almost half the sample is overweight or obese (49.3%), and that 48.2% are in the normal weight category.

The survey is completed online, and therefore has attracted a national sample of participants. The largest proportion of respondents live in Victoria (30.8%) and another 27.2% in New South Wales and 14.5% in Queensland.


**CSIRO Healthy Diet Score is freely available to all Australians**

**Individuals answer 70 questions about their diet including 11 questions about their fruit and vegetable intake**


**Individuals receive a Diet Score out of 100 and tips on how to improve**

# How representative is the sample?

The CSIRO Healthy Diet Score Survey has received national coverage resulting in Australia's largest ever survey of dietary intake. However, as is commonly observed with health related surveys the majority of the sample is women (71% compared to 51% within the Australian population). In addition, the sample has a higher proportion of young adults than the Australian population (18–30 years: 30% compared to 19% nationally).

Normal weight adults make up the greatest proportion of this sample but still almost 50% of the sample are overweight or obese (compared to 63% nationally).

The largest proportion of respondents resided in Victoria (31% compared to 25% nationally), followed by New South Wales (27% compared to 32% nationally) and Queensland (14% compared to 20% nationally).

While a large and diverse group of Australians have completed the CSIRO Healthy Diet Score survey, the volunteer nature of the sample and the fact that dietary intake is self reported may have influenced the summary findings, including the amount of fruit and vegetables reported. The interpretation of these results should be considered within this context.

TABLE 1: CHARACTERISTICS OF THE CSIRO HEALTHY DIET SCORE SAMPLE (N=145,975)

| CHARACTERISTICS | (N=145,975) | SAMPLE | POPULATION (N=21,507,719) |
|---|---|---|---|
| **Gender** | | | |
| Male | 42,385 | 29.0% | 49.4% |
| Female | 103,590 | 71.0% | 50.6% |
| **Age group** | | | |
| 18-30 years | 44,534 | 30.5% | 18.6% |
| 31-50 years | 52,599 | 36.0% | 37.7% |
| 51-70 years | 44,096 | 30.2% | 30.5% |
| 71+ years | 4,746 | 3.3% | 13.1% |
| **Weight status** | | | |
| Underweight | 3,685 | 2.5% | 1.7% |
| Normal weight | 70,205 | 48.2% | 35.5% |
| Overweight | 44,376 | 30.4% | 35.3% |
| Obese | 27,517 | 18.9% | 27.5% |
| **State or territory** | | | |
| New South Wales | 39,313 | 27.2% | 32.2% |
| Queensland | 20,988 | 14.5% | 20.1% |
| Australian Capital Territory | 6,047 | 4.2% | 1.7% |
| Northern Territory | 1,197 | .8% | 1.0% |
| Tasmania | 4,418 | 3.1% | 2.3% |
| Victoria | 44,558 | 30.8% | 24.9% |
| Western Australia | 13,415 | 9.3% | 10.4% |
| South Australia | 14,631 | 10.1% | 7.4% |

*Population estimates of the Australian population were taken from the 2011 Census data, available from the Australian Bureau of Statistics.



# Chapter 1: Fruit, vegetables and Diet Score

## FAST FACTS

Average total Diet Score is 59/100

Vegetable component score is 70/100

Fruit component score is 68/100

Women score better than men

# How do fruit and vegetables score?

Fruit and vegetables are two of the nine components making up an individual's total Diet Score. The average total Diet Score of the sample was 59 out of a possible 100.

Component scores for fruit and vegetables were similar: vegetables scored 70 out of a possible 100, and fruit scored 68 out of 100.

## Women score better than men

Women scored 3 points higher than men for the fruit component and 12 points higher than men for the vegetable component. For the total Diet Score, women also scored higher, leading men by 4 points.

## Diet Score increases with fruit and vegetable intake

Fruit and vegetable intake is often used as a proxy for a healthy diet. In this sample, Diet Score was positively correlated with fruit and vegetable intake (Figure 1).

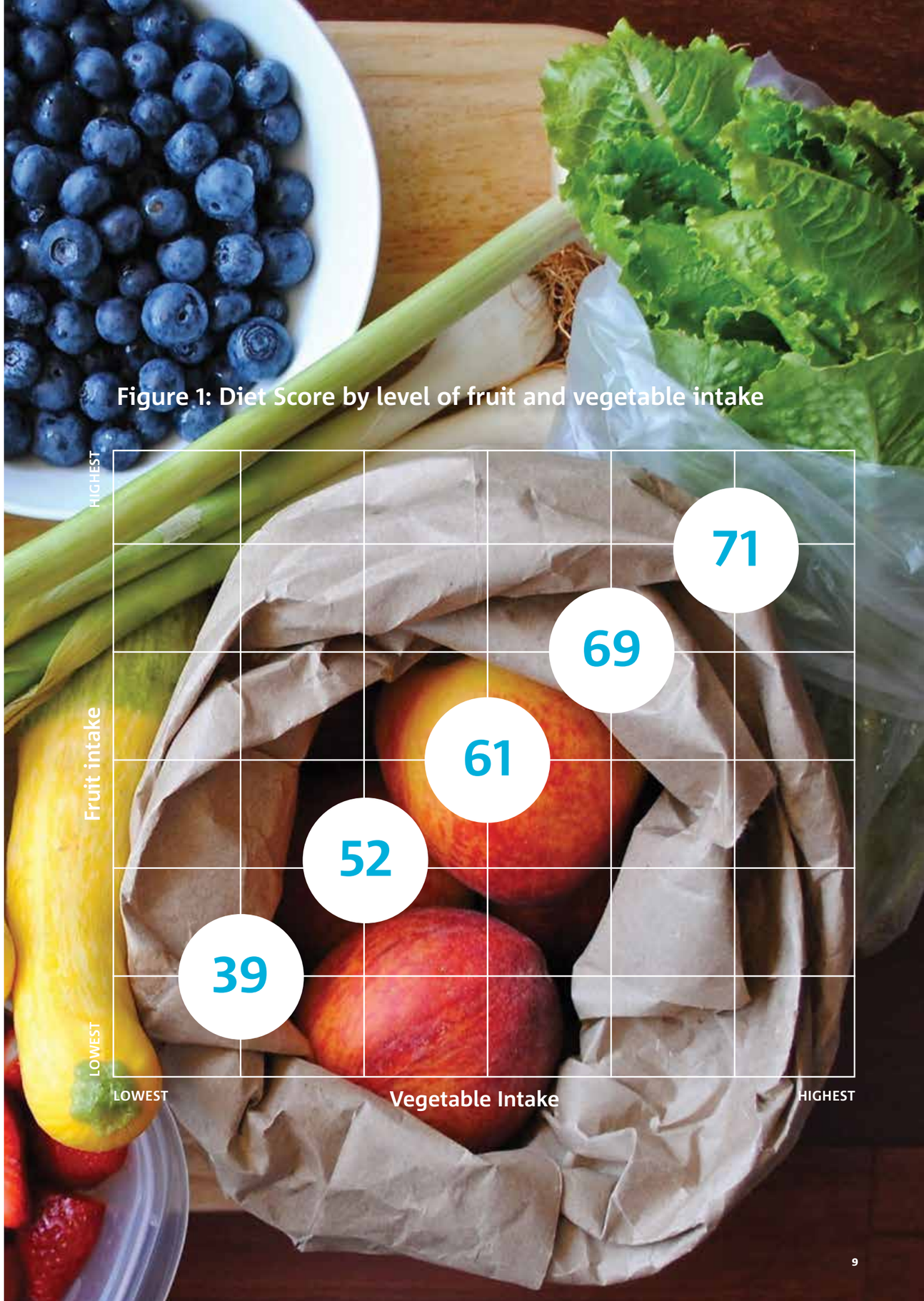
TABLE 2: CSIRO HEALTHY DIET SCORE AND FOOD GROUP COMPONENTS SCORES BY GENDER AND FOR THE TOTAL SAMPLE (N=145,975)

| COMPONENT SCORES (OUT OF 100)* | MALE | | FEMALE | | TOTAL | |
|---|---|---|---|---|---|---|
| | MEAN | SD | MEAN | SD | MEAN | SD |
| Diet Score | 56 | 13 | 60 | 13 | 59 | 13 |
| Food Group Component Scores | | | | | | |
| Fluids | 89 | 18 | 94 | 14 | 92 | 16 |
| Vegetables | 62 | 30 | 74 | 28 | 70 | 29 |
| Meat and alternatives | 68 | 26 | 71 | 25 | 70 | 26 |
| Fruit | 66 | 37 | 69 | 35 | 68 | 36 |
| Variety | 64 | 13 | 65 | 13 | 65 | 13 |
| Breads and cereals | 62 | 25 | 61 | 24 | 61 | 24 |
| Healthy fats | 51 | 29 | 54 | 27 | 53 | 27 |
| Dairy and substitutes | 48 | 26 | 48 | 27 | 48 | 26 |
| Discretionary foods | 26 | 31 | 32 | 32 | 30 | 32 |

*Component scores are expressed as a score out of 100 for ease of comparison between components.



Figure 1: Diet Score by level of fruit and vegetable intake

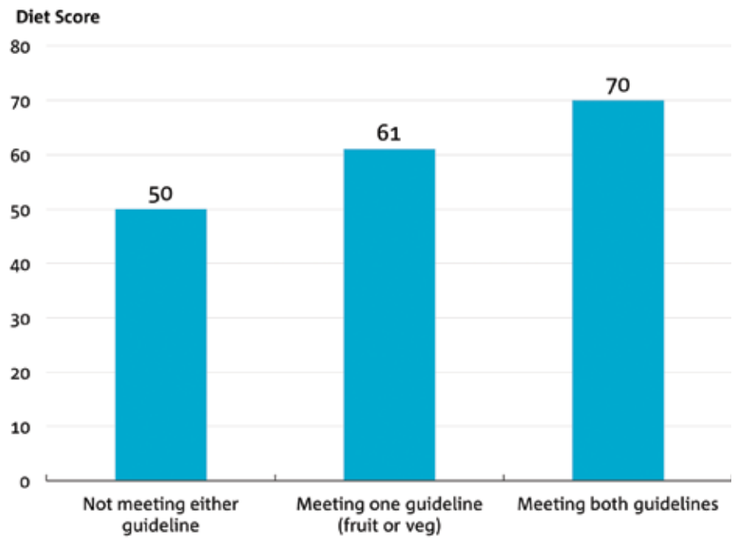


# Fruit and vegetable intake boosts Diet Score

There is a positive relationship between fruit and vegetable intake and total Diet Score.

