

# The role of beverages in the Australian diet

A secondary analysis of the Australian Health Survey:  
*National Nutrition and Physical Activity Survey (2011-12)*



# Snapshot of key findings



## What are Australians consuming?

- Across the population, the most commonly consumed non-dairy, non-alcoholic beverages were water, followed by sugar-sweetened soft drinks and fruit juice.
- In general, women consume more non-dairy, non-alcoholic beverages than men, though men consume more sugar-sweetened beverages than women.
- Across the population, teenagers, especially males, are the highest consumers of sugar-sweetened beverages.
- Among adult consumers, the average daily volume of sugar-sweetened beverages consumed was similar to low-kJ beverages (~670mL for males and ~485mL for females).
- Among children, both the percentage consuming and mean intakes of soft drinks/flavoured water appear to have decreased between 1995 and 2011-12.
- Among children, both the percentage consuming and mean intake of fruit and vegetable juices/drinks appear to have decreased between 1995 and 2011-12.



## Contribution to energy intake

- The contribution of beverages to total energy intake is relatively low across the population – 4% of adults' and 6% of children's intake.
- The contribution of sugar-sweetened beverages to total energy intake increased with age to a peak in 14-18 year olds, before declining through adulthood.
- Overall, soft drinks contributed <2% to the total energy intakes of Australian adults and children.
- Discretionary foods and drinks contribute significantly to the total energy intake of the population – 36% for adults and 42% for children.
- **ADULTS:** Choices contributing the most to total dietary energy from the discretionary food and drink category are: confectionery & chocolates (18% of total discretionary kilojoules), sweet biscuits & cakes (13%) and alcoholic beverages (13%), followed by burgers/pizza/tacos (7%), sweet & savoury pies & pastries (6%) and fried potatoes & crisps (5%). Soft drinks provide 4% of discretionary kilojoules, ranked 7th.
- **CHILDREN:** Choices contributing the most to total dietary energy from the discretionary food and drink category: are confectionery & chocolates (17% of total discretionary kilojoules), sweet biscuits & cakes (16%) and fried potatoes & crisps (11%), followed by burgers/pizza/tacos (10%), savoury biscuits (6%) and sweet & savoury pies & pastries (5%). Soft drinks provide 4% of discretionary kilojoules, ranked 7th.
- Among discretionary beverages, alcoholic beverages were the highest contributor to total energy intake at 5.3% for adults, followed by soft drinks at 1.7%.

*The Australian Health Survey 2011-2012 is the largest and most comprehensive health survey ever conducted in Australia*



## Socio-economic factors

- In adults, consumption of non-dairy, non-alcoholic beverages was greater in people with higher household income, largely due to greater water intake.
- Sugar-sweetened beverage consumption was higher, and fruit juice intake was lower, in people with lower ranking of socio-economic status.
- Intake of sugar-sweetened beverages was lower among those living in major cities compared to those in regional centres and more remote areas.



## Association with weight status

- In adults, there was no clear relationship between weight status and the proportion consuming sugar-sweetened beverages, or the total consumption of these beverages.
- Consumption of sugar-sweetened beverages increased with weight status in girls, but not boys.
- Consumption of low-kJ sweetened beverages increased with weight status in adults.



## Nutrient contributions

- Beverages contribute appreciably to total sugars intake, with soft drinks being the major contributor (7.7% of total sugars intake for children, 7.1% of total sugars intake for adults).
- Fruit juices and fruit drinks provide about 60% of the Vitamin C intake of consumers of these beverages.
- For all age groups of children (consumers and non-consumers), fruit juice contributed 12-15% to total Vitamin C intake
- On a population basis, the contribution of beverages (not including coffee or tea) to caffeine intake is low, though it averages about one-fifth of the caffeine intake among consumers of these beverages



## Association with lifestyle patterns

- Beverage consumption is strongly associated with lifestyle pattern, which considers dietary quality and physical activity/sedentary behaviour.
- Adults and children with the least healthy lifestyle pattern reported in the survey consume 4-6 times more sugar-sweetened beverages than those with the most healthy lifestyle pattern.



# Introduction

Australians have access to a wide variety of beverages to quench their thirst and provide enjoyment.

To understand the role of non-dairy, non-alcoholic beverages in the diet of Australians, a secondary analysis of the *National Nutrition and Physical Activity Survey (2011-12)* (part of the Australian Health Survey) was commissioned by the Australian Beverages Council and conducted by the CSIRO Food and Nutrition Flagship.

The secondary analysis examined beverage consumption levels and patterns and the relationships between beverage intake and nutritional status, lifestyle behaviour and other factors related to health.

This report aims to provide health professionals, health organisations, policy makers and the beverage industry with an accurate and contemporary understanding of the role of beverages in the diet of Australian children and adults.

# The Australian Health Survey and secondary analysis

The Australian Health Survey 2011-2013 was conducted by the Australian Bureau of Statistics and includes the *National Nutrition and Physical Activity Survey (2011-12)* (NNPAS). **It is the largest and most comprehensive health survey ever conducted in Australia.**

## The Survey includes data on:

- Dietary behaviour and intake
- Physical activity and sedentary behaviour; and
- Health measurements, such as weight status.

## Data collection:

- 2011-2012

## Survey sample:

- 12,153 adults and children aged 2 years and over from across Australia

## Survey methods:

- 24-hour multiple-pass dietary recall
- Data collected during face-to-face interview
- Data gathered for all days, and across four seasons of the year
- Height and weight were collected for 85% of the sample
- Assessment of physical activity and sedentary behaviour was included

## Secondary analysis of the National Nutrition and Physical Activity Survey

### Conducted by:

- CSIRO Food and Nutrition Flagship


### Methodological considerations:

- The analysis focussed on dietary intake measured on a single day for each individual subject. The mean intake results for a single day represent the population mean intake. The terminology 'on the day of the survey' is employed when reporting a result which changes according to the number of days of intake measurement.
- Under-reporting of energy intake in the survey data (and therefore food intake) is estimated to be up to 17% for males and 21% for females.
- Results are population weighted to provide a true estimate of population intake.




# Beverage categories


Australians consume a diverse array of beverages. The focus of the secondary analysis was on non-dairy, non-alcoholic beverages, which included the following:

 **Water**  
including tap water, rain water, bore water, bottled water, sparkling and still water

 **Fruit juice** (with no added sugar)

## Sweetened beverages

 **Sugar-sweetened beverages (SSBs)**  
including soft drinks, fruit drinks, cordials, sports drinks, energy drinks, flavoured water and iced tea

 **Low-kilojoule (low-kJ) sweetened beverages**  
including soft drinks, fruit drinks, cordials, energy drinks, flavoured water and iced tea

This analysis excludes milk, milk-based drinks, meal replacements, vegetable juices, tea, coffee, beer, wine and spirits, including premixed alcoholic drinks.

## Key Definitions

Beverages are consumed by some sections of the population but not others. In this report, specific beverages are considered in terms of their impact on the sub-section of the population that consumed the beverage on the day of the survey and on the whole population.

### Population

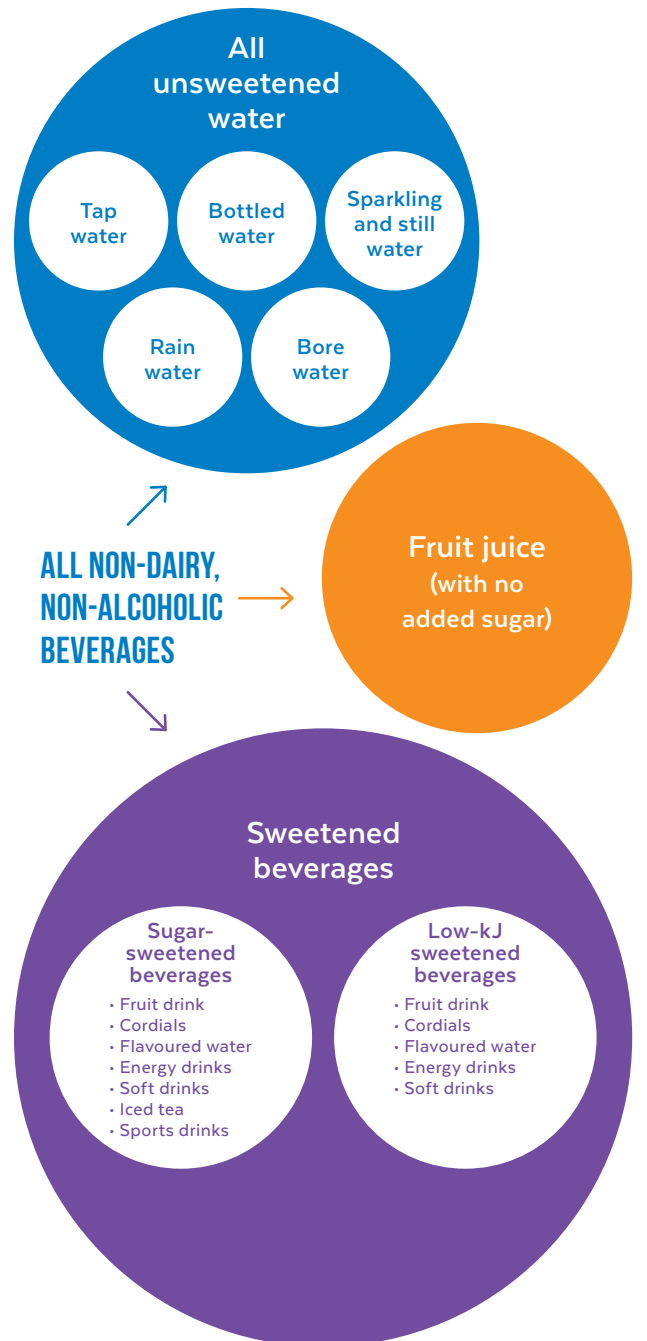
All survey subjects  
(consumers + non-consumers).

