



**Australian Government**

**Australian Institute of  
Health and Welfare**

# A picture of overweight and obesity in Australia

2017






# A picture of overweight and obesity in Australia

2017



The Australian Institute of Health and Welfare is a major national agency that provides reliable, regular and relevant information and statistics on Australia's health and welfare. The Institute's purpose is to provide authoritative information and statistics to promote better health and wellbeing among Australians.

© Australian Institute of Health and Welfare 2017 

This product, excluding the AIHW logo, Commonwealth Coat of Arms and any material owned by a third party or protected by a trademark, has been released under a Creative Commons BY 3.0 (CC BY 3.0) licence. Excluded material owned by third parties may include, for example, design and layout, images obtained under licence from third parties and signatures. We have made all reasonable efforts to identify and label material owned by third parties.

You may distribute, remix and build upon this work. However, you must attribute the AIHW as the copyright holder of the work in compliance with our attribution policy available at <[www.aihw.gov.au/copyright/](http://www.aihw.gov.au/copyright/)>. The full terms and conditions of this licence are available at <<http://creativecommons.org/licenses/by/3.0/au/>>.

A complete list of the Institute's publications is available from the Institute's website <[www.aihw.gov.au](http://www.aihw.gov.au)>.

ISBN: 978-1-76054-246-7 (PDF)

ISBN: 978-1-76054-247-4 (Print)

#### **Suggested citation**

Australian Institute of Health and Welfare 2017. A picture of overweight and obesity in Australia 2017. Cat. no.PHE 216. Canberra: AIHW.

#### **Australian Institute of Health and Welfare**

Board Chair

Mrs Louise Markus

Director

Mr Barry Sandison

Any enquiries about or comments on this publication should be directed to:

Website and Publishing Unit

Australian Institute of Health and Welfare

GPO Box 570

Canberra ACT 2601

Tel: (02) 6244 1000

Email: [info@aihw.gov.au](mailto:info@aihw.gov.au)

Published by the Australian Institute of Health and Welfare.

Please note that there is the potential for minor revisions of data in this report. Please check the online version at <[www.aihw.gov.au](http://www.aihw.gov.au)> for any amendments.

# Contents

<b>Acknowledgments</b> .....	<b>v</b>
<b>Abbreviations</b> .....	<b>v</b>
<b>Symbols</b> .....	<b>v</b>
<b>Summary</b> .....	<b>vi</b>
<b>1 Introduction</b> .....	<b>1</b>
Defining overweight and obesity .....	1
Measuring overweight and obesity in children .....	2
Structure of this report .....	3
<b>2 Factors leading to overweight and obesity</b> .....	<b>5</b>
Food and nutrition .....	5
Physical activity .....	6
The obesogenic environment .....	7
Schools .....	8
Workplace .....	8
Home and neighbourhood .....	8
Media influence .....	8
Increase in convenience foods and portion sizes .....	8
<b>3 Overweight and obesity among children and adolescents</b> .....	<b>11</b>
Prevalence of overweight and obesity in children and adolescents .....	11
Trends in prevalence .....	12
Prevalence by birth cohort .....	12
Prevalence by remoteness area .....	13
Prevalence by socioeconomic group .....	13
Prevalence among Indigenous children and adults .....	14
<b>4 Overweight and obesity among adults</b> .....	<b>15</b>
Prevalence of overweight and obesity in adults .....	15
Body mass index .....	15
Waist circumference .....	17
Trends in prevalence .....	18
Prevalence by birth cohort .....	20
Prevalence by remoteness area .....	20
Prevalence by socioeconomic group .....	21
Prevalence among Indigenous adults .....	21
Prevalence by Primary Health Network area .....	22
International comparisons .....	24
Maternal overweight and obesity .....	25

<b>5 Impact of overweight and obesity</b> .....	<b>27</b>
Health impacts .....	27
Chronic conditions .....	27
Mortality .....	28
Burden of disease .....	29
Economic impacts .....	31
<b>6 Approaches for reducing overweight and obesity</b> .....	<b>33</b>
Laws and regulations .....	34
Tax and price interventions .....	34
Community-based interventions .....	35
Health promotion .....	35
Weight loss surgery .....	36
<b>Appendix A: Classification of overweight and obesity for children and adolescents</b> ..	<b>37</b>
<b>Appendix B: Defining socioeconomic groups</b> .....	<b>38</b>
<b>Appendix C: Measuring overweight and obesity rates at Primary Health Network area level</b> .....	<b>39</b>
<b>Appendix D: State and territory policy actions and infrastructure support actions</b> ..	<b>40</b>
<b>Glossary</b> .....	<b>43</b>
<b>References</b> .....	<b>44</b>
<b>List of tables</b> .....	<b>48</b>
<b>List of figures</b> .....	<b>48</b>
<b>List of boxes</b> .....	<b>49</b>
<b>Related publications</b> .....	<b>49</b>

# Acknowledgments

Jessica Dawson, Rosalind Morland and Ruby Brooks of the Population Health Unit at the Australian Institute of Health and Welfare (AIHW) authored this report, under the guidance of Jenna Haddin, Claire Sparke, and Lynelle Moon.