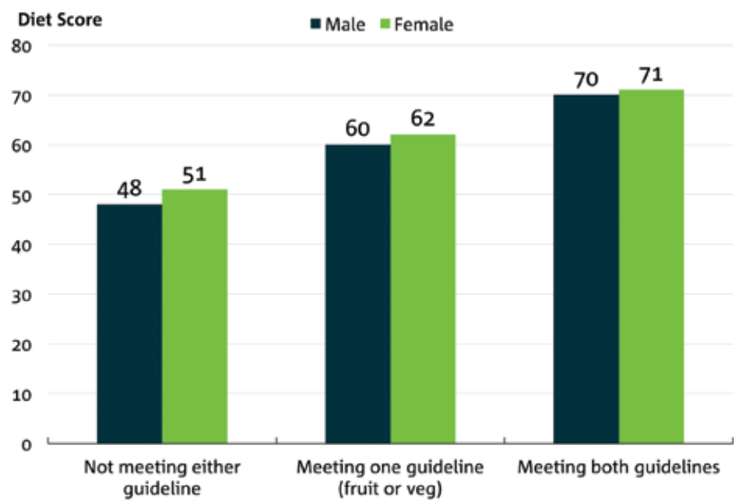
Adults who meet the *Australian Dietary Guidelines* fruit and vegetable target (see Appendix and definitions) have a higher Diet Score than those who only meet one of the guidelines (70 vs 61), and those that don't meet either of the guidelines (70 vs 50) (Figure 2).

FIGURE 2: DIET SCORE BY COMPLIANCE WITH FRUIT AND VEGETABLE GUIDELINES




The positive relationship between fruit and vegetable intake and Diet Score was consistent in men and women (Figure 3).

FIGURE 3: DIET SCORE BY COMPLIANCE WITH FRUIT AND VEGETABLE GUIDELINES BY GENDER






# Chapter 2: Who meets the Australian Dietary Guidelines for fruit and vegetables?

## FAST FACTS

About half of the sample meet the fruit guideline

Only one third meet the vegetable guideline

Less than one quarter meet both the fruit and vegetable guidelines

# The majority don't meet the fruit and vegetable guidelines

The *Australian Dietary Guidelines* provide age and gender specific recommendations for fruit and vegetable intake. While there is some variation, on average it is recommended that Australians consume 2 serves of fruit and 5 serves of vegetables each day. See the Appendix and definitions for the specific fruit and vegetable recommendations by age and gender.

About half of the sample consume enough fruit to meet the *Australian Dietary Guidelines* target (Figure 4).
About one third consume enough vegetables to meet the Dietary Guidelines target (Figure 5).

FIGURE 4: PERCENTAGE OF THE SAMPLE WHO MEET THE DIETARY GUIDELINE FOR FRUIT


FIGURE 5: PERCENTAGE OF THE SAMPLE WHO MEET THE DIETARY GUIDELINE FOR VEGETABLES




# Women are more likely to meet the vegetable guideline

A similar percentage of men and women consume enough fruit to meet the Dietary Guideline target (48% vs 49%). Whereas, women are more likely than men to meet the Dietary Guideline target for vegetables (39% vs 23%).

Less than one quarter of the sample consume enough fruit and vegetables to meet the Dietary Guideline targets for both. In fact, only 24% of women and 15% of men meet both the fruit and vegetables guidelines (Table 3).

TABLE 3: PERCENTAGE OF THE SAMPLE WHO ARE MEETING THE DIETARY GUIDELINES BY GENDER

| GENDER | MEETING FRUIT GUIDELINE | MEETING VEGETABLES GUIDELINE | NOT MEETING EITHER GUIDELINE | MEETING ONE GUIDELINE | MEETING BOTH GUIDELINES |
|---|---|---|---|---|---|
| Male | 48% | 23% | 44% | 41% | 15% |
| Female | 49% | 39% | 36% | 41% | 24% |
| Total | 49% | 34% | 38% | 41% | 21% |


Percentage of women and men who meet both the fruit and vegetable guidelines

# Younger generations are less likely to meet the guidelines

About 18% of Generation X and Generation Y respondents are consuming enough fruits and vegetables to meet both the fruit and vegetables guidelines, compared to 27% of Baby Boomers and 33% of the Silent Generation (Table 4).

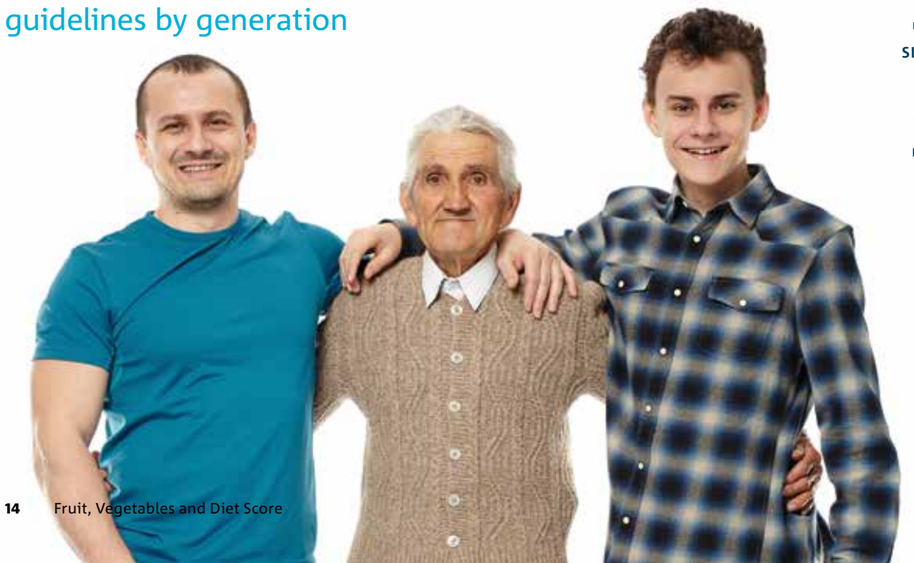
Older adults are more likely to meet the fruit and vegetable guidelines. 43% of adults aged 50 years or younger meet the recommended intake for fruit, compared to 59% of 51-70 year olds and 70% of 71+ year olds.

TABLE 4: PERCENTAGE OF THE SAMPLE WHO ARE MEETING THE DIETARY GUIDELINES BY AGE GROUP AND GENERATION

| AGE | | MEETING FRUIT GUIDELINE | MEETING VEGETABLES GUIDELINE | NOT MEETING EITHER GUIDELINE | MEETING ONE GUIDELINE | MEETING BOTH GUIDELINES |
|---|---|---|---|---|---|---|
| Age group | 18-30 years | 43% | 32% | 43% | 38% | 19% |
| | 31-50 years | 43% | 32% | 42% | 40% | 17% |
| | 51-70 years | 59% | 39% | 29% | 44% | 26% |
| | 71+ years | 70% | 42% | 22% | 45% | 33% |
| Generation* | Generation Y | 43% | 32% | 43% | 38% | 18% |
| | Generation X | 44% | 32% | 42% | 41% | 17% |
| | Baby boomers | 59% | 39% | 29% | 44% | 27% |
| | Silent generation | 69% | 42% | 22% | 45% | 33% |

*See Appendix and definitions for explanation of the generations

## Percentage meeting both fruit and vegetable guidelines by generation



**33%**
SILENT GENERATION

**27%**
BABY BOOMERS

**17%**
GENERATION X

**18%**
GENERATION Y



# Obese individuals are less likely to meet the guidelines

Just over half of all normal weight adults consume enough fruit to meet the Dietary Guideline target. This decreases to 48% of overweight and 39% of obese adults who meet the fruit guideline.

Obese adults are also less likely to consume adequate amounts of vegetables than normal weight adults (32% vs 36%). The proportion of adults who meet both the fruit and vegetable guidelines decreases from 23% in normal weight adults to 17% in obese adults (Table 5).

TABLE 5: PERCENTAGE OF THE SAMPLE WHO ARE MEETING THE DIETARY GUIDELINES BY WEIGHT STATUS

| WEIGHT STATUS | MEETING FRUIT GUIDELINE | MEETING VEGETABLES GUIDELINE | NOT MEETING EITHER GUIDELINE | MEETING ONE GUIDELINE | MEETING BOTH GUIDELINES |
|---|---|---|---|---|---|
| Underweight | 52% | 39% | 35% | 38% | 27% |
| Normal weight | 53% | 36% | 35% | 42% | 23% |
| Overweight | 48% | 32% | 39% | 42% | 19% |
| Obese | 39% | 32% | 45% | 38% | 17% |

## Percentage meeting both fruit and vegetable guidelines by weight status

**23%**
NORMAL WEIGHT

**19%**
OVERWEIGHT

**17%**
OBESE

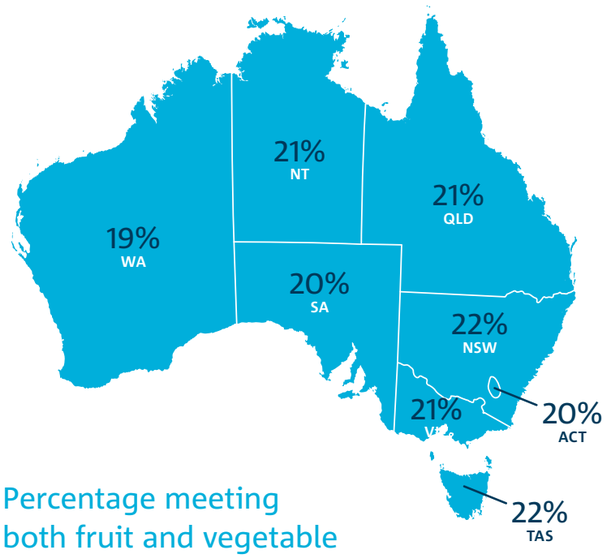
# Not a lot of difference between the states

The variation in the percentage of the sample meeting the fruit and vegetable guidelines by state was small. About 19% of West Australians meet both the fruit and vegetable guidelines compared to 22% of Tasmanians.