### Consumers

Survey subjects who reported consumption of a specific non-dairy, non-alcoholic beverage in any amount on the day of the 24-hour recall. For example, survey subjects who consumed fruit drink within the 24-hour recall are referred to as 'fruit drink' consumers.

**FIGURE 1:**

Relationship between the beverage categories



**Note:** To assess the contribution of beverages to 'Discretionary Choices', the analysis included all discretionary beverages – alcoholic beverages as well as sugar-sweetened beverages – along with other discretionary foods like cakes, chocolates and confectionary (categorisation guided by the recent ABS classification<sup>1</sup>).

# Australians' beverage intake

## What is the population consuming?

On the day of the survey, almost all Australians reported consuming non-dairy, non-alcoholic beverages. The percentage of adult consumers (95%) was lower than children (99%), although tea, coffee, milk and alcoholic drinks were excluded from this analysis.

The overall pattern of consumption of beverages was similar for adults and children with the most commonly consumed beverage being water, followed by sugar-sweetened soft drinks and fruit juice (Table 1).

**Water was consumed by 92% of children and 86% of adults on the day of the survey.**







## Consumption of other beverages

There were a number of beverage types which were infrequently consumed by adults and children including sports drinks, low-kJ sweetened cordials and flavoured water, energy drinks, iced tea and flavoured water – where less than 3% of the population reported to consume each of these beverages.

**Less than 3% of the population consumed sports drinks, low-kJ sweetened cordials and flavoured water, energy drinks, iced tea, flavoured, sparkling and still water, and bore water.**

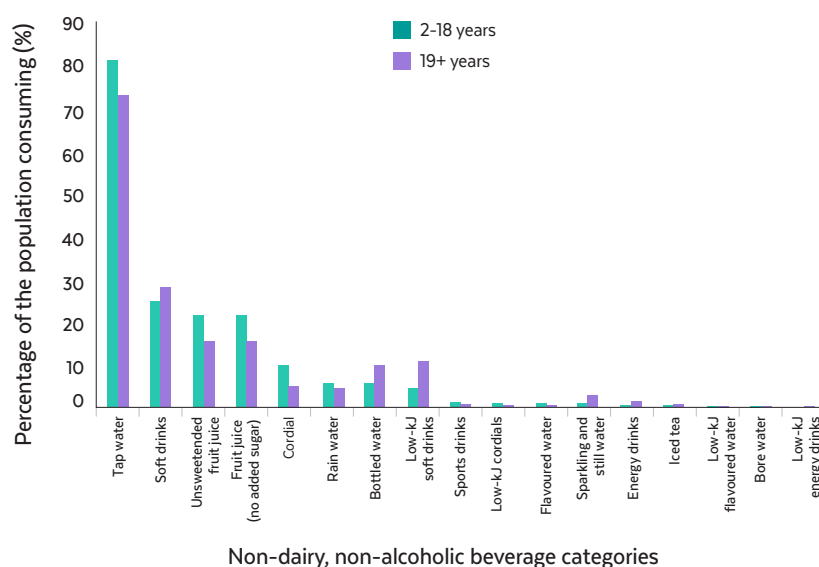
**TABLE 1:**

The top six non-dairy, non-alcoholic beverages consumed across the population on the day of the survey for children and adults

	Children (2-18 yrs)	Adults (19+ yrs)
 Water	92%	86%
 Sugar-sweetened soft drinks	25%	19%
 Fruit juice (no added sugar)	23%	15%
 Fruit drinks	17%	8%
 Cordial	10%	5%
 Low-kJ Drinks	6%	11%

**FIGURE 2:**

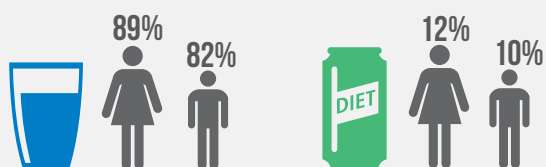
Percentage of the population consuming non-dairy, non-alcoholic beverages on the day of the survey for children 2-18 years and adults 19+ years



# What we drink changes by life-stage

**TABLE 2:**

Age and gender differences at a population level



The proportion of women consuming water and low-kJ sweetened beverages was higher than men (89% vs 82% and 12% vs 10% respectively for water and low-kJ sweetened beverages).



A greater proportion of men consume sugar-sweetened beverages than women (36% compared to 25%).



Young children (2-8 years) had the highest prevalence of fruit drink and cordial consumption (20% and 11% respectively), and this steadily decreased with age.



The proportion of Australians consuming sugar-sweetened soft drinks peaks in 14-18 year olds (43% for males and 32% for females) before declining in the older adult years (19 years and over) (23% for males and 14% for females).



More adults consume low-kJ sweetened beverages than children (11% compared to 6%). A peak in the proportion consuming occurred in older age groups (31-50 years).



# Mean intake of beverages across the population

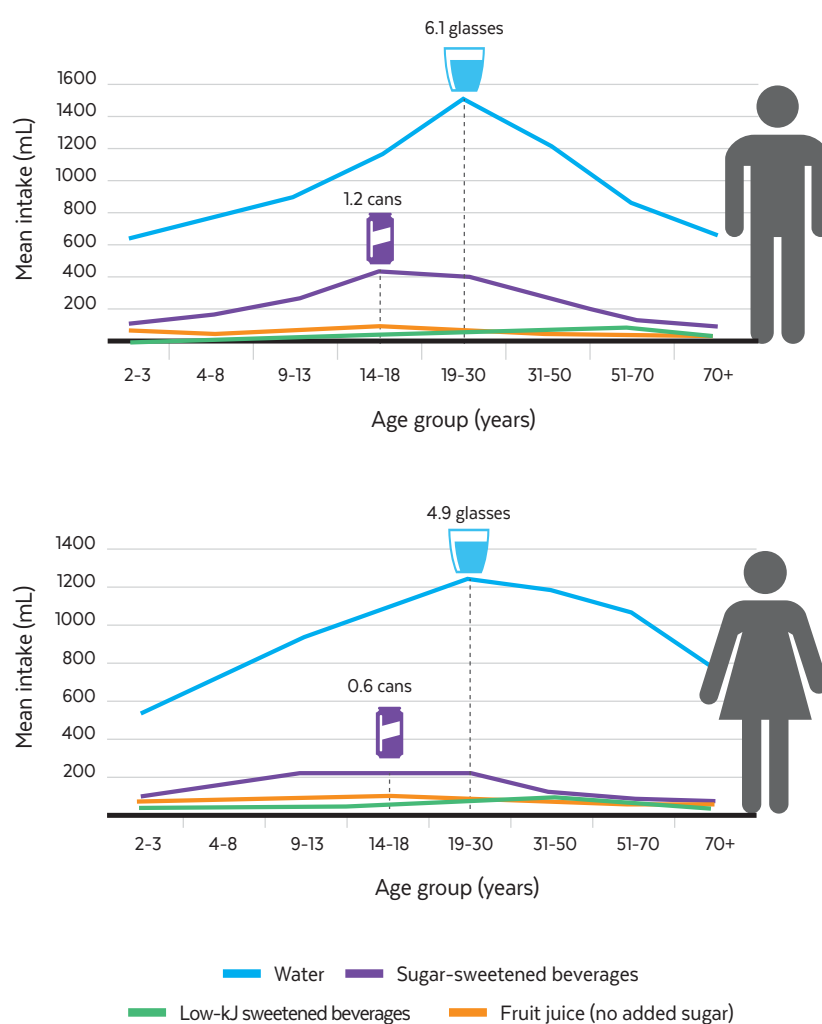
The mean total intake of non-dairy, non-alcoholic beverages across the Australian population was approximately 1200mL for children and 1400mL for adults, with mean intake being higher in males than females. The major contributor to intake was water, in particular tap water, in both males and females, followed by sugar-sweetened beverages, with fruit juice and low-kJ sweetened beverages making relative minor contributions (Figure 3).