The input and assistance of Jennifer Kerrigan, Peta Craig, Grant Waraker, Andrew Kettle, and Fadwa Al-Yaman of the AIHW is appreciated and acknowledged.

Anna Peeters from Deakin University reviewed the report, and provided valuable feedback.

## Abbreviations

<b>ABS</b>	Australian Bureau of Statistics
<b>AIHW</b>	Australian Institute of Health and Welfare
<b>BMI</b>	body mass index
<b>CDC</b>	Centers for Disease Control and Prevention
<b>CI</b>	confidence interval
<b>COAG</b>	Council of Australian Governments
<b>DALY</b>	disability-adjusted life year
<b>GST</b>	goods and services tax
<b>IRSD</b>	Index of Relative Socioeconomic Disadvantage
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>PHN</b>	Primary Health Network
<b>WHO</b>	World Health Organization
<b>YLD</b>	years lived with disability
<b>YLL</b>	years of life lost

## Symbols

<b>cm</b>	centimetre
<b>kg</b>	kilogram
<b>kg/m<sup>2</sup></b>	kilograms per metre squared
<b>kJ</b>	kilojoule
<b>m</b>	metre



# Summary

Overweight and obesity is a major public health issue in Australia. It results from a sustained energy imbalance—when energy intake from eating and drinking is greater than energy expended through physical activity. This energy imbalance might be influenced by a person’s biological and genetic characteristics, and by lifestyle factors.

This report brings together a variety of information to create a picture of overweight and obesity in Australia. It summarises factors that influence people’s energy intake and expenditure and contribute to the rising prevalence of overweight and obesity, as well as some approaches aiming to reduce its prevalence. It presents the prevalence of overweight and obesity in children, adolescents, and adults, and includes trends over time, differences among population groups, and the health and economic impact of overweight and obesity.

## One-quarter of children and adolescents are overweight or obese

In 2014–15, 1 in 5 (20%) children aged 2–4 were overweight or obese—11% were overweight but not obese, and 9% were obese.

About 1 in 4 (27%) children and adolescents aged 5–17 were overweight or obese—20% were overweight but not obese, and 7% were obese.

For both children aged 2–4 and 5–17 years, similar proportions of girls and boys were obese. For children aged 5–17, the prevalence of overweight and obesity rose from 21% in 1995 to 25% in 2007–08, then remained relatively stable to 2014–15.

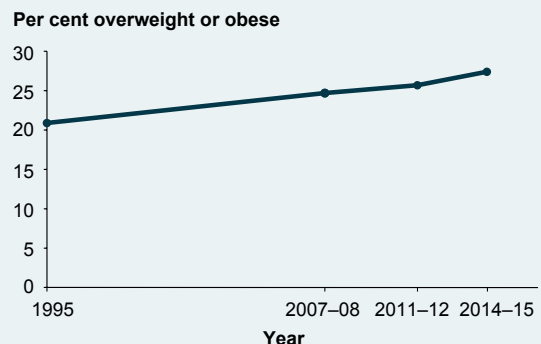
## Nearly two-thirds of adults are overweight or obese, and obesity is on the rise

In 2014–15, nearly two-thirds (63%) of Australian adults were overweight or obese. The prevalence of overweight and obesity has steadily increased, up from 57% in 1995—which has largely been driven by a rise in obesity.

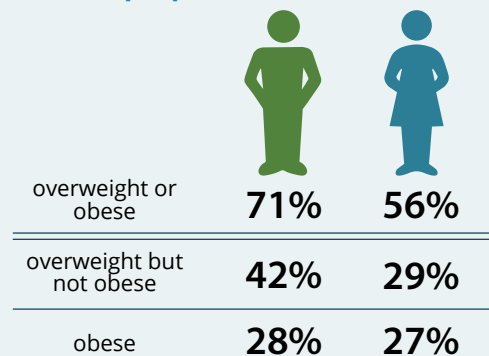
The prevalence of severe obesity among Australian adults has almost doubled over this period, from 5% in 1995 to 9% in 2014–15.

In 2014–15, 71% of men were overweight or obese, compared with 56% of women. A greater proportion of men (42%) than women (29%) were overweight but not obese, while a similar proportion of men (28%) and women (27%) were obese.

For children aged 5–17, the prevalence of overweight and obesity rose from 1995 to 2007–08 and remained relatively stable to 2014–15



More men than women were overweight or obese in 2014–15; a similar proportion were obese



### Some groups are more likely to be overweight or obese than others

Compared with non-Indigenous Australians, Indigenous adults are more likely to be overweight or obese, and Indigenous children and adolescents are more likely to be obese. Those who live outside of *Major cities*, or who are in the lower socioeconomic groups are more likely to be overweight or obese than others.

### Overweight and obesity has high health and financial costs

Among adults, overweight and obesity has adverse health and economic impacts, including a higher risk of developing many chronic conditions, and of death (due to any cause).

Overweight and obesity was responsible for 7% of the total health burden in Australia in 2011, 63% of which was fatal burden. In 2011–12, obesity was estimated to have cost the Australian economy \$8.6 billion.