Some of these differences may be due to the differing demographic profiles of the states.

Adults living in the Northern Territory (51%), the ACT and Victoria (50%) are most likely to meet the fruit guideline.

Tasmanians are most likely to meet the vegetable guideline, but still only 37% are meeting the guideline target.




Percentage meeting both fruit and vegetable guidelines by state

TABLE 6: PERCENTAGE OF THE SAMPLE WHO ARE MEETING THE DIETARY GUIDELINES BY AUSTRALIAN STATE OF RESIDENCE

| STATE / TERRITORY | MEETING FRUIT GUIDELINE | MEETING VEGETABLES GUIDELINE | NOT MEETING EITHER GUIDELINE | MEETING ONE GUIDELINE | MEETING BOTH GUIDELINES |
|---|---|---|---|---|---|
| New South Wales | 49% | 35% | 37% | 41% | 22% |
| Queensland | 48% | 35% | 39% | 40% | 21% |
| Australian Capital Territory | 50% | 32% | 37% | 42% | 20% |
| Northern Territory | 51% | 34% | 37% | 42% | 21% |
| Tasmania | 46% | 37% | 39% | 39% | 22% |
| Victoria | 50% | 34% | 37% | 41% | 21% |
| Western Australia | 46% | 33% | 40% | 41% | 19% |
| South Australia | 47% | 33% | 39% | 41% | 20% |

# Rural areas best for fruit, urban areas worst for vegetables

A greater proportion of adults living in rural areas meet the fruit guideline compared to other areas (53% vs 48-49%).

About one third of adults in urban areas meet the recommendation for vegetables (33%) compared to about 37% in other areas.

The percentage of adults who meet both the fruit and vegetable guidelines varies a little by degree of remoteness. About 20% of those living in major urban areas meet both guidelines compared to 24% of those in rural areas.

TABLE 7: PERCENTAGE OF THE SAMPLE WHO ARE MEETING THE DIETARY GUIDELINES BY REMOTENESS OF REGION

| REGION* | MEETING FRUIT GUIDELINE | MEETING VEGETABLES GUIDELINE | NOT MEETING EITHER GUIDELINE | MEETING ONE GUIDELINE | MEETING BOTH GUIDELINES |
|---|---|---|---|---|---|
| Major Urban | 49% | 33% | 39% | 41% | 20% |
| Other Urban | 49% | 37% | 36% | 41% | 23% |
| Bounded Locality | 48% | 38% | 37% | 41% | 23% |
| Rural Balance | 53% | 37% | 33% | 43% | 24% |

*See Appendix and definitions for explanation of regions

## Percentage meeting both fruit and vegetable guidelines by remoteness of region

**24%** RURAL BALANCE

**23%** BOUNDED LOCALITY

**23%** OTHER URBAN

**20%** MAJOR URBAN

# Retirees above average in terms of meeting the guidelines

Retired adults are most likely to meet the guideline for fruit (63%); and adults who are unemployed least likely to meet the guideline (37%).

Homemakers, those working in the health industry and retired adults are most likely to meet the guideline for vegetables (41%).

The two occupation groups most likely to meet both the guideline for fruit and vegetables are retired adults (30%) and those working in the health industry (26%). Whereas, adults working in science/programming, the construction industry and those that are unemployed are least likely to meet both guidelines (15% of these occupation groups do) (Table 8).

Part of these differences by occupation may be due to the different age/gender profiles of workers within these occupations.

## Percentage meeting both fruit and vegetable guidelines by occupation


TABLE 8: PERCENTAGE OF THE SAMPLE WHO ARE MEETING THE DIETARY GUIDELINES BY OCCUPATION

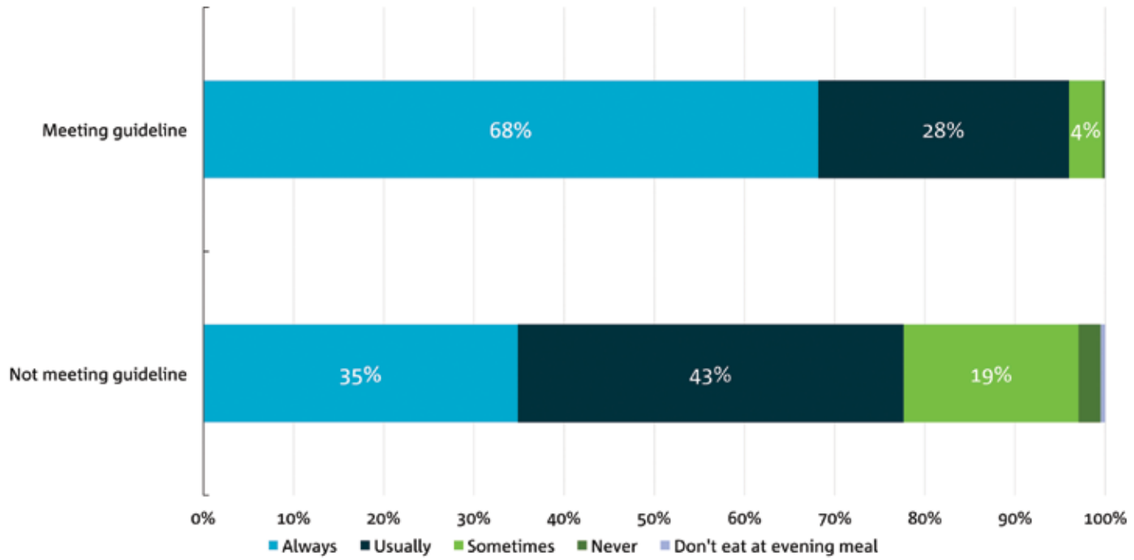
| OCCUPATION | MEETING FRUIT GUIDELINE | MEETING VEGETABLES GUIDELINE | NOT MEETING EITHER GUIDELINE | MEETING ONE GUIDELINE | MEETING BOTH GUIDELINES |
|---|---|---|---|---|---|
| Retired | 63% | 41% | 26% | 45% | 30% |
| Administration | 44% | 34% | 41% | 41% | 19% |
| Student | 48% | 35% | 39% | 38% | 22% |
| Health industry | 52% | 41% | 33% | 42% | 26% |
| Education / Research | 52% | 34% | 35% | 43% | 21% |
| Science / Programming | 45% | 24% | 45% | 40% | 15% |
| Homemaker | 46% | 41% | 36% | 40% | 23% |
| Management / Finance | 45% | 30% | 42% | 41% | 17% |
| Sales / Marketing / PR | 43% | 32% | 42% | 40% | 17% |
| Customer / Food Service | 40% | 33% | 45% | 38% | 18% |
| Media / Arts | 45% | 37% | 39% | 41% | 20% |
| Construction Industry | 47% | 24% | 44% | 41% | 15% |
| Unemployed | 37% | 28% | 50% | 35% | 15% |
| Other | 47% | 34% | 39% | 41% | 20% |

# Variety is the key to meeting the guidelines

The amount of fruit and vegetables adults consume is important to promote health and wellbeing, but so is choosing a variety of fruits and vegetables.

- Eating a greater variety of fruits and vegetables is associated with a greater likelihood of meeting the fruit and vegetable guideline.
- Adults who eat 3 or more different types of fruit across 2 days are more likely to meet the guideline for fruit than those who don't (79% vs 26%).
- Adults who meet the guideline for vegetables are more likely to always have 3 or more vegetables at the evening or main meal. 68% of adults who meet the recommendation for amount of vegetables also report to always consume 3 or more vegetables at the evening meal, compared to 35% of those who don't meet the recommendation for vegetables.

FIGURE 5: PERCENTAGE OF THE SAMPLE HAVING 3 OR MORE VEGETABLES AT EVENING MEAL BY THOSE MEETING OR NOT MEETING THE VEGETABLE GUIDELINE






# Chapter 3: Fruit and vegetable intake

How much do adults eat, and how often?

## FAST FACTS

7 out of 10 eat fruit every day

6 out of 10 eat cooked vegetables every day

Median intake is 1.5 serves of fruit and 4 serves of vegetables a day

# How frequently are fruit and vegetables consumed?

Eating fruit and vegetables is a daily habit for most of the sample.