## Population consumption: male subgroups

Although mean consumption of sugar-sweetened beverages at the population level was less than 125mL (one-third of a can) on the day of the survey, specific subgroups reported higher intakes (Figure 3). For example, on average across the population, adolescent males aged 14-18 years reported a mean intake of 435mL (1.2 cans). This group and men in the 19-30 year age group consumed about 150mL (0.4 can) or more sugar-sweetened beverage than any other age/gender subgroup on the day of the survey.

**FIGURE 3:**

Mean consumption of non-dairy, non-alcoholic beverages across the population, by age and gender



**The mean population intake of sugar-sweetened beverages was one-third of a can, though adolescent males reported a higher intake of 1.2 cans on the day of the survey.**

0.3 cans  
**Total population**

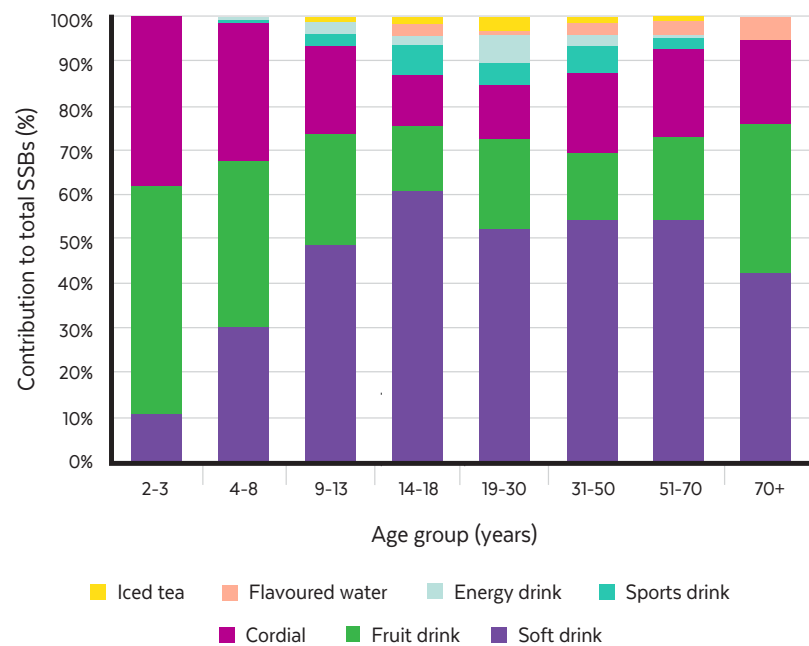
1.2 cans  
**Adolescent males**

# Population consumption: Sugar-sweetened beverages

Amongst Australians, the contribution of specific beverages to sugar-sweetened beverages consumption (as a percentage) by age group is depicted in Figure 4. The combination of soft drinks and fruit drinks comprises 60–75% of all sugar-sweetened beverages for most age groups. Cordial makes a significant contribution in young children but declines considerably in the teenage years being replaced by a variety of sugar-sweetened beverages, such as soft drinks, iced tea, flavoured water, sports drinks and energy drinks. On average, sports and energy drinks make up a small proportion of total sugar-sweetened beverages consumption across all age groups of the population.

**FIGURE 4:**

Contribution of specific beverages to total sugar-sweetened beverages consumption, by age



*Soft drinks and fruit drinks contribute up to 60-75% of the total consumption of sugar-sweetened beverages for most age groups.*



# Consumers only: Mean intakes of all beverages

The mean intake of all beverages for consumers only was similar to the mean intake in the population for non-dairy, non-alcoholic beverages (Children: 1146mL population, 1283mL consumers; Adults: 1392mL population, 1597mL consumers) because almost everybody consumed a beverage. Adult consumers had a higher intake of beverages than children and males a higher mean intake than females.

## Adults

The mean daily amount consumed by adult consumers (19+ years):

1. Water - mean intake of 1300mL
2. Sugar-sweetened beverages - 584mL
3. Low-kJ beverages - 579mL
4. Fruit juice (no added sugar) - 313mL

## Children and Teenagers

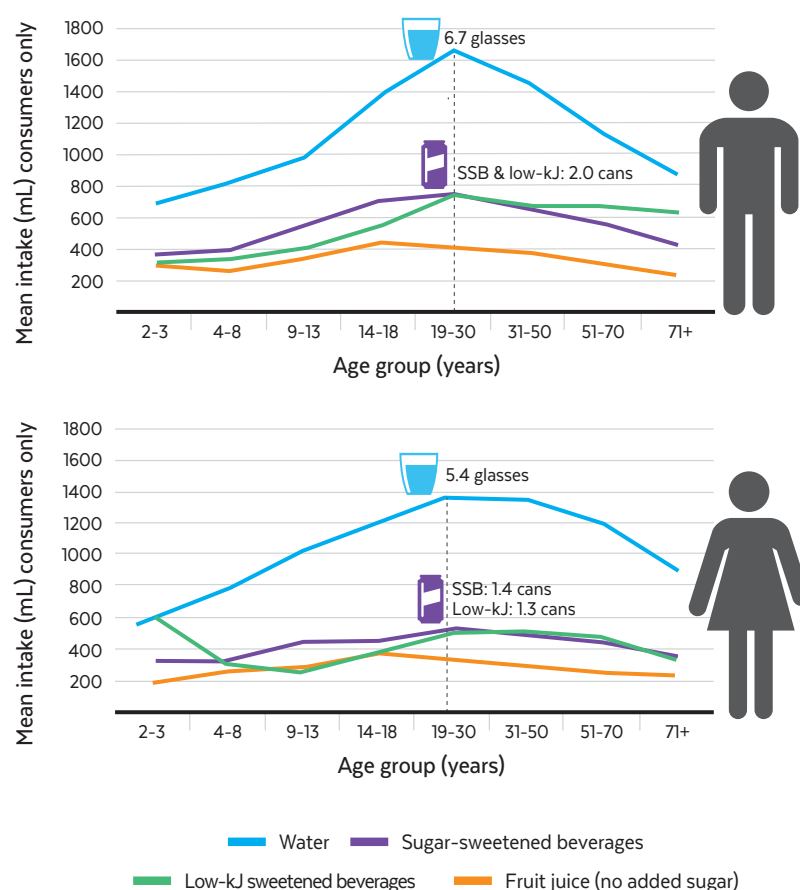
The mean daily amount consumed by children consumers (2-18 years):

1. Water - 971mL
2. Sugar-sweetened beverages - 476mL
3. Low-kJ beverages - 380mL
4. Fruit juice - 302mL

Among consumers, the mean intake of beverages across gender and age sub-groups shows water, sugar-sweetened beverages and low-kJ beverages tended to increase with age, peaking in the 19-30 year age group before declining in later adult years (Figure 5).

**FIGURE 5:**

Mean intake (mL) of non-dairy, non-alcoholic beverages at the major level (consumers only), by age group and gender



Consumption of fruit juice also increased with age group however the peak intake among consumers occurred earlier, in the 14-18 year age group.

Within the sugar-sweetened beverage category, both adult and children consumers reported having sports drinks in the highest mean volumes (675mL and 585mL) on the day of the survey. However, as only 1.2% of adults and 1.5% of children consumed sports drinks on the day of the survey, the mean intake for the overall population was much lower (~8mL).

**Among adult consumers, the mean daily volume of sugar-sweetened beverages consumed was similar to low-kJ beverages (~670mL for males and ~485mL for females).**

# Effect of socio-economic status and remoteness on beverage consumption across the population

As illustrated in Figure 6, mean daily sugar-sweetened beverage consumption decreased in a stepwise manner with increasing socio-economic status. That is, the lower socio-economic households tended to consume the most sugar-sweetened beverages. In contrast, mean fruit juice intake increased with increasing socio-economic status. Water consumption increased with increasing household income - highest intake in the fourth quintile of socio-economic status.

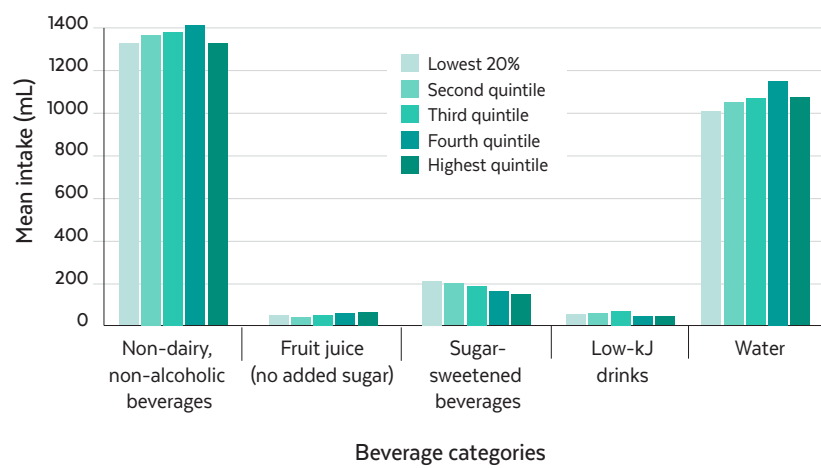
**Lower socio-economic status is associated with lower consumption of water and fruit juice and higher consumption of sugar-sweetened beverages.**

## City vs rural living

Mean daily intake of sugar-sweetened beverages was lower, by around 40mL among those living in major cities compared to those in regional centres and more remote areas. The reverse was true for fruit juice and low-kJ sweetened beverages, where people living in major cities reported slightly higher intakes (5mL and 6mL respectively) than those in inner regional or other regions of Australia.