### Small changes, big health gains

If all Australians at risk of disease due to overweight or obesity reduced their body mass index by just 1 kilogram per metre squared, or about 3 kilograms for a person of average height, the overall health impact of excess weight would drop substantially. Maintaining any weight loss is critical for long-term health gains.

### Approaches for reducing overweight and obesity

Population health approaches to address overweight and obesity provide an opportunity for widespread benefit. They include laws and regulations, tax and price interventions, community-based interventions—including those in schools and workplaces—and public education through platforms such as social marketing campaigns.

Individual-level approaches are also important, and may either be preventive, or incorporate treatment strategies such as weight loss surgery.

Indigenous Australians and those living outside *Major cities* or who are in lower socioeconomic groups are more likely to be overweight or obese



Cost to the economy was \$8.6 billion in 2011–12



Losing 3kg would substantially decrease negative health impacts





Overweight and obesity is a risk factor for many serious and chronic health conditions, and it is a major public health issue in Australia. Being obese presents greater health risks than being overweight but not obese (AIHW 2016a).

Rates of overweight and obesity in Australia have risen over recent decades, with nearly 2 in 3 adults, and 1 in 4 children considered overweight or obese in 2014–15 (ABS 2015).

This report presents a current, comprehensive picture of overweight and obesity in Australia, and discusses population health approaches targeting this major risk factor. It is intended that this report forms the basis of more regular reporting by the AIHW on overweight and obesity.

## Defining overweight and obesity

Overweight and obesity refers to excessive fat accumulation that presents health risks (WHO 2016a). It generally arises from a sustained energy imbalance when energy intake through eating and drinking is more than energy expended through physical activity (AIHW 2016a).

Consuming low-nutrient, energy-dense foods, and drinks, not doing enough physical activity, a sedentary lifestyle, and insufficient sleep can result in weight gain, leading to overweight and obesity (CDC 2016). A person's appetite, satiety, metabolism, and body fat distribution can also contribute to overweight and obesity, and this might be influenced by their genetics and epigenetic changes (NHMRC 2013b).

The most common and practical methods of measuring overweight and obesity in population surveys are calculating a person's body mass index (BMI), or measuring their waist circumference.

For adults, BMI is a useful population measure, as it is the same for males and females, and for all ages of adults (WHO 2016a). However, BMI might not be the best measure for individuals—because it does not necessarily reflect body fat distribution, it might not describe the same body fat percentage or associated health risks in different individuals (WHO 2000). Differences in body composition might also mean that different BMI cut-off points need to be considered for certain population groups, such as older people, people with high muscle mass, Aboriginal and Torres Strait Islander people, and Pacific Islander, South Asian, Chinese, and Japanese populations (NHMRC 2013b).

Measuring waist circumference assesses abdominal obesity, where excess fat has consistently been associated with a higher risk of chronic disease. Different waist circumference cut-off points might need to be considered for certain population groups, such as South Asian, Chinese, and Japanese populations (Department of Health 2009; NHMRC 2013b).

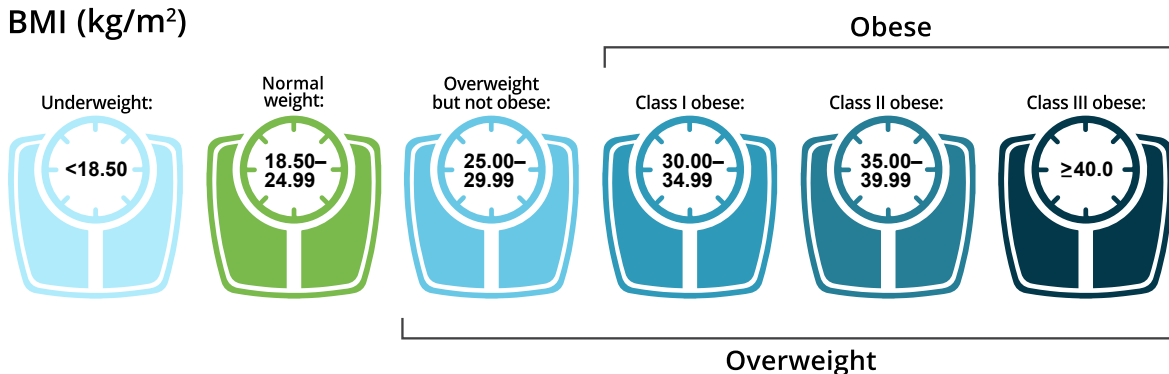
## Box 1.1: Measuring overweight and obesity

BMI is calculated by dividing a person's weight (in kilograms) by their height (in metres) squared.

$$\text{BMI} = \frac{\text{weight in kg}}{(\text{height in m})^2}$$

This report uses the BMI classifications for adults defined by the World Health Organization (WHO). Obesity is split into 3 classes, according to severity, with more severe obesity associated with a higher risk of comorbidities (WHO 2000).

### BMI (kg/m<sup>2</sup>)

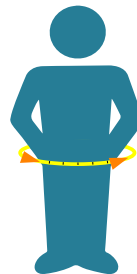


Waist circumference is another commonly used measure of overweight and obesity. A wider waist is associated with a higher risk of metabolic complications. The following waist circumference classifications for Caucasian adults were developed by the WHO:

### Waist circumference

**Increased risk of metabolic complications**

**Men:** 94 cm or more  
**Women:** 80 cm or more



**Substantially increased risk of metabolic complications**

**Men:** 102 cm or more  
**Women:** 88 cm or more

Different waist circumference cut-off points might need to be considered for certain population groups, such as South Asian, Chinese, and Japanese populations (NHMRC 2013b).