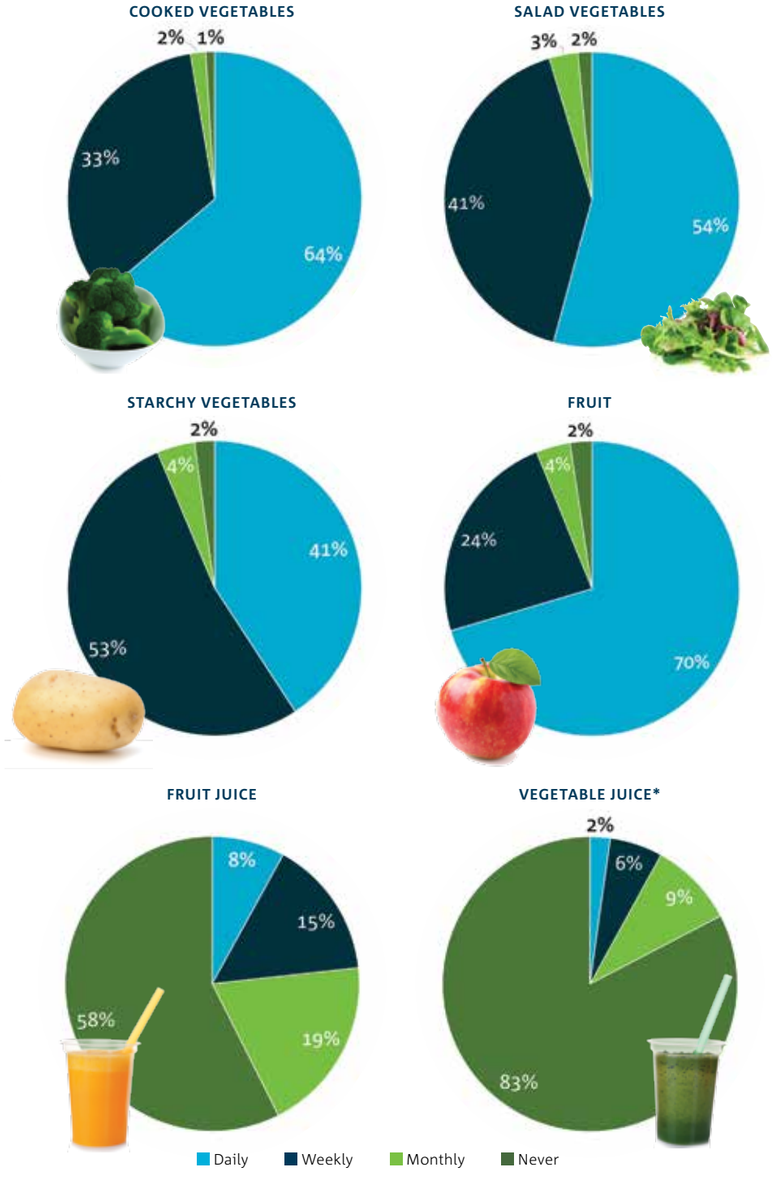
Seven out of 10 adults report to consume fruit each day.

64% of adults report to consume cooked vegetables (such as broccoli, cauliflower, pumpkin) each day, 54% consume salad vegetables (such as lettuce, cucumber, capsicum) each day and 41% consume starchy vegetables (such as potato, sweet potato, corn) each day.

However, juice is not as popular. Over half of all adults (57%) report to never consume fruit juice, and 83% report to never consume vegetable juice*.

*Note that a question about vegetable juice was not part of the original survey. The question was added in August 2016 and therefore the sample is a subset of respondents (n=53,977).

FIGURE 7: FREQUENCY OF FRUIT AND VEGETABLE CONSUMPTION BY TYPE




# How many serves of fruit and vegetables are reported to be eaten daily?

The median fruit intake is 1.5 serves and median vegetable intake is 4 serves per day.

**1.5**
SERVES FRUIT
(APPROXIMATELY 225G)

**4**
SERVES VEGETABLES
(APPROXIMATELY 300G)

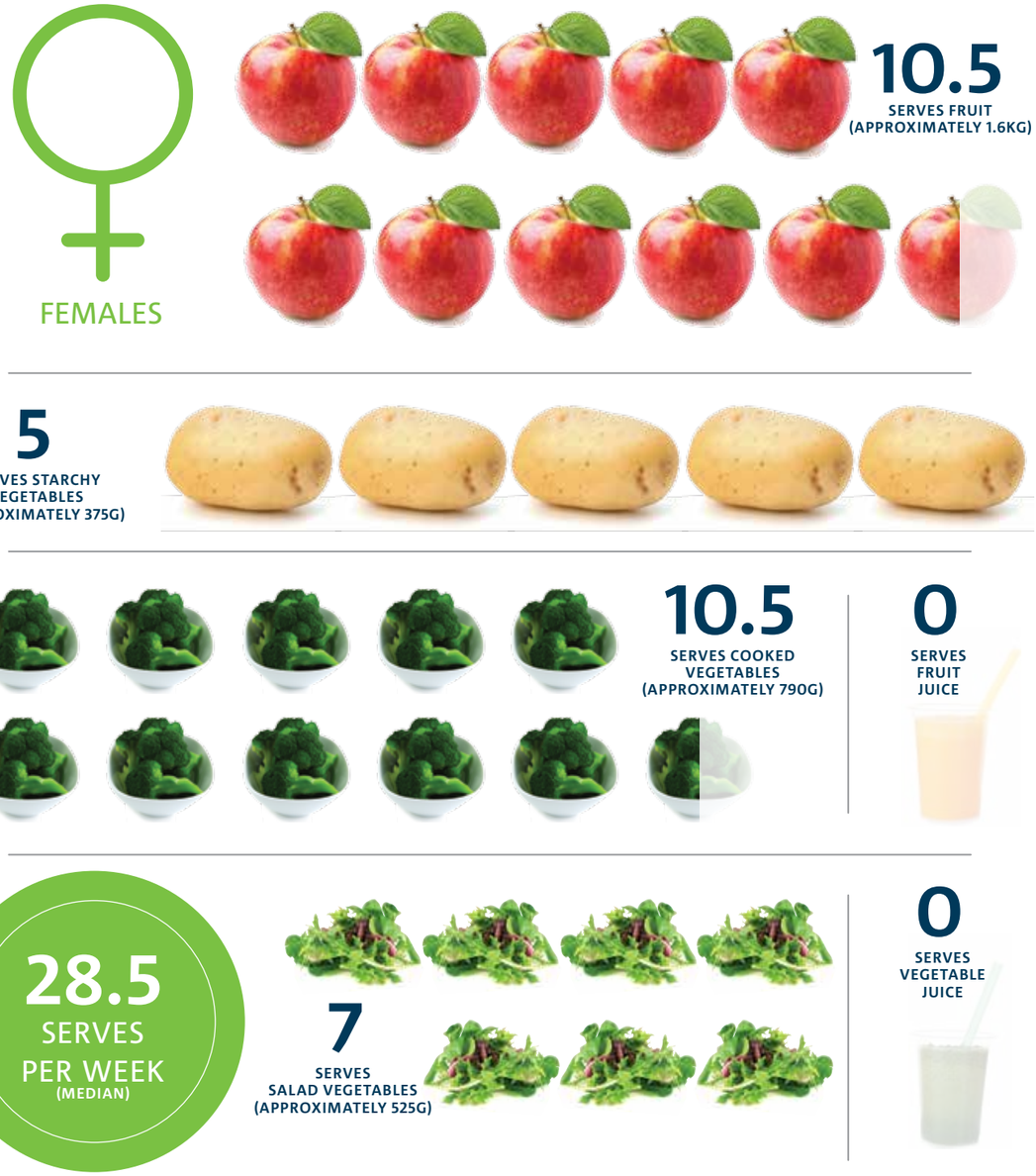
**Total daily intake of fruit and vegetable (median)**