**FIGURE 6:**

Mean population intake of beverages by socio-economic status









## Effect of seasons and day of the week on beverage choice

- Consumption of non-dairy, non-alcoholic beverages was highest in summer (1504mL) and lowest in winter (1169mL). Water accounted for most of the difference.
- More adults (35% vs 29%) and children (53% vs 45%) consumed sugar-sweetened beverages on weekend days compared to weekdays.
- Adults' consumption of water (difference: 62mL) and low-kJ sweetened beverages (difference: 23mL) was lower on weekend days.

# How have consumption patterns changed over time?

Direct comparisons between the Australian Health Survey and the few previous national nutrition surveys are not straightforward; there are important differences in the population structure, the sampling, data collection and classification of beverages. Nevertheless, general comparisons of unadjusted estimates can be made between the 2011-12 Australian National Nutrition and Physical Activity Survey (NNPAS) and the 1995 National Nutrition Survey.





## Key trends - what's DECREASED over time

Children				
	<b>Soft drinks/ flavoured waters</b>	<b>% of children consuming - appreciable decrease</b>	<b>Mean intakes - appreciable decrease</b>	
	1995	26%-58%*	58-417.5mL*	
	2011-12	6%-45%*	12-242.5mL*	
	<b>Fruit and vegetable juices/drinks</b>	<b>% of children consuming - appreciable decrease</b>	<b>Mean intakes - appreciable decrease</b>	
	1995	55%-81.5%*	278mL-313mL*	
	2011-12	35%-44%*	114mL-138.5mL*	
Adults				
	<b>Soft drinks/ flavoured waters</b>	<b>% of adults consuming - small decrease</b>	<b>Mean intakes - small decrease</b>	
	1995	31%	180mL	
	2011-12	29%	160mL	
	<b>Fruit and vegetable juices/drinks</b>	<b>% of adults consuming - appreciable decrease</b>	<b>Decrease consistent with % adults consuming</b>	
	1995	36%	124mL	
	2011-12	24%	85mL	

\*Range, as data reported for specific age groups

Note: To compare beverage intakes with the 1995 National Nutrition Survey, fruit and vegetable juices/drinks were combined together as a category (which is different from the rest of the Report which separates out fruit juice from fruit drinks and excludes vegetable juices/drinks). In 1995, cordial was included in the fruit and vegetable juices/drinks but was reported as a separate category in 2011/12. This change in categorisation is likely to account for some, but not all of the apparent decrease in fruit and vegetable juices/drinks intake.

## Key trends - what's INCREASED over time

Children				
	<b>Water</b>	<b>% of children consuming - marginal increase</b>		
	1995		83%-88%*	
	2011-12		88%-95%	
Adults				
	<b>Water</b>	<b>% of adults consuming - marginal increase</b>	<b>Mean intakes - substantial increase</b>	
	1995	80%	852mL	
	2011-12	86%	1123mL	

\*Range, as data reported for specific age groups



### New drinks

Sports drinks and energy drinks emerged as separate categories in the recent surveys (2007, 2011-12) though intake remains low – less than one percent of total beverage consumption, across the population.

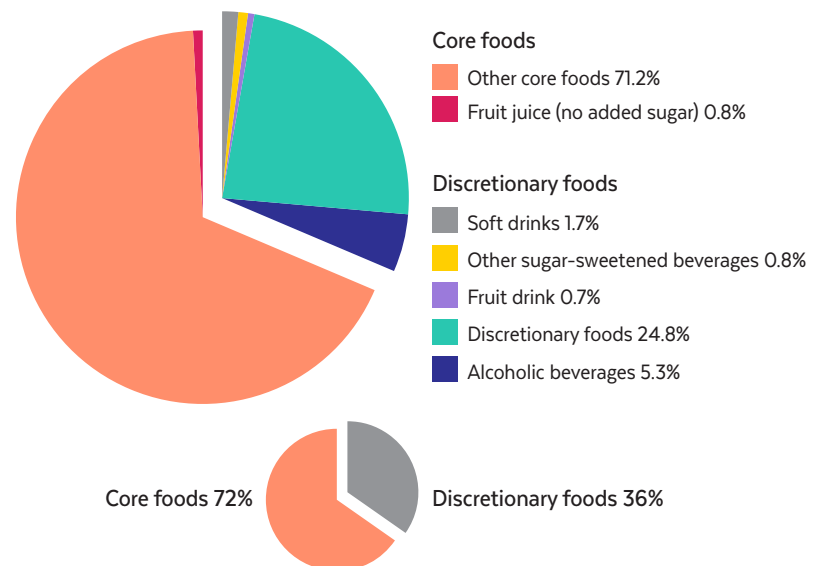
# What is the contribution of beverages to energy intake across the population?

## Adults

Across the adult population, non-dairy, non-alcoholic beverages contributed 3.9% to adults' total energy intake, with sugar-sweetened beverages contributing the most energy (3.2%). Among the latter, soft drinks contributed 1.7%. Alcoholic beverages contributed 5.3% to the total energy intake (Figure 7a).

**FIGURE 7A:**

Percentage of total energy intake from different sources for Australian adults



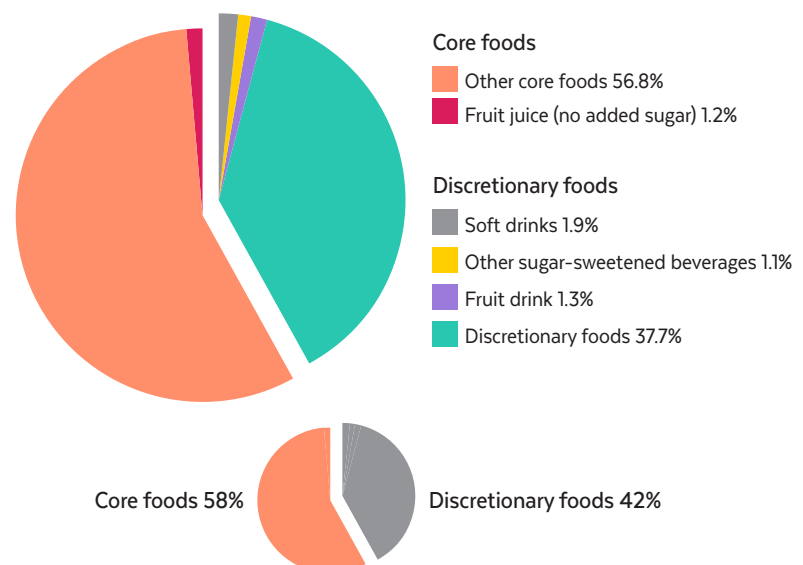
## Children

Across all children surveyed, non-dairy, non-alcoholic beverages contributed 5.5% to total energy intake, with sugar-sweetened beverages contributing 4.3% to total energy intake including 1.9% from soft drinks (Figure 7b).

**Across the population, sugar-sweetened soft drinks contribute <2% of total energy intake for adults and children.**

**FIGURE 7B:**

Percentage of total energy intake from different sources for Australian children



# Contribution of beverages to energy intake by life-stage

## Adolescents

Contribution of non-dairy, non-alcoholic beverages to total energy intake was highest in 14-18 year olds – 8.2% in males and 5.7% in females. This was largely attributable to a peak in the consumption of sugar-sweetened soft drinks.

## Children and adults

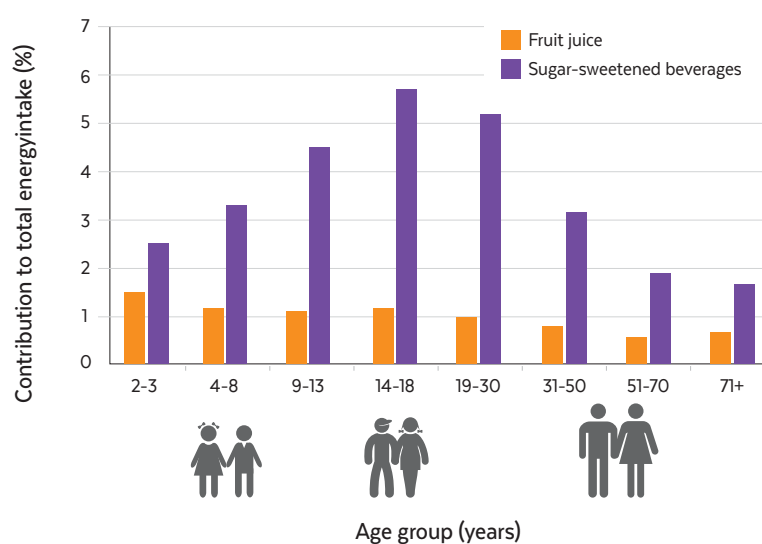
In contrast, the contribution of fruit juice (with no added sugar) to energy intake generally falls across the childhood and adult years. Fruit juice contributes less than 1% of total energy on average to the Australian population.