## Measuring overweight and obesity in children

Assessing overweight and obesity among children and adolescents is more complicated due to their growing bodies. In health-care settings, it is recommended that the BMI of children and adolescents is compared with the appropriate growth reference for their age. In Australia, it is recommended that children aged 0–2 are assessed using the WHO growth chart, and children aged 2–18 are assessed using either the United States Centers for Disease Control and Prevention (CDC) growth charts or the WHO charts (Department of Health 2009; NHMRC 2013b).

At the population level, a series of age- and sex-specific BMI ranges developed by Cole et al. (2000) are recommended to monitor overweight and obesity in children (Department of Health 2009). These are in 'Appendix A'

## Structure of this report

- **Chapter 2** describes the factors that influence overweight and obesity in Australia, including food and nutrition, physical activity, sedentary behaviour, and the 'obesogenic environment'.
- **Chapters 3 and 4** present the most recent Australian data on prevalence and trends in overweight and obesity, including breakdowns by remoteness area, socioeconomic group, and Indigenous status, as well as international comparisons of obesity prevalence, and data on overweight and obesity for Australian mothers during pregnancy.
- **Chapter 5** presents data on the health impacts of overweight and obesity in Australia, including chronic conditions, death, and the burden of disease associated with overweight and obesity, as well some of the direct and indirect economic impacts.
- **Chapter 6** describes approaches that have been implemented in Australia to target overweight and obesity at the individual level, such as weight loss surgery, and population level, including laws and regulations, tax and price interventions, community-based interventions, and health promotion measures.
- Supplementary data tables for the data presented in figures throughout this report are available on the AIHW website at: <https://www.aihw.gov.au/reports/overweight-obesity/a-picture-of-overweight-and-obesity-in-australia/data>.



# 2

## Factors leading to overweight and obesity

Overweight and obesity is influenced by a complex interplay of individual, environmental, and societal factors, which provides an opportunity to target interventions at multiple levels.

This chapter describes factors contributing to overweight and obesity, including food and nutrition, physical activity, and the obesogenic environment.

**Chapter 6** discusses some of the interventions that can be used to target some these factors in order to reduce the prevalence of overweight and obesity in Australia.

### Food and nutrition

In 2011, 10% of the total burden of disease in Australia was due to dietary risk factors, with a diet low in fruit and vegetables accounting for 2.0% and 1.4% of the total disease burden, respectively (AIHW 2016c, 2017a).

Excessive energy intake from foods and drinks can contribute to energy imbalance and weight gain, leading to overweight and obesity. Energy-dense foods can encourage energy intake that exceeds requirements (NHMRC 2013a). These include foods high in fat and/or sugar. For example, in the United States of America, there is strong evidence associating greater intake of sugar-sweetened drinks with higher body fat among children, and higher body weight among adults (NHMRC 2013a).

Conversely, other foods, nutrients, and dietary patterns help weight control, and have protective effects against chronic conditions—for example, consuming vegetables is associated with a lower risk of weight gain (NHMRC 2013a).

The Australian Dietary Guidelines recommend a diet relatively high in vegetables, fruit, whole grains, poultry, fish, and reduced fat dairy. Diets consistent with these guidelines have been shown to positively influence certain indicators of health and wellbeing (NHMRC 2013a).

Box 2.1 provides further information about the Australian Dietary Guidelines.

## Box 2.1: What should Australians eat?

The Australian Dietary Guidelines (NHMRC 2013a)—developed by the National Health and Medical Research Council in 2013—recommend consumption of a wide variety of nutritious food. Essential nutrients for good health are found in varying amounts in many different food groups. Variety in a diet maximises the possibility of getting enough essential nutrients.

The guidelines recommend adults, adolescents, and children should:

1. be physically active, and choose amounts of nutritious food and drinks to meet energy needs
2. drink plenty of water, and enjoy a wide variety of nutritious foods from the 5 food groups every day, including:
  - plenty of vegetables, including different types and colours, and legumes/beans
  - fruit
  - grain (cereal) foods, mostly wholegrain and/or high fibre varieties, such as breads, cereals, rice, pasta, noodles, polenta, couscous, oats, quinoa, and barley
  - lean meats and poultry, fish, eggs, tofu, nuts, seeds, and legumes/beans
  - milk, yoghurt, cheese and/or their alternatives, mostly reduced fat (reduced fat milks are not suitable for children under 2)
3. limit intake of foods containing saturated fat, added salt, added sugars, and alcohol
4. encourage, support, and promote breastfeeding
5. care for their food, and prepare and store it safely.



Each guideline is considered to be equally important for effective public health outcomes. For more information on the Australian Dietary Guidelines, go to the Eat for Health website at: <[www.eatforhealth.gov.au](http://www.eatforhealth.gov.au)>.