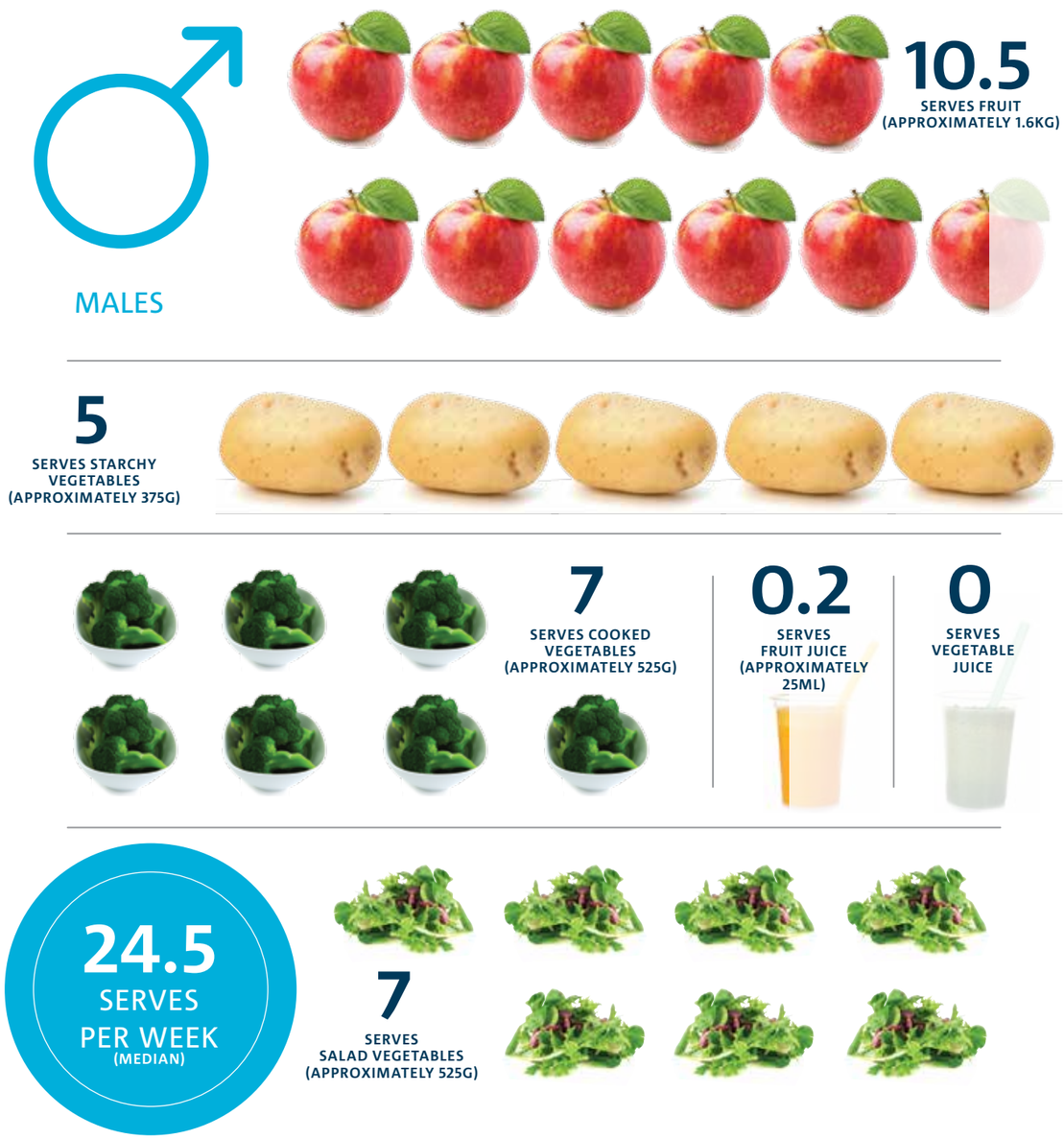
TABLE 9: DAILY AND WEEKLY INTAKE (SERVES) OF FRUIT AND VEGETABLES

| | DAILY | | | WEEKLY | | |
|---|---|---|---|---|---|---|
| | MEAN | STANDARD DEVIATION | MEDIAN | MEAN | STANDARD DEVIATION | MEDIAN |
| Total fruit | 1.8 | 1.6 | 1.5 | 12.8 | 11.5 | 10.5 |
| Total vegetables | 4.7 | 3.6 | 4 | 32.9 | 25 | 28 |
| Starchy vegetables | 1.1 | 1.3 | 0.7 | 7.5 | 9.1 | 5 |
| Salad vegetables | 1.6 | 1.8 | 1 | 11.5 | 12.7 | 7 |
| Cooked vegetables | 2 | 2.2 | 1.5 | 13.9 | 13.8 | 10.5 |
| Fruit juice | 0.2 | 0.7 | 0 | 1.5 | 5 | 0 |
| Vegetable juice | 0.1 | 0.4 | 0 | 0.5 | 3 | 0 |

# How much fruit and what types of vegetables are eaten weekly?

These infographics show the median intake of fruit and vegetables by type for men and women. The median is calculated at the total level and per category, therefore the categories do not add up to the total.



# What about fruit and vegetable juice?

While eating fruit and vegetables is a daily habit for most of the sample, drinking juice is not as common.

The average intake of fruit juice is 0.2 serves per day (approximately 25ml) and of vegetable juice is 0.1 serves (or 12ml) per day. The median intake of fruit and vegetable juice is zero.

Of adults that report to consume fruit juice (42.6% of the sample), the average consumption is half of one serve (or 62ml).

Of adults that report to consume vegetable juice (17.4% of the sample,) the average reported consumption was 0.4 of a serve (or 50ml).

**0.5**
SERVES FRUIT JUICE
(APPROXIMATELY 62ML)

**0.4**
SERVES VEGETABLE JUICE
(APPROXIMATELY 50ML)

**Average juice intake of adults who report to drink fruit or vegetable juice**

# How does intake vary by gender, age, region and occupation?

Variations in consumption of fruit and vegetable intake in serves is consistent with variations in the percentage meeting the Dietary Guidelines (Chapter 2).

Highlights are as follows (refer to Table 10 for values):

- Daily fruit intake is similar for men and women.
- Women report to consume more vegetables each day than men.
- Daily fruit and vegetable intake is highest in adults aged 71+ years and lowest in those aged 18-30 years. This means the Silent Generation consumes more fruit and vegetables than Generation Y.
- Normal weight adults report to consume more fruit and slightly more vegetables than overweight and obese adults.
- There was little variation in fruit and vegetable intake by state of residence.
- The average fruit intake was similar for adults living in urban and rural areas.
- Interestingly, the median fruit intake was half a serve greater in rural areas compared to others.
- The average vegetable intake was slightly lower for adults living in major urban areas compared to more remote areas, however, the median intake of vegetables was similar by area.
- The average reported fruit intake was highest in retired adults and lowest in those who are unemployed or working in administration.
- Vegetable intake was also highest in retired adults, as well as homemakers and those working in the health industry. Vegetable intake was lowest in those working in the construction industry and those who were unemployed.

## How does intake compare to the Australian Health Survey?

The CSIRO Healthy Diet Score captures rich information on what people "*believe*" they are eating.

It is well-established that when responding to short surveys such as Diet Score people typically overestimate the "good" aspects of their diet, such as fruit and vegetable consumption, and underestimate the "not-so-good" aspects, such as junk food or alcohol intake.

This likely explains the variation between reported intake of fruit and vegetables from Diet Score to intake reported by the Australian Health Survey 2011-12 using the 24-hour recall method (Figure 8).

While over- or underestimation could be considered a limitation of short surveys, it is also a consideration for population health campaigns in that people "*believe*" they are eating more fruit vegetable than they actually are.

FIGURE 8: COMPARISON OF FRUIT AND VEGETABLE INTAKE FROM DIET SCORE (USING SHORT QUESTIONS) TO THE AUSTRALIAN HEALTH SURVEY 2011-12 (24-HOUR RECALL)

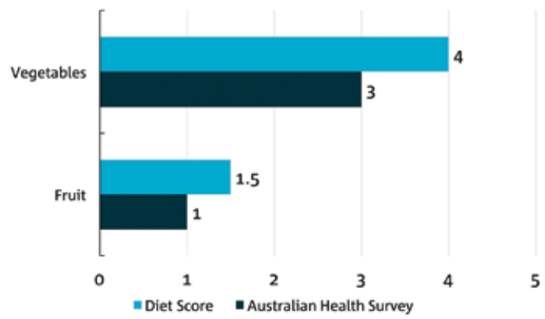


TABLE 10: DAILY INTAKE (SERVES) OF FRUIT AND VEGETABLES BY GENDER, AGE, WEIGHT, REGION AND OCCUPATION

| | | FRUIT | | | VEGETABLES | | |
|---|---|---|---|---|---|---|---|
| | | MEAN | STANDARD DEVIATION | MEDIAN | MEAN | STANDARD DEVIATION | MEDIAN |
| **Entire Sample** | **All** | 1.8 | 1.6 | **1.5** | 4.7 | 3.6 | **4** |
| Gender | Male | 1.9 | 1.8 | **1.5** | 4.3 | 3.6 | **3.5** |
| | Female | 1.8 | 1.6 | **1.5** | 4.9 | 3.6 | **4.1** |
| Age Group | 18-30 years | 1.7 | 1.5 | **1.5** | 4.5 | 3.4 | **3.8** |
| | 31-50 years | 1.6 | 1.5 | **1.5** | 4.6 | 3.5 | **3.9** |
| | 51-70 years | 2.1 | 1.8 | **2** | 5 | 3.7 | **4.1** |
| | 71+ years | 2.7 | 2.2 | **2** | 5.3 | 4.3 | **4.3** |
| Weight Status | Underweight | 2.1 | 1.9 | **2** | 5 | 4 | **4.1** |
| | Normal weight | 2 | 1.6 | **2** | 4.8 | 3.5 | **4** |
| | Overweight | 1.8 | 1.7 | **1.5** | 4.6 | 3.6 | **3.9** |
| | Obese | 1.5 | 1.6 | **1** | 4.6 | 3.7 | **3.7** |
| State of Residence | New South Wales | 1.9 | 1.7 | **1.5** | 4.7 | 3.6 | **4** |
| | Queensland | 1.8 | 1.7 | **1.5** | 4.7 | 3.6 | **4** |
| | Australian Capital Territory | 1.8 | 1.5 | **2** | 4.5 | 3.1 | **3.9** |
| | Northern Territory | 1.9 | 1.8 | **2** | 4.6 | 3.4 | **4** |
| | Tasmania | 1.8 | 1.7 | **1.5** | 4.9 | 3.8 | **4** |
| | Victoria | 1.9 | 1.6 | **1.8** | 4.7 | 3.6 | **4** |
| | Western Australia | 1.7 | 1.6 | **1.5** | 4.7 | 3.7 | **3.9** |
| | South Australia | 1.8 | 1.7 | **1.5** | 4.6 | 3.5 | **3.9** |
| Remoteness of Region | Major Urban | 1.8 | 1.6 | **1.5** | 4.6 | 3.5 | **3.9** |
| | Other Urban | 1.8 | 1.7 | **1.5** | 4.9 | 3.7 | **4.1** |
| | Bounded Locality | 1.8 | 1.7 | **1.5** | 5 | 3.8 | **4.1** |
| | Rural Balance | 1.9 | 1.6 | **2** | 4.9 | 3.7 | **4** |
| Occupation | Retired | 2.3 | 1.9 | **2** | 5.2 | 3.9 | **4.3** |
| | Administration | 1.6 | 1.5 | **1.5** | 4.5 | 3.5 | **3.7** |
| | Student | 1.9 | 1.7 | **1.5** | 4.6 | 3.5 | **4** |
| | Health industry | 1.9 | 1.6 | **2** | 5.1 | 3.7 | **4.4** |
| | Education/ Research | 1.9 | 1.6 | **2** | 4.7 | 3.5 | **4** |
| | Science/ Programming | 1.7 | 1.5 | **1.5** | 4.1 | 3.1 | **3.5** |
| | Homemaker | 1.7 | 1.5 | **1.5** | 5.1 | 3.8 | **4.3** |
| | Management / Finance | 1.7 | 1.5 | **1.5** | 4.5 | 3.4 | **3.7** |
| | Sales/Marketing/ PR | 1.7 | 1.6 | **1.5** | 4.6 | 3.5 | **3.8** |
| | Customer/Food Service | 1.6 | 1.6 | **1** | 4.6 | 3.8 | **3.6** |
| | Media/Arts | 1.7 | 1.5 | **1.5** | 4.8 | 3.3 | **4.1** |
| | Construction industry | 1.9 | 2 | **1.5** | 4.4 | 3.7 | **3.5** |
| | Unemployed | 1.6 | 1.8 | **1** | 4.4 | 4.1 | **3.4** |
| | Other | 1.8 | 1.7 | **1.5** | 4.8 | 3.7 | **4** |



# Chapter 4: The variety equation

Boosting variety could help increase fruit and vegetable consumption

## FAST FACTS

Most adults eat 5 types of vegetables across 2 days

Always having 3 vegetables at dinner increases the likelihood of meeting the Dietary Guidelines

Greater variety of fruit correlates with greater consumption

# The importance of variety

The *Australian Dietary Guidelines* include two important recommendations* for fruit and vegetable intake:

1. A recommendation about how much to eat each day; as well as
2. Advice to choose a variety of fruits and vegetables each day.