## Older adults

The lowest contributions to total energy intake from sugar-sweetened beverages were in the two oldest age brackets, 51-70 years and 71+ (1.9% and 1.6% respectively).

**FIGURE 8:**

Contribution of sugar-sweetened beverages and fruit juice (with no added sugar) to total energy intake by age group



# Energy intake among beverage consumers

Among those who reported consuming specific beverages, contribution to their energy intakes from those beverages were predictably higher than for the general population surveyed (Figure 9).

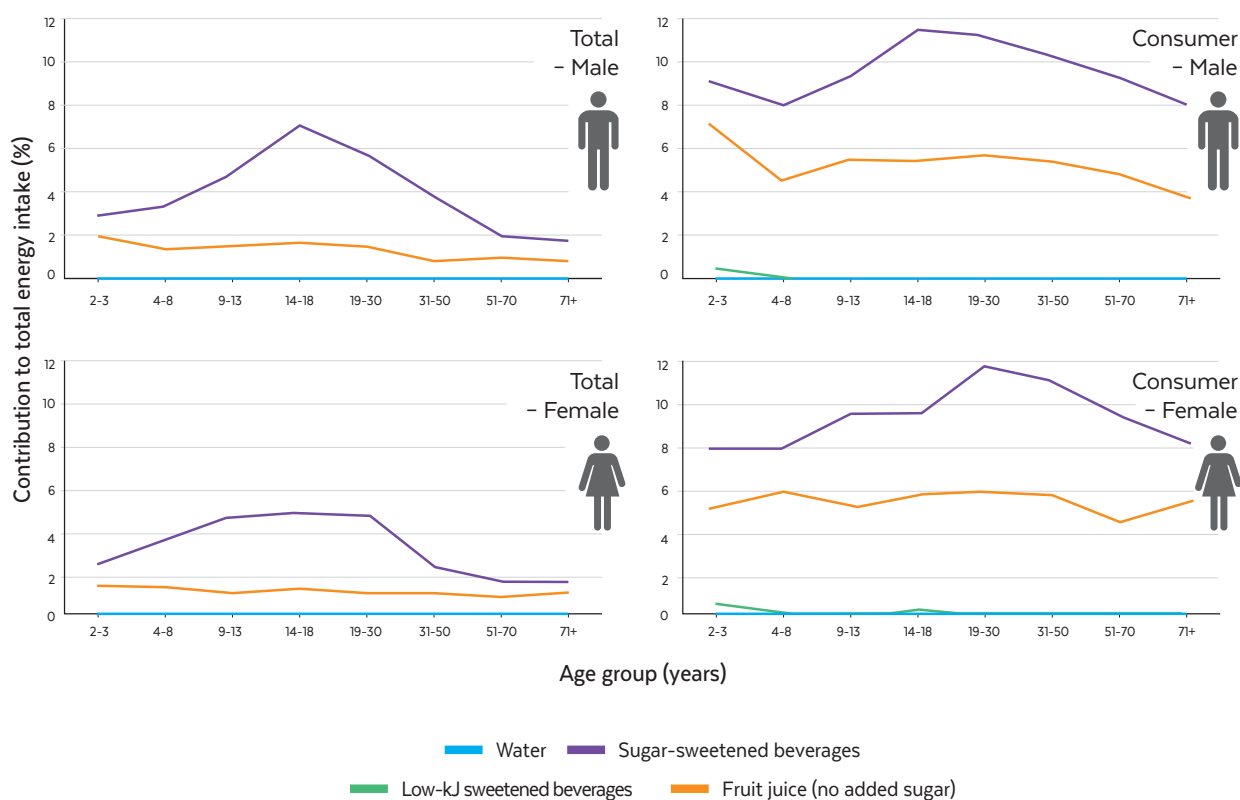
For example:

- Although sugar-sweetened soft drinks contributed an average of 1.7% of energy across the whole adult population, among the 19% of adults who reported consuming sugar-sweetened soft drinks on the day of the survey, the contribution to total energy intake was 9.0%.
- For children, sugar-sweetened soft drinks contributed an average of 1.9% of energy across the whole population (2-18 year olds), compared to the quarter (25%) of children who consumed sugar-sweetened soft drinks on the day of the survey where the contribution to total energy intake was 7.7%.



**FIGURE 9:**

Percentage contribution of beverages to total energy intake by age and gender, across the population and for consumers only





# The contribution of beverages to discretionary choices

There is a key public health focus on discretionary choices as this group of foods and drinks contribute significantly to Australians' total energy intake – 36% of kilojoules in adults (19+ years) and 42% in children (2-18 years). Generally, this percentage is higher in males than females.

The Australian Bureau of Statistics segmented non-alcoholic, non-dairy beverages into 2 categories<sup>1</sup>:

- **Discretionary beverages:** The majority of beverages e.g. soft drink, fruit juice drink, sports and energy drinks and flavoured water.
- **Non-discretionary beverages:** Fruit juice (with no added sugar) and water.

**Discretionary foods contributed a large proportion of total energy intake in adults (36%) and children (42%).**

## What are “discretionary choices”?

The *Australian Dietary Guidelines* describe discretionary foods as:

***Foods and drinks not necessary to provide the nutrients the body needs, but that may add variety. Discretionary choices are high in kilojoules, saturated fats, added sugars and/or salt or alcohol. They can be included sometimes in small amounts by those who are physically active, but are not a necessary part of the diet<sup>2</sup>.***

Discretionary choices include: most sweet biscuits, cakes, desserts and pastries; processed meats and sausages; ice-cream and other ice confections; confectionery and chocolate; savoury pastries and pies; commercial burgers; commercially fried foods; potato chips, crisps and other fatty and/or salty snack foods; cream, butter and spreads which are high in saturated fats; sugar-sweetened soft drinks and cordials, sports and energy drinks and alcoholic drinks<sup>2</sup>.



# What are the largest contributors to total energy from discretionary choices for adults?

This section explores the energy contribution of specific discretionary foods and beverages (based on ABS categorisation) to the **total discretionary food energy intake**.

This is not the same as assessing the percentage contribution of these foods to the total energy intake of the whole diet (which includes both Core Foods and Discretionary Foods).

Discretionary foods were categorised into commonly consumed groups consistent with the ABS hierarchy of food classification (generally at the 3-digit level), except for the sugar-sweetened beverages which were separated into the beverage types described throughout this report.

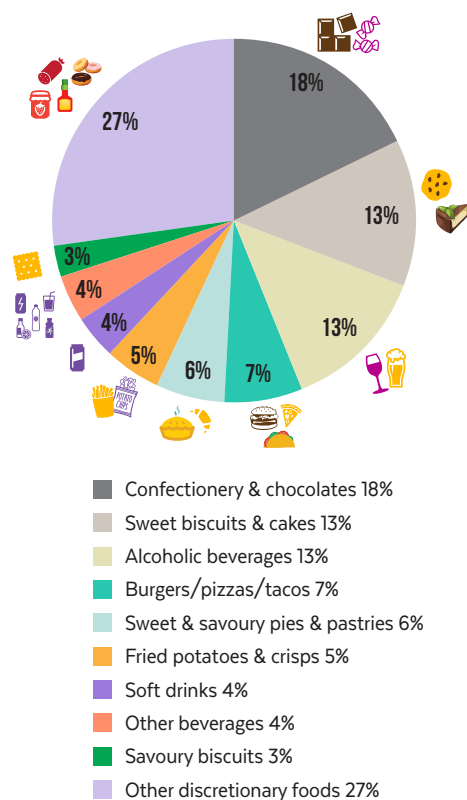
## Adults

1. Confectionery & chocolates (18%)
2. Sweet biscuits & cakes (13%)
3. Alcoholic beverages (13%)
4. Burgers/pizzas/tacos (7%)
5. Sweet & savoury pies & pastries (6%)
6. Fried potatoes & crisps (5%)
7. Soft drinks (4%)
8. Other beverages (4%)

*The foods contributing the most to total energy intake from the discretionary food group were confectionery & chocolates, followed by sweet biscuits & cakes and alcohol in adults.*

**FIGURE 10:**

Contribution of specific discretionary food categories to the total discretionary food energy intake in adults



# What are the largest contributors to total energy from discretionary choices for children?

## Children

1. Confectionery & chocolates (17%)
2. Sweet biscuits & cakes (16%)
3. Fried potatoes & crisps (11%)
4. Burgers/pizzas/tacos (10%)
5. Savoury biscuits (6%)
6. Sweet & savoury pies & pastries (5%)
7. Soft drinks (4%)
8. Fruit drink (3%)