## Physical activity

Energy is expended through bodily functions and physical activity, including sport, organised recreation, and incidental activity, such as housework, gardening, and walking or cycling for transport (NHMRC 2013a).

Various physical activities have positive health impacts, including reducing body fat and the likelihood of gaining weight (Okely et al. 2012). On the other hand, not expending enough energy can contribute to energy imbalance, weight gain, and overweight and obesity.

In 2014–15, nearly 1 in 3 (30%) Australian adults aged 18–64 were insufficiently active (less than 150 minutes of physical activity in the previous week), while 15% were inactive (no exercise in the previous week) (ABS 2015).

Sedentary behaviour (sitting or lying down, except when sleeping) can also contribute to overweight and obesity. In 2014–15, Australians spent an average of 34 hours per week sitting at leisure, up from 31 hours per week in 2011–12 (ABS 2013a, 2015). Increasing evidence also suggests sedentary behaviour is associated with health risks, independent of physical activity levels (van der Ploeg et al. 2012).

The Department of Health has developed Australia's Physical Activity and Sedentary Behaviour Guidelines, which recommend the type, duration, intensity, and frequency of physical activity, and practices for sedentary behaviour, for people of different life stages.

The guidelines are summarised in Box 2.2 (Department of Health 2014a).

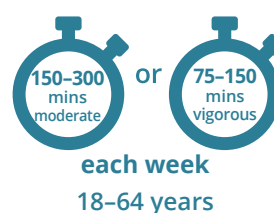
### Box 2.2: How active should Australians be?

Australia's Physical Activity and Sedentary Behaviour Guidelines recommend children aged 5–12, and young people aged 13–17 accumulate at least 60 minutes of moderate to vigorous intensity physical activity every day, and limit use of electronic media for entertainment to no more than 2 hours a day.

For adults aged 18–64, the guidelines recommend being active on most, preferably all, days of the week, and accumulating 150–300 minutes of moderate intensity physical activity, 75–150 minutes of vigorous physical activity, or an equivalent combination of moderate and vigorous activities, each week. The guidelines also recommend minimising time spent sitting, and breaking up long periods of sitting as often as possible.

For healthy older Australians, the Department of Health's Physical Activity Recommendations for Older Australians (65 years and older) advise that older Australians be physically active for 30 minutes every day.

For the full recommendations and more information on Australia's Physical Activity and Sedentary Behaviour Guidelines, go to: [www.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-strateg-phys-act-guidelines](http://www.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-strateg-phys-act-guidelines).



## The obesogenic environment

Overweight and obesity is caused by a sustained energy imbalance, which can be influenced by environmental factors. The term 'obesogenic environment' has been used to describe an environment that promotes obesity among individuals and populations (Swinburn et al. 1999). It includes physical, economic, political, and sociocultural factors.

Each day, people interact with various services in schools, workplaces, homes, supermarkets and other food outlets, neighbourhoods, and communities. These settings are influenced by the government (laws and policies), industry, economic imperatives, and society as a whole. All these factors shape people's environments, and can affect an individual's energy balance, by inhibiting or encouraging healthy dietary and physical activity patterns (Espinel & King 2009; NSW Centre for Public Health Nutrition & NSW Health 2003).

This section provides an overview of selected environmental factors that influence an individual's energy intake and expenditure.

## Schools

Schools can greatly affect the behaviours and decisions of children and adolescents. For example, children and adolescents might consume up to 2 meals and snacks per day at school, 5 days a week (Espinel & King 2009).

Students buy food at school canteens, cafeterias, and vending machines, and the food supplied in these facilities can influence their food choices and dietary intake. School policies can regulate the food available to buy. Supportive play equipment and physical activity programs can also enable students to participate in physical activity (Escalante et al. 2013).

## Workplace

Workplaces and their surrounds can have an impact on the health of adults. Factors affecting workplace health include food outlets nearby, working hours, vending machines, event catering, and public transport access.

Occupation also plays a role, with predominantly office-type settings being associated with sedentary work (Parry & Straker 2013), which has been linked to weight gain and chronic conditions, such as heart disease, diabetes, and cancer (independent of physical activity) (Thorpe et al. 2011; Wilmore et al. 2012).

Building design, ease of access to work sites, good stair design, access to showers, and physical activity facilities and programs all enable people to be more active at work (Espinel & King 2009).

## Home and neighbourhood

The home and neighbourhood can be a complex environment for healthy lifestyle choices. Factors such as the availability and accessibility of healthy food, limiting sedentary activities at home, and positive role modelling for children are all linked to healthy lifestyle habits.

Less available and more expensive healthy food can negatively influence people's diets, especially in remote or lower-income communities that might not have adequate access to healthy food choices (Glanz et al. 2007; Ward et al. 2012). Conversely, closer proximity to supermarkets has been linked to higher intake of fruits and vegetables, and a higher-quality overall diet (Moore et al. 2008).

Screen-based activities in young people and adults are strongly linked to obesity, with higher obesity rates associated with higher screen time (independent of physical activity) (Banks et al. 2011; Boone et al. 2007). Fewer hours of screen time in adolescence have also been shown to reduce the likelihood of obesity in adulthood (Boone et al. 2007).