Including plenty of vegetables of a variety of different types and colours provides a range of nutrients that may help to reduce the risk of obesity. Diets which are high in a variety of vegetables are especially important in helping to maintain a healthy weight.

The CSIRO Healthy Diet Score survey asks questions about the starchy, salad and cooked vegetables and well as the number of different types of fruits and vegetables consumed, and how often 3 or more vegetables are consumed at the evening meal.

## What types of vegetables do adults eat?

On average, 42% of total vegetable consumption is cooked vegetables such as steamed broccoli and spinach, 35% is salad vegetables, and 23% is starchy vegetables such as potato and corn.

## How does consumption vary by gender?

Women consume a greater proportion of their vegetables as cooked vegetables than men (43% vs 39%), whereas men consume a greater proportion of starchy vegetables (27% vs 21%) (Figure 9, page 32).

## Are there differences by age?

Older adults tend to consume a greater proportion of their vegetables as cooked vegetables (44% vs 40%), whereas younger adults (18-30 years) tend to consume a greater proportion as salad vegetables (36% vs 30%) (Figure 9, page 32).

## Are there differences by weight status?

Normal weight adults consume 36% of their total vegetables as salad compared to 33% for obese adults. The other differences in consumption were only small (Figure 9, page 32).

## Are there differences by region?

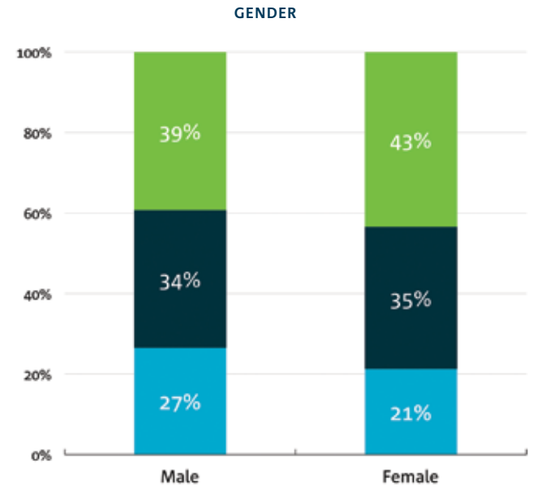
Adults living in major urban cities consume 36% of their vegetables as salad and 42% as cooked vegetables. This is compared to 31% and 45% for those living in the most rural areas of Australia (Figure 9, page 32).

*See Appendix and definitions for the specific fruit and vegetable recommendations

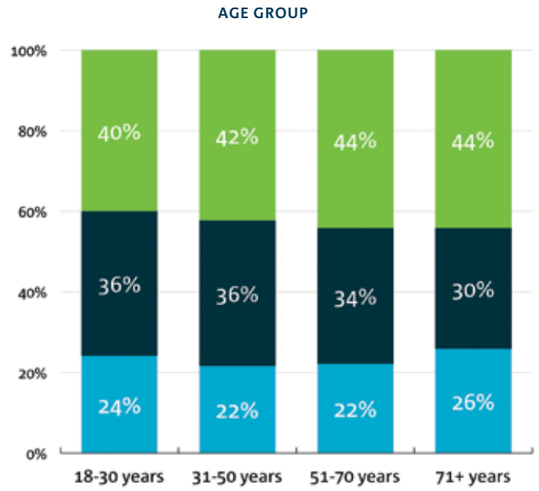
# Cooked vegetables are the most common type consumed

# Differences in the type of vegetables consumed

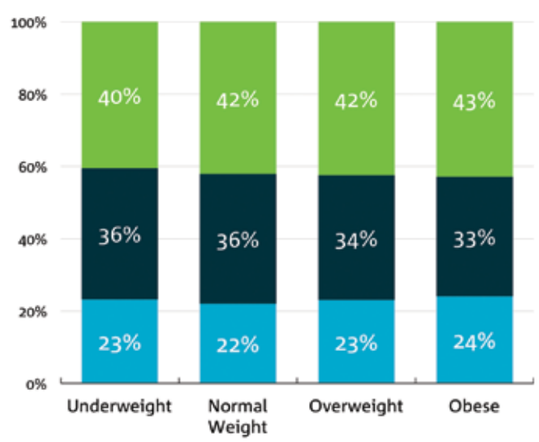
FIGURE 9: TYPE OF VEGETABLES CONSUMED AS A PROPORTION OF TOTAL VEGETABLES, BY GENDER, AGE GROUP, WEIGHT STATUS AND REMOTENESS



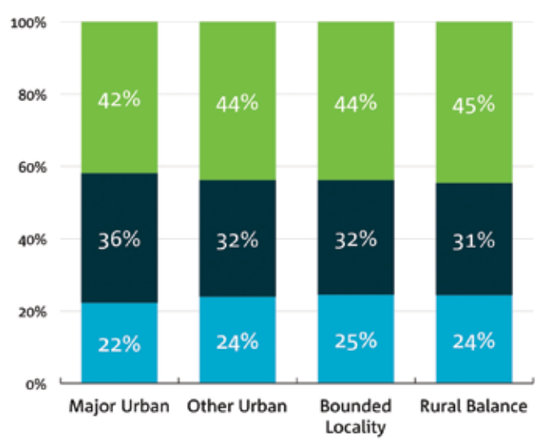

Men eat proportionately more starchy vegetables than women




Older adults eat proportionately more cooked vegetables than younger adults




Normal weight adults eat proportionately more salad vegetables than obese adults




Adults in major urban areas eat proportionately more salad vegetables than adults in other areas

Starchy Vegetables  Salad Vegetables  Cooked Vegetables

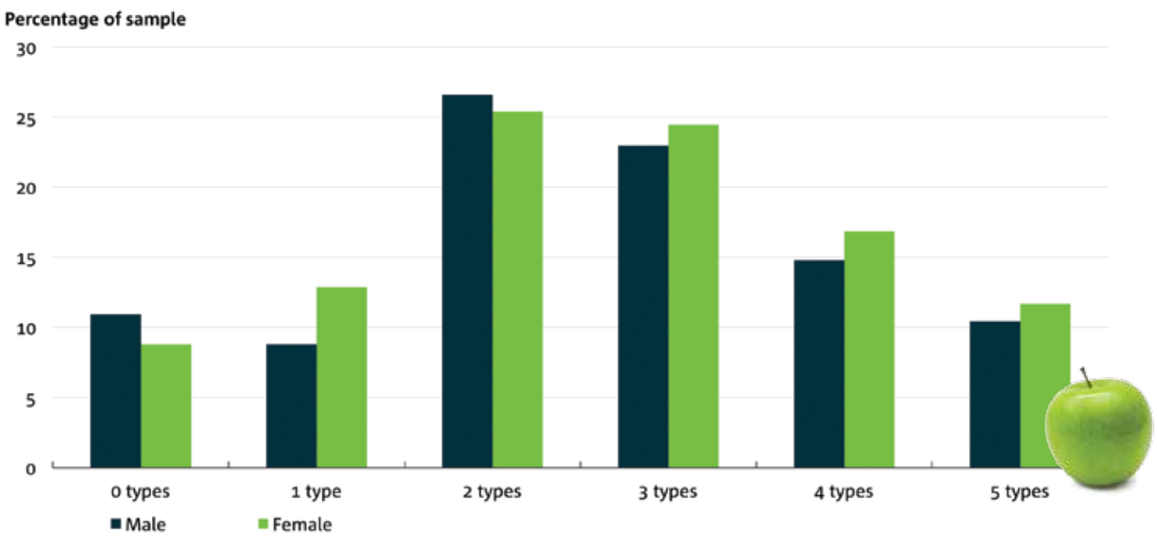


# Fruit variety: how many different types?

There are many different fruits available in Australia, and the Dietary Guidelines suggest we choose to eat a wide variety of fruit.

In this sample, most adults report to consume 2 or 3 different fruits across a 2 day period. Men and women have similar amounts of variety of fruits in their diet (Figure 10).

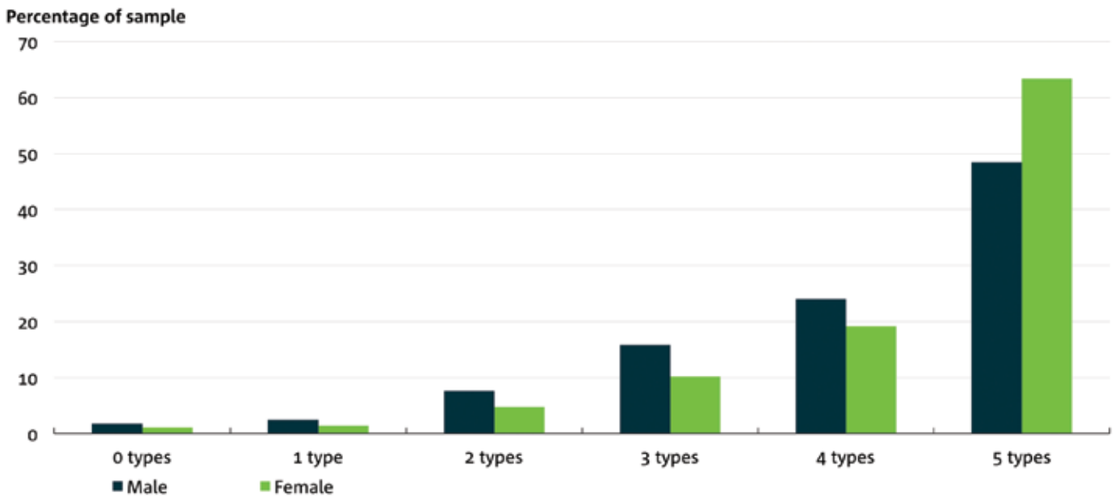

FIGURE 10: NUMBER OF TYPES OF FRUIT CONSUMED EVERY 2 DAYS, BY GENDER.