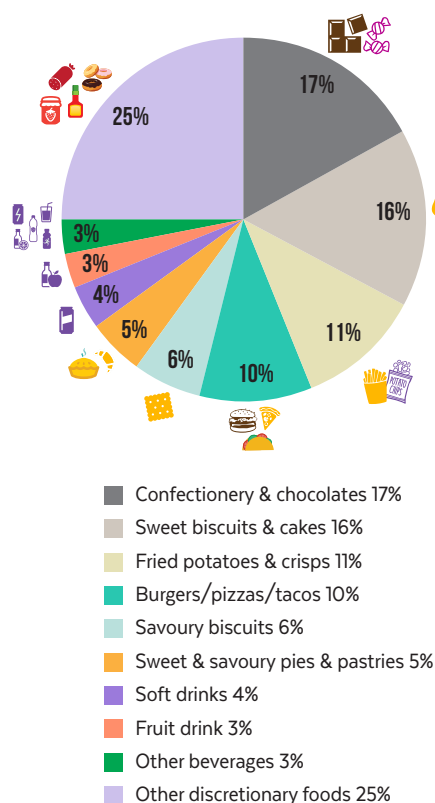
*The foods contributing the most to total energy intake from the discretionary food group were confectionery & chocolates, followed by sweet biscuits & cakes and fried potatoes & crisps in children.*

## Food and beverage choices by gender

There were some noteworthy differences by gender. For example, females aged 14-18 years tended to consume a greater percentage of energy from sweet biscuits & cakes and confectionery & chocolates (12% and 9% of energy) compared to males of the same age group who consumed more energy from burgers/pizzas/tacos and soft drinks (14.7% and 9.3%).

**FIGURE 11:**

Contribution of specific discretionary food categories to the total discretionary food energy intake in children



# Discretionary beverages by life stage

Sugar-sweetened beverages and alcoholic drinks are categorised as discretionary beverage choices. Figure 12 shows the individual contributions of sugar-sweetened and alcoholic beverages<sup>2</sup> to total energy intakes across the population in all age groups.

## Children and adolescents

As would be expected, across the population, sugar-sweetened beverages are preferred by children with peak contribution to total energy (5.7%) occurring in the 14-18 year age group.

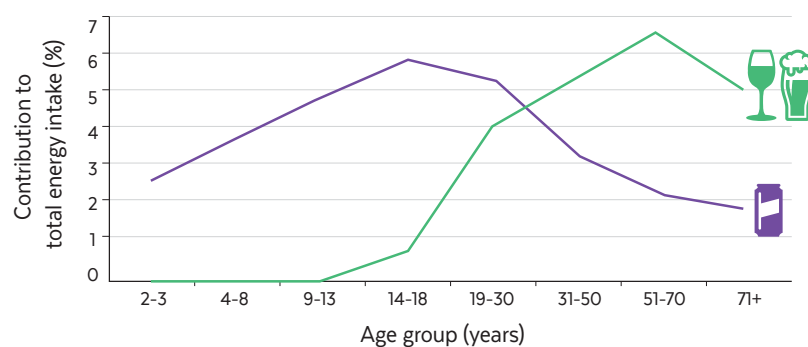
## Adults

Alcoholic beverages are preferred by the adult population, with peak contribution to total energy (6.6%) occurring in the 51-70 year age group.

**Among discretionary beverages, alcoholic beverages were the highest contributor to total energy intake across the adult population: 5.3% followed by 1.7% contributed by soft drinks.**

**FIGURE 12:**

Contributions of sugar-sweetened and alcoholic beverages to total energy intakes across the population, by age<sup>2</sup>



# Beverages and weight status

As the Australian Health Survey was cross-sectional in design, any association between beverage consumption and weight status needs to be interpreted cautiously. It is not clear whether consumption is a result of weight status, occurred prior to achieving weight status and is a cause of it, or is causally unrelated to weight status. As with all cross-sectional studies, the associations cannot be assigned as cause and effect.

Across the population, total consumption of non-dairy, non-alcoholic beverages in adults was consistent across all weight status groups, with an average of about 1400mL consumed on the day of the survey. The majority of this was water (around 1.1L) which was consumed consistently across weight status groups. In male children, water consumption increased slightly with weight status though the pattern for female children was less clear.

## Sugar-sweetened beverages

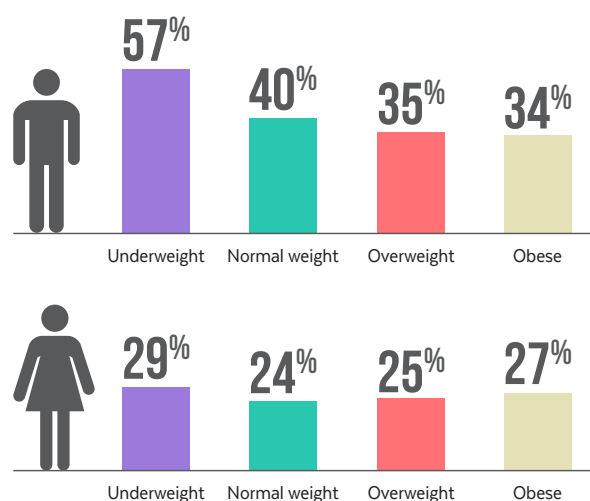
### Adults

In adults, there was no association between the proportion that consumed sugar-sweetened beverages and weight status, and the highest prevalence occurred in the underweight category. However, gender differences were evident.

Total consumption of sugar-sweetened beverages reflected the prevalence data and was highest in underweight adults (Figure 14). Note that the number of subjects in the survey who were underweight was 35 for men and 81 for women. Similar mean daily intakes were reported for normal, overweight and obese adults.

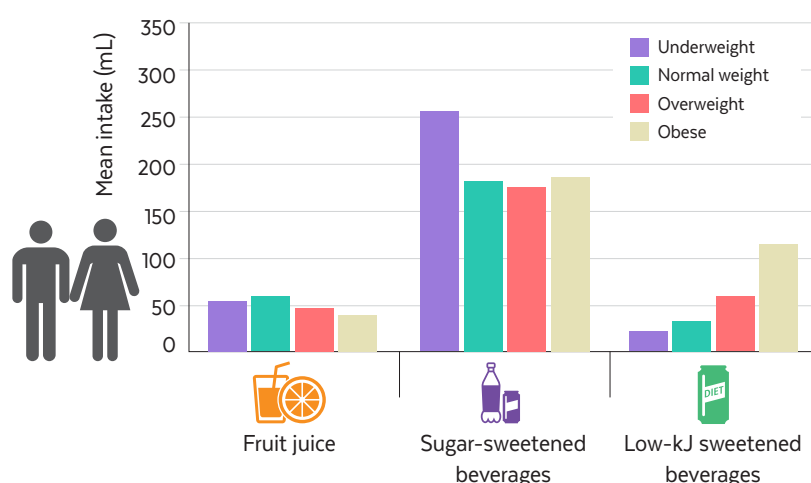
**FIGURE 13:**

Percentage of Australian adults reporting consumption of sugar-sweetened beverages on the day of the survey



**FIGURE 14:**

Mean daily consumption of beverages for adults by weight status



# Beverages and weight status

## Sugar-sweetened beverages

### Children

In girls, both the proportion who consumed and the total consumption of sugar-sweetened beverages showed a clear stepwise increase with increasing weight status (Figure 15). However, neither association was evident in boys.

### Fruit juice

The percentage of women and the percentage of men consuming fruit juice on the day of the survey was about the same for each category of weight status. There was also no statistical evidence to support a difference in prevalence of fruit juice consumption across weight status categories in children, either male or female.

The mean total daily intake of fruit juice did not differ by weight status category for children or adults.

## Low-kJ sweetened beverages

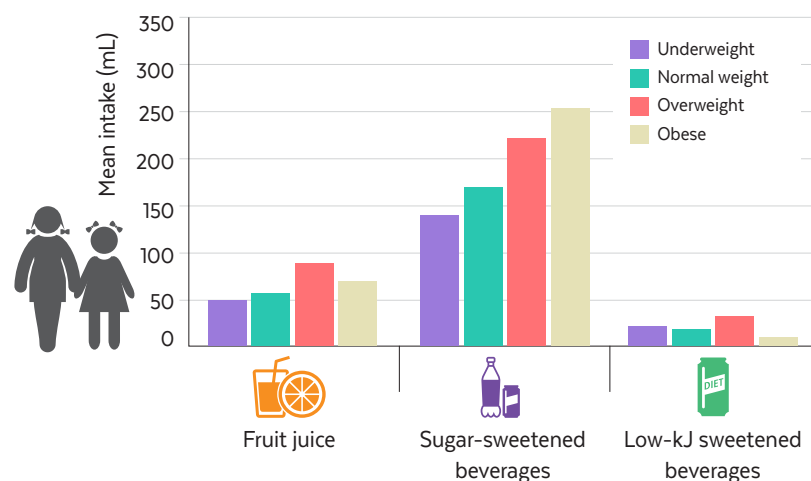
The proportion of the adult population that reported consuming low-kJ sweetened beverages increased with increasing weight status. The trends were similar in both genders.