Aspects of the neighbourhood that might influence physical activity include people's access to local facilities and their feelings of safety (Humpel et al. 2002).

Several studies have shown that access to green space is associated with reduced obesity in populations across the United States, Australia, Canada, New Zealand, and Europe (Lachowycz & Jones 2011). This might be due to more recreational walking, more physical activity, and less sedentary time, which have also been associated with access to, and use of, green spaces in individuals of all ages (WHO 2016c).

## Media influence

Advertising unhealthy food and drinks to children can influence their food choices and awareness of brands (Cairns et al. 2013; Kelly et al. 2015). While regulations and standards exist to limit the exposure of unhealthy food advertising to children, a recent study showed there had been no change in this exposure in Australia from 2011 to 2015 (Watson et al. 2017).

## Convenience foods and portion sizes

Australia's food preferences have changed significantly over recent decades, with a notable trend towards convenience foods—packaged foods that can be prepared quickly and easily (Symons 2007). With more women in the workforce, the number of dual-income families has risen, potentially providing families with more money, but less time to spend on preparing food. Other demographic influences on food habits include the trend for smaller households, greater ethnic diversity in the community, and an ageing population.

For many families with all adults in (paid) employment, modern life is characterised by a hectic lifestyle, including working more hours and spending less time preparing food. Meal times are commonly fragmented—people often eat at different times and in different places, often outside the home, and rely heavily on snack and convenience foods. The food industry has responded to this demand, with every sector developing some form of new convenience product (AIHW 2012).

Portion sizes of discretionary foods (energy-dense, nutrient-poor foods and drinks that are not necessary for a healthy diet) have also become larger in Australia. A study comparing portion sizes from the 1995 National Nutrition Survey and the 2011–12 National Nutrition and Physical Activity Survey found a significant increase (up to 66%) in energy per typical portion in common discretionary foods, including pizza, cake, sausages, cereal bars, processed meats, ice cream, and wine. In contrast, the energy per typical portion of pastries, snack foods, and potato fries decreased by 10%–40% over the same period. Typical portions were defined and calculated as the median portion sizes (in kilojoules and grams) of foods recorded in day one dietary data for adults aged 19 and over from each survey (Zheng et al. 2017).





# 3

## Overweight and obesity among children and adolescents

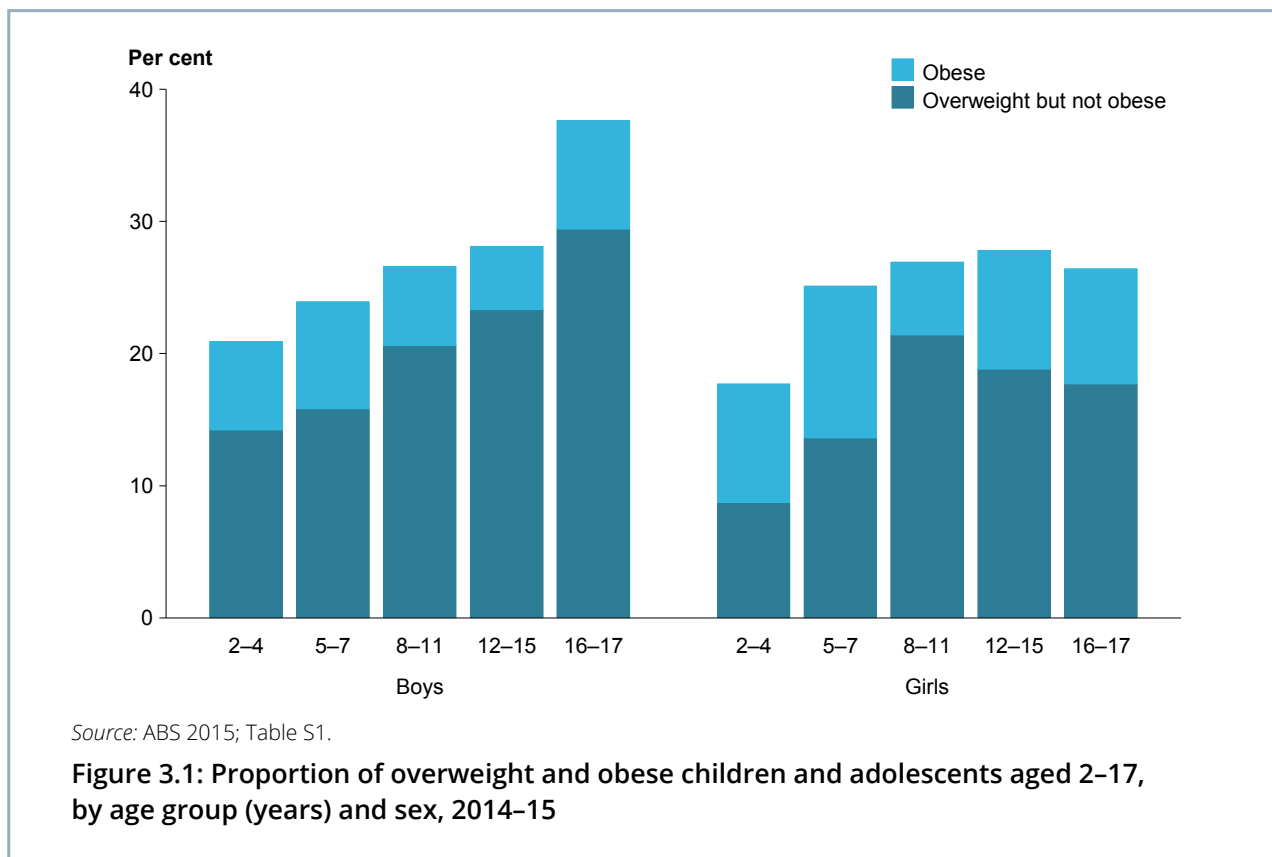
This chapter presents information on the prevalence of overweight and obesity among children and adolescents, including trends in prevalence, and variation between different populations. All results are based on BMI calculated using the age- and sex-specific ranges developed by Cole et al. (2000) (see 'Appendix A').