# Vegetable variety: how many different types?

Most adults report to consume 5 or more different types of vegetables across a 2 day period. Women are more likely than men to consume a higher variety of vegetables (63% of women vs 48% of men) (Figure 11).


FIGURE 11: NUMBER OF TYPES OF VEGETABLES CONSUMED EVERY 2 DAYS, BY GENDER.




# Vegetable variety: different colours

Almost all adults in the sample report to consume some red or orange vegetables across a 2 day period. About one third of men and women report to consume 2 different red or orange vegetables (Figure 12).

Women are more likely than men to consume a greater variety of red or orange and green vegetables across a 2 day period.

Most adults in this sample report to consume 2 or 3 different type of green vegetables across a 2 day period (Figure 13).

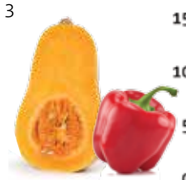


FIGURE 12: NUMBER OF TYPES OF RED OR ORANGE VEGETABLES CONSUMED EVERY 2 DAYS, BY GENDER

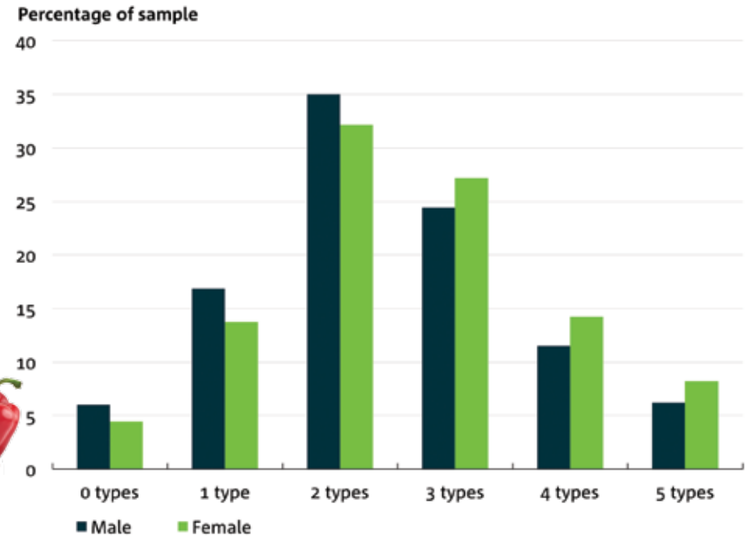
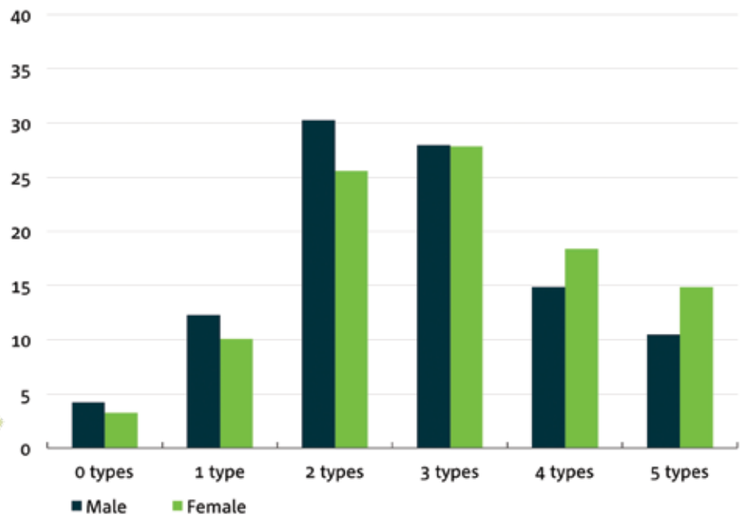



FIGURE 13: NUMBER OF TYPES OF GREEN VEGETABLES CONSUMED EVERY 2 DAYS, BY GENDER



# Vegetables at dinnertime

The CSIRO Healthy Diet Score survey also asks about variety of vegetables consumed at the evening or main meal.

46% of adults report to always have 3 or more vegetables at their evening meal. This increases to 84% when you include always or usually have 3 or more vegetables at their evening meal (Figure 14).

Women are more likely than men to have 3 or more vegetables at their evening meal.

Conversely, men are more likely to only sometimes or never have 3 or more vegetables at their evening meal.

The likelihood of having 3 or more vegetables with the evening meal increases with age. About 57% of adults aged 71 years and older compared to 42% of 18-30 year olds have 3 or more vegetables with the evening meal.

Normal weight adults are more likely than overweight or obese adults to always have 3 or more vegetables at the evening meal (49% vs 40%) (Figure 15).

FIGURE 14: FREQUENCY OF INCLUDING 3 OR MORE VEGETABLES AT THE EVENING OR MAIN MEAL

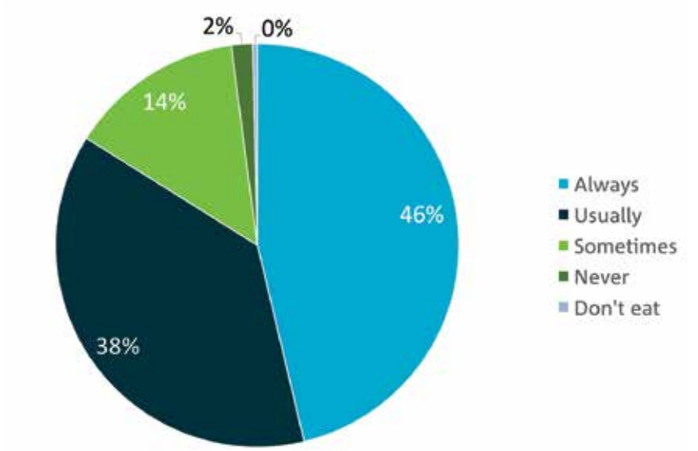
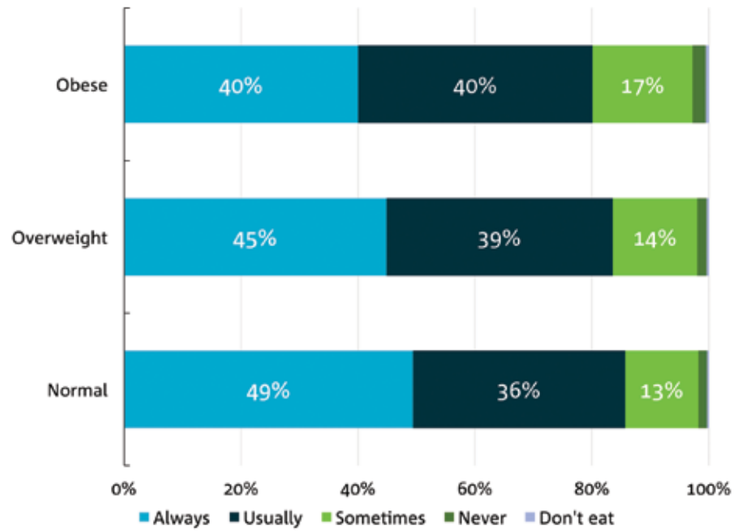
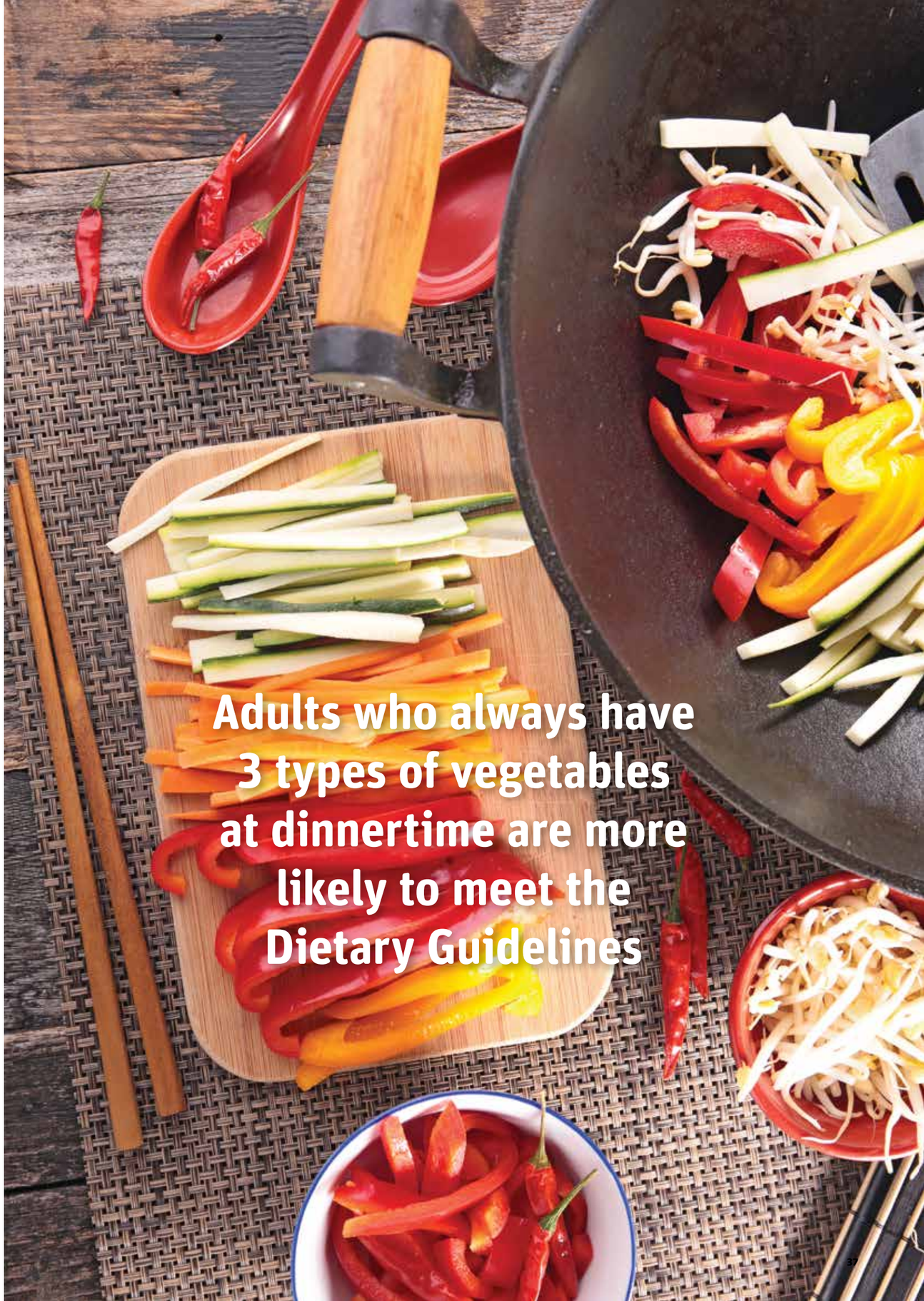