There was a stepwise increase in total consumption of low-kJ sweetened beverages with increasing weight status in adults (Figure 14).

The percentage of male children consuming low-kJ sweetened beverages increased with increasing weight status but this was not evident in girls.

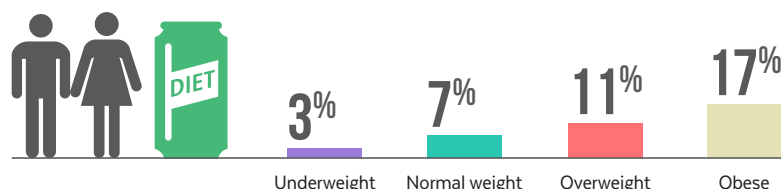
**FIGURE 15:**

Mean daily consumption of beverages in female children by weight status, across the population



**FIGURE 16:**

Percentage of Australian adults reporting consumption of low-kJ sweetened beverages on survey day



# Contribution of beverages to key nutrients

## Carbohydrate and total sugars

Across the whole population, non-dairy, non-alcoholic beverages contributed 9% to total carbohydrate intake. This was higher in children (11%) compared to adults (8%).

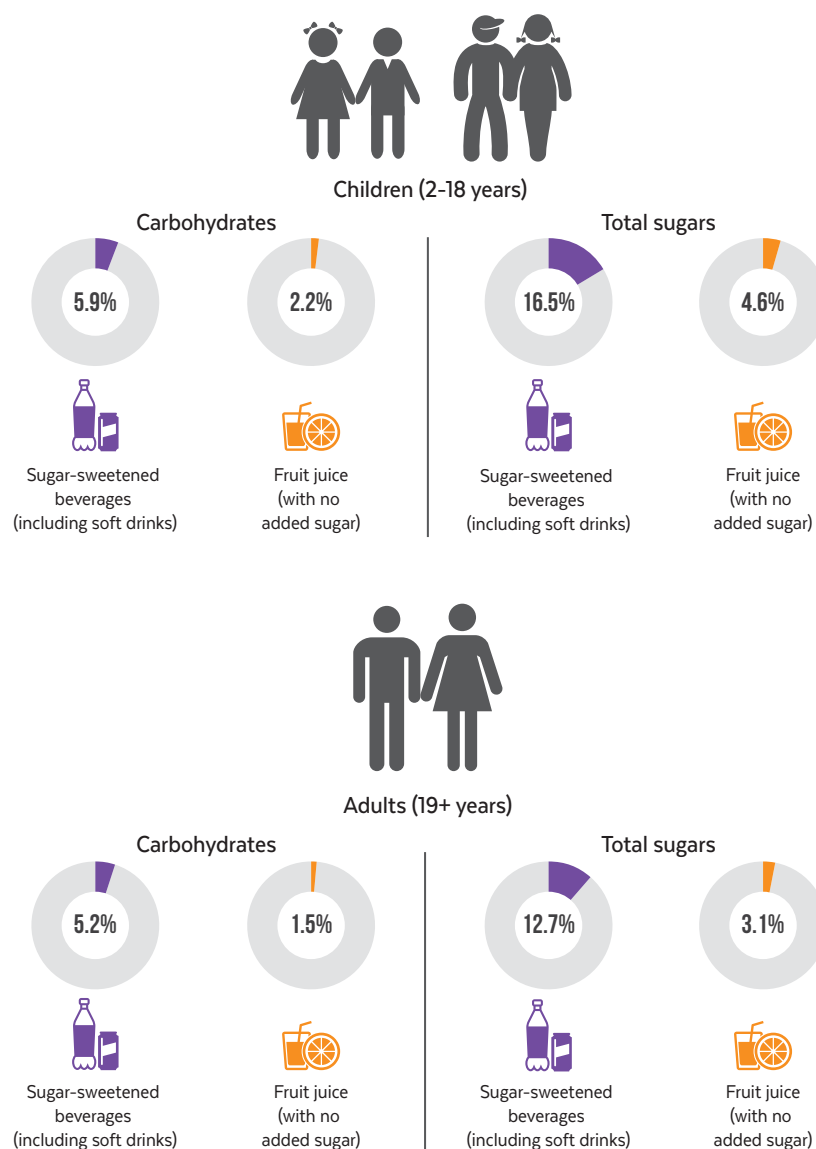
The contribution of beverages across the population, to total sugars intake was 21% in children and 16% in adults. Across the population as a whole this equated to almost 17%, the greatest contributors to total sugars intake being soft drinks (7.2%), fruit juice (3.5%), fruit drink (3.1%) and cordial (1.9%).

The variation in the contribution of beverages to total carbohydrate and sugars intake by age and gender followed a similar pattern to the contribution of beverages to total energy intake, with sugar-sweetened beverages peaking in the 14-18 year age group.

**Across the Australian population, sugar-sweetened beverages contributed 17% of the total sugar intake.**

**TABLE 3:**

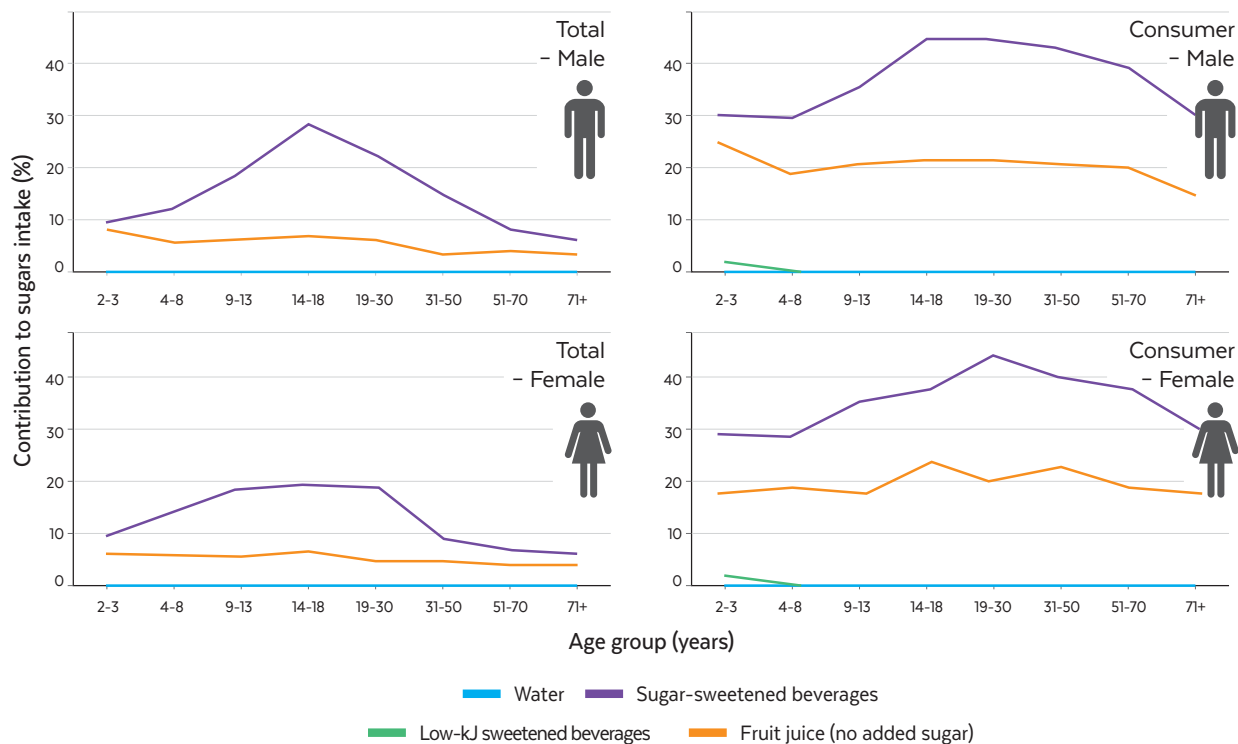
Contribution of beverages to carbohydrate and sugars intake by most common beverage type across the total population



# Contribution of beverages to key nutrients

**FIGURE 17:**

Contribution of beverages to carbohydrate and sugars intake by most common beverage type across the total population and for consumers only



## Consumers

Among those who had consumed specific beverages on the day of the survey, the contributions of these drinks to total carbohydrate and sugars intakes were predictably higher. For example, consumers of sugar-sweetened beverages obtained 40% of their sugar intake from these drinks compared to 14% for the whole population (Figure 17). For fruit juice consumers, 20% of their energy intake was from total sugars, versus 3.5% for the whole population (Figure 17).

## Vitamin C

For the whole population, non-dairy, non-alcoholic beverages contributed 17% to total vitamin C intake, most of which came from fruit juice (10%) and fruit drink (5%).