### Prevalence of overweight and obesity in children and adolescents

In 2014–15, just over a quarter (27%) of children and adolescents aged 5–17 were overweight or obese, with 20% overweight but not obese, and 7% obese. Boys and girls in that age group had similar proportions of overweight and obesity combined (28% of boys, and 27% of girls), and of obesity alone (7% of boys, 8% of girls) (ABS 2015).

Of children aged 2–4, 1 in 5 (20%) were overweight or obese, with similar proportions of boys (7%) and girls (9%) in that age group being obese (ABS 2015).

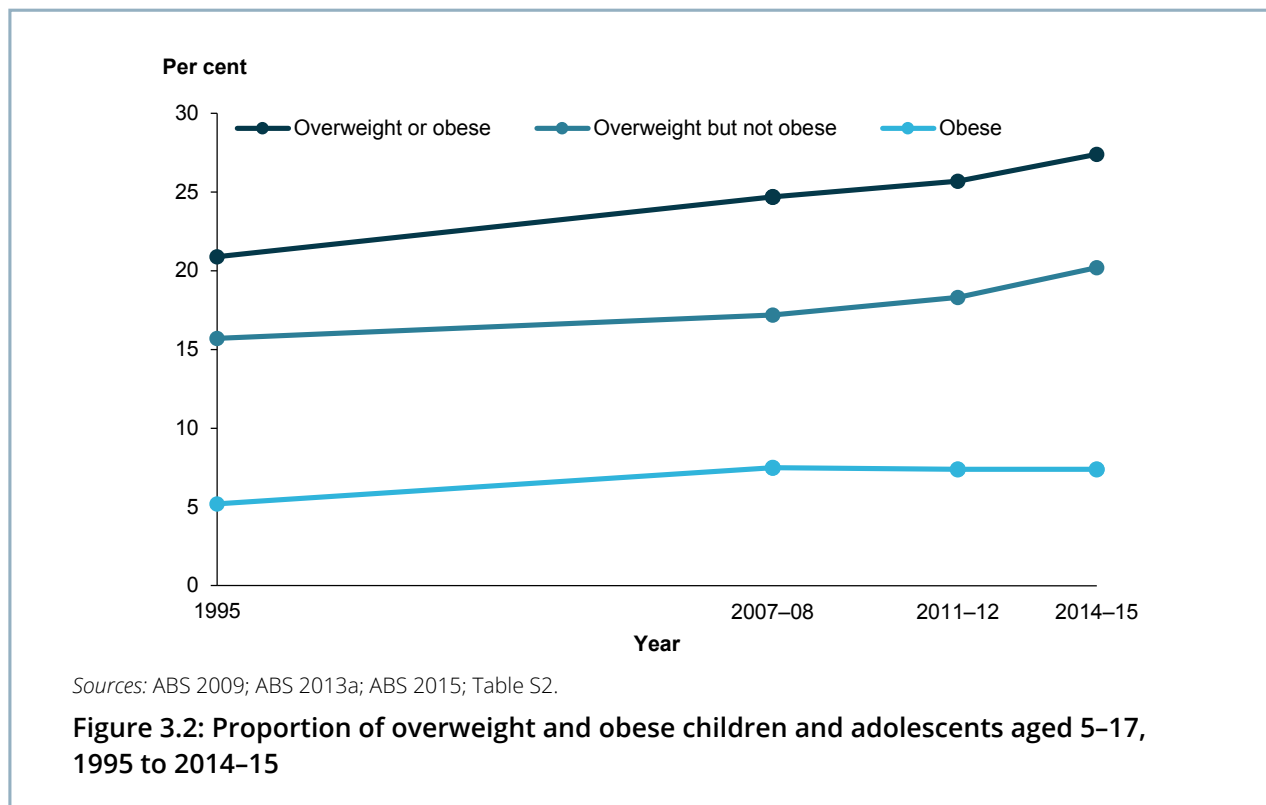
Boys were most likely to be overweight but not obese at age 16–17 (29%), while for girls this was most likely at age 8–11 (21%) (Figure 3.1). The highest prevalence of obesity was at age 16–17 for boys (8%), and at age 5–7 for girls (12%).



## Trends in prevalence

Information dating back to 1995 is available for children aged 5–17. It shows the prevalence of overweight and obesity rose from 21% in 1995 to 25% in 2007–08 (Figure 3.2).