FIGURE 15: FREQUENCY OF INCLUDING 3 OR MORE VEGETABLES AT THE EVENING OR MAIN MEAL, BY WEIGHT STATUS



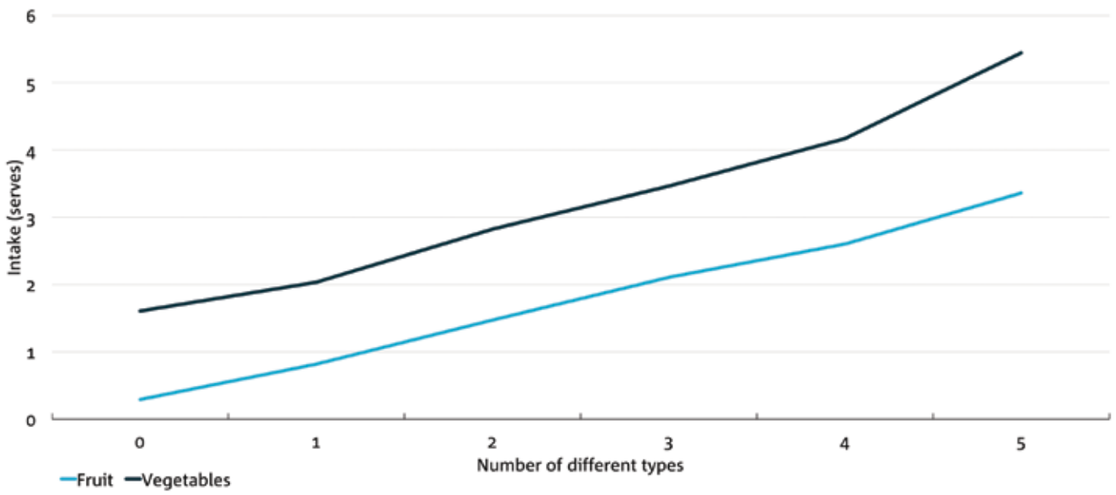



# Fruit and vegetable intake increases with variety

Fruits and vegetables are good sources of vitamins, minerals and dietary fibre and choosing a variety of these in the diet can provide a range of nutrients. Eating a variety of fruits and vegetables can also encourage greater consumption.

Adults who report to consume a greater number of different fruits and vegetables (across a 2 day period) also report to consume a greater amount of fruits and vegetables (Figure 16).

FIGURE 16: INTAKE OF FRUIT AND VEGETABLES, BY VARIETY






# Chapter 5: Who and how to help

Recommendations for boosting fruit and vegetable consumption

## FAST FACTS

The majority of adults need to increase their fruit and vegetable intake

Men, young adults, obese adults and unemployed adults need the most help

Focusing on variety could improve diet quality and boost consumption

# Who needs the most help increasing fruit and vegetable intake?

The CSIRO Healthy Diet Score survey asks everyday Australians about what and how much they usually eat. With only half of all adults in this sample reporting to meet the *Australian Dietary Guidelines* target for fruit and one third meeting the target for vegetables, the majority of adults need to increase the amount of fruit and vegetables they consume each day.

Some groups of the population may require additional support, and even tailored programs, to help to increase their intake and likelihood of meeting the Dietary Guidelines for fruit and vegetables.

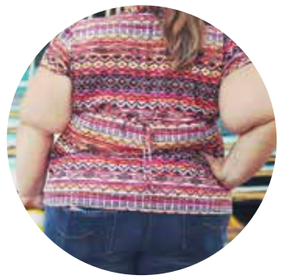
**This report has identified four groups of particular interest who may need extra support to increase their intake: men, younger adults, obese adults and unemployed adults.**

## Men

23% of men consume enough vegetables to meet the Dietary Guideline target, and only 15% meet the Guidelines for both fruit and vegetables.

## Younger adults

have the lowest intakes of vegetables. About 42% of adults aged 18-50 years don't meet either guideline for fruit or vegetables.



## Obese adults

have lower intakes of fruit and vegetables than adults who are of a normal weight. Only 17% of obese adults meet the Dietary Guidelines for fruit and vegetables, and 45% don't meet either Guideline.

## Unemployed adults

37% consume adequate amounts of fruit and 34% adequate amounts of vegetables to meet the Dietary Guidelines. Only 15% of unemployed adults meet the fruit and vegetable guidelines.

# Focusing on variety could improve diet quality and boost consumption of fruit and vegetables

The Dietary Guidelines recommend Australians consume a variety of fruits and vegetables to provide a range of nutrients but also for disease prevention and to promote a healthy weight.

**Another key finding of this report was that total consumption of fruit and vegetables increases with increased variety.** Adults are more likely to meet the Dietary Guidelines for fruits and vegetables if they:

- **Eat a wide range of fruits**: Having 3 or more different fruits across 2 days was associated with higher intake.
- **Have 3 types of vegetables with dinner:** Always having 3 or more vegetables at the main or evening meal increased the likelihood of meeting the Dietary Guideline for vegetables.

This new insight may help inform population health campaigns or tailored programs designed to boost fruit and vegetable intake.

# Appendix and definitions

## Australian Dietary Guidelines

The *Australian Dietary Guidelines* are authored by the National Health and Medical Research Council (NHMRC). They provide up-to-date advice about the amount and kinds of foods Australians need to eat for health and wellbeing.

The *Australian Dietary Guidelines* provide advice to eat a wide variety of nutritious foods fromthese five food groups every day:

- Vegetables including different types and colours of starchy, cooked and salad vegetables
- Fruit including fresh, canned and dried fruit
- Grain foods including breads, rice, pasta and other cereals
- Meat including red meat, chicken, fish and vegetarian alternatives such as legumes, eggs and nuts
- Dairy foods including milk, cheese, yoghurt and their nondairy alternatives

The Dietary Guidelines also recommend Australians limit the amounts of discretionary foods consumed. These include foods that are high in saturated fat, salt, sugar and alcohol such as cakes and biscuits, chocolate and confectionary, sweet and savoury pastries, processed meat and sugar sweetened beverages.

## Australian Dietary Guidelines – fruit target

According to the *Australian Dietary Guidelines* the recommended intake of fruit is as follows.

A standard serve of fruit is about 150g (350kJ) e.g. 1 medium apple, banana, orange or pear 2 small apricots, kiwi fruits or plums or 1 cup diced or canned fruit (with no added sugar).

| | 19–50 YEARS | 51–70 YEARS | 70+ YEARS |
|---|---|---|---|
| Men | 2 serves | 2 serves | 2 serves |
| Women | 2 serves | 2 serves | 2 serves |

## Australian Dietary Guidelines – vegetable target

According to the *Australian Dietary Guidelines* the recommended intake of vegetables is as follows.

A standard serve of vegetables is about 75g (100-350kJ) e.g. ½ cup cooked green or orange vegetables (for example, broccoli, spinach, carrots or pumpkin); ½ cup cooked, dried or canned beans, peas or lentils; 1 cup green leafy or raw salad vegetables; ½ cup sweet corn; ½ medium potato or other starchy vegetables (sweet potato, taro or cassava); 1 medium tomato.

| | 19–50 YEARS | 51–70 YEARS | 70+ YEARS |
|---|---|---|---|
| Men | 6 serves | 5.5 serves | 5 serves |
| Women | 5 serves | 5 serves | 5 serves |

## CSIRO Healthy Diet Score survey questions

The survey includes 4 separate questions about fruit and vegetable consumption, and 2 questions about juice consumption. The questions asked about usual consumption of:

- Fruit (examples include fresh, canned and dried)
- Cooked vegetables (examples include broccoli, cauliflower and pumpkin)
- Starchy vegetables (examples include potato, sweet potato and corn)
- Salad vegetables (examples include lettuce, cucumber and capsicum)
- 100% fruit juice
- Vegetable juice (fresh, canned or bottled)

Each question provides images and written examples of foods and written descriptions of the serve size (consistent with the *Australian Dietary Guidelines*).

## Generations

The generational classifications used in this report are defined as follows:

- **Generation Y** – adults born between 1983 and 1999, also known as Millennials
- **Generation X** – adults born between 1965 and 1982
- **Baby boomers** – adults born between 1946 and 1964
- **Silent generation** – adults born up to 1945

## Regions

This geographical classification uses population counts to define areas as urban and rural. These categories are provided by the Australian Bureau of Statistics and are as follows:

- **Major Urban** – population clusters of 100,000 people or more
- **Other Urban** – population clusters of 1,000 to 99,999 people
- **Bounded Locality** – population clusters of between 200 and 999 people
- **Rural Balance** – the remainder of the state/territory

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