In children, the contribution of the non-dairy, non-alcoholic beverage category to total Vitamin C intake was 23%, with fruit juice being the main source (12-15%).

Among consumers, fruit juice contributed about 60% of total Vitamin C intake, regardless of age.

**Among consumers, fruit juice contributed about 60% of total Vitamin C intake, regardless of age.**

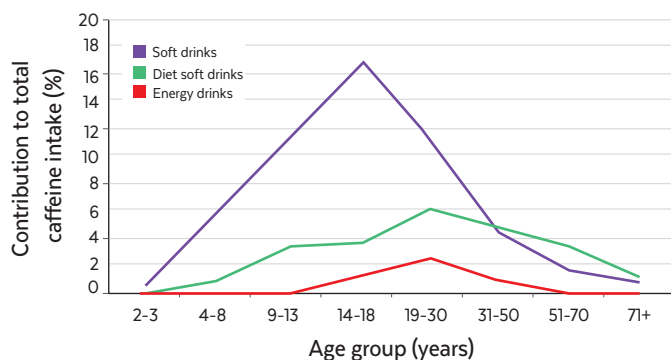




# Contribution of beverages to caffeine intake

**FIGURE 18:**

Contribution of beverages to total caffeine intake (as a mean percentage of total intake) by age group, across the population



## Caffeine

Across the total adult population, non-dairy, non-alcoholic beverages contributed 10% of the total caffeine intake, the major contributors being sugar-sweetened soft drinks (5%) and low-kJ sweetened drinks (4%).

Sugar-sweetened soft drinks and low-kJ sweetened drinks contributed about 10% and 2%, respectively, to children's total caffeine intake. The 14-18 year old age group had the highest caffeine intake from non-alcoholic, non-dairy beverages (22% of the total) largely driven by the high soft drink consumption of this group (Figure 18).

Energy drinks contributed less than 1% to total caffeine intake in all age groups except 14-18 and 19-30 year olds, where they contributed 1% and 3% respectively. Other age groups were getting almost all their caffeine from other foods or beverages not included in this analysis.

Among those who consumed sugar-sweetened beverages, the contribution of this beverage group to total caffeine intake was 23% in children and 20% in adults. The contribution was highest among 9-13, 14-18 and 19-30 year age groups. Among those who consumed low kJ beverages, these contributed 39% of the total caffeine intake in children and 36% in adults.

**Across the population, energy drinks contributed 1% and 3% of the total caffeine intake for 14-18 year olds and 19-30 year olds, respectively.**



# Beverages, diet quality, activity and lifestyle pattern

## Diet quality

The secondary analysis considered associations between beverage consumption and diet quality, which was measured using a composite index to estimate individuals' compliance with the *Australian Dietary Guidelines* in their entirety<sup>4</sup>.

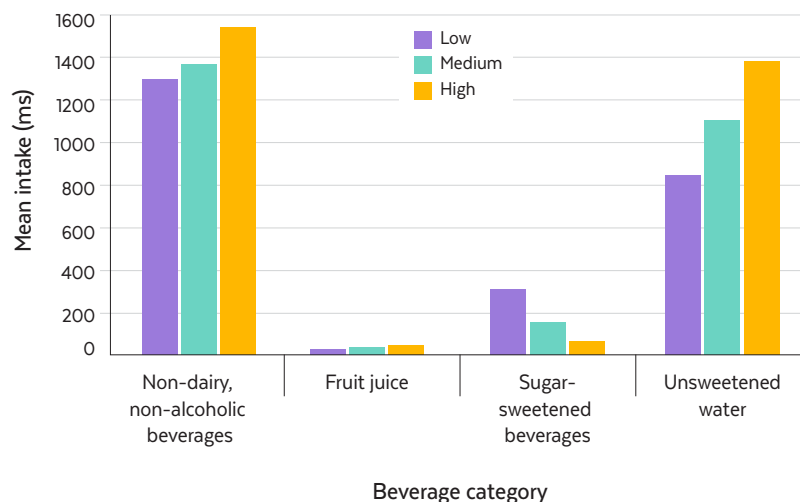
In adults, there was a stepwise increase in total consumption of non-dairy, non-alcoholic beverages with increasing diet quality, due primarily to water consumption which forms part of the diet quality index (Figure 17). Conversely, sugar-sweetened beverage consumption decreased with increasing diet quality – sugar-sweetened beverages were also an element of the diet quality index. Adults with dietary intake falling in the lowest tertile of diet quality consumed about five times as much sugar-sweetened beverages as those with dietary intake falling in the highest tertile of diet quality (Figure 17). These opposing trends were also observed in children.

Adults who consumed fruit juice on the day of the survey, reported a lower mean percentage of energy from discretionary foods (33.3%) and a higher mean diet quality score (48.1 of a possible 100), than non-consumers of fruit juice (36.3% energy from discretionary foods and 42.6 mean dietary quality score).

**In general, consumers of sugar-sweetened beverages reported a dietary pattern that was higher in discretionary foods (not including beverages) and lower in vegetables than non-consumers of these beverages.**

**FIGURE 17:**

Mean beverage consumption by diet quality tertile in adults



## Physical activity and sedentary behaviour

Adults reporting low levels of physical activity in the survey had the lowest intakes of non-dairy, non-alcoholic beverages. This was due almost entirely to differences in water intake as intakes of fruit juice, sugar-sweetened beverages and low-kJ sweetened beverages did not differ greatly with physical activity.

There were similar findings in children. Water consumption increased in a stepwise manner with the level of physical activity in all age groups of children, except for 14–18 year olds. In this age group, sugar-sweetened beverage consumption increased by level of physical activity.

Sugar-sweetened beverage intake also increased with degree of sedentary behaviour in children.

This difference was particularly pronounced in 14–18 year olds; those who were most sedentary consumed about 1.5 times as much sugar-sweetened beverages as those who were least sedentary.

## Lifestyle pattern

Sugar-sweetened beverage intake was strongly associated with 'lifestyle pattern' which considered dietary quality and physical activity or sedentary behaviour.

**Adults and children with the least healthy lifestyle pattern consumed 4–6 times more sugar-sweetened beverages than those with the most healthy lifestyle pattern.**

# Australian Beverages Council perspective

This secondary analysis of the Australian Health Survey provides a valuable insight into the role of beverages in the diets of Australian adults and children. Since the last adult national nutrition survey, conducted in 1995, the food supply has changed greatly to meet changing consumer needs. How these changes in the food supply have impacted beverage consumption behaviour over time was an important part of the research.

Water remains the drink of choice across the population, being the most commonly consumed beverage by adults (86%) and children (92%) on the day of the survey. This finding was consistent with that of the secondary analysis of the 2007 Australian National Children's Nutrition and Physical Activity Survey<sup>5</sup>.

One of the most interesting aspects of this research was the insight into how beverage choice evolves with age. Fruit juice, fruit drink and cordial are most commonly consumed by young children, though this steadily decreases with age as sugar-sweetened soft drinks become the beverage of choice among adolescents, especially males. Consumption of these beverages peaks in the 14-18 year old age bracket and then gradually declines in early adulthood. By comparison, consumption of low kJ drinks peaks in the 31-50 year age group before declining in older adults.

Beverage choice has also been changing over time as indicated by some notable shifts in consumption between the national dietary surveys. Among children, both the percentage consuming sugar-sweetened beverages and the mean intake of these drinks have fallen since 1995. This is consistent with findings that the mean energy contribution from sugar-sweetened beverages dropped by more than two percent of total energy across the population between the 1995 and 2007 national surveys<sup>6</sup>. This finding is further supported through evidence of falling sales of sugar-sweetened soft drinks over the same period<sup>7</sup>.

From a public health perspective, the marked increase in alcohol consumption that occurs in the late teenage years and early adulthood is noteworthy. The overall impact of the uptake of alcoholic beverages is an increase in total discretionary beverage consumption, which peaks quite late in adulthood (51-70 years) at over eight percent of overall dietary energy. This highlights the need for public health messages related to different beverages to be targeted at different age groups.

More generally, the high contribution of discretionary foods and drinks to the energy intake of Australians – 36% in adults and 42% in children – is a major public health challenge. Key targets within the discretionary foods category contributing most to energy intake include confectionary and chocolates, sweet biscuits and cakes, alcoholic beverages (in adults) and fried potatoes and crisps (in children). Non-alcoholic, non-dairy beverages, as a general category, made a smaller contribution to energy than these foods.

Although the contribution of sugar-sweetened beverages to discretionary food intake is low across the population, it is high in those who consumed these drinks in the measurement period. High sugar-sweetened beverage consumption may also serve as a marker of poor diet quality and least healthy lifestyle patterns, and is associated with low physical activity or high sedentary behaviour.

Together, these findings highlight the importance of targeted initiatives to improve beverage choice within the context of a healthier diet with fewer discretionary foods and a healthier, more active lifestyle.



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