Since 2007–08, the prevalence of overweight and obesity for children aged 5–17 has remained relatively stable, at 26% in 2011–12 and 27% in 2014–15.



## Prevalence by birth cohort

The prevalence of overweight and obesity and of obesity alone among children and adolescents varies by birth cohort (a group of people born in the same year or years—the experiences of people in a particular birth cohort can be different to those of people in other birth cohorts).

Based on BMI, children and adolescents in 2014–15 were significantly more likely to be overweight or obese at ages 10–13 and 14–17 than their counterparts 20 years earlier (AIHW 2017b).

At age 10–13, 31% of children and adolescents born in 2002–2005 were overweight or obese, compared with 24% of those born in 1982–1985.

At age 14–17, 30% of adolescents born in 1998–2001 were overweight or obese, compared with 19% of those born in 1978–1981.

For obesity alone, children who were aged 2–5 in 2014–15 were twice as likely to be obese (9%) as children of the same age in 1995 (4%).

## Prevalence by remoteness area

Children and adolescents living in *Outer regional/Remote* areas are more likely to be overweight and obese than those in *Major cities* (Figure 3.3).

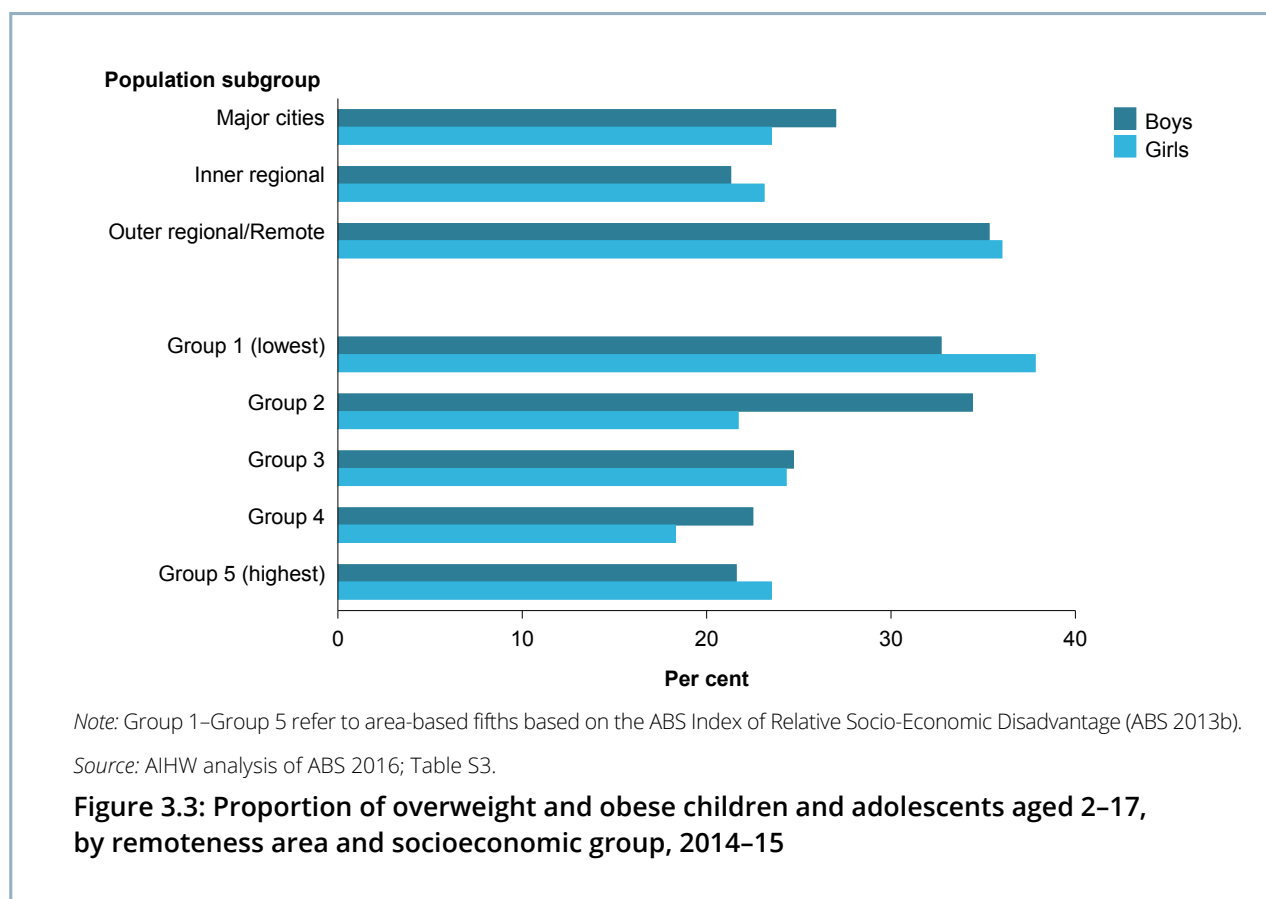
In 2014–15, boys living in *Outer regional/Remote* areas (35%) were 1.3 times as likely to be overweight or obese as those living in *Major cities* (27%). For girls living in *Outer regional/Remote* areas (36%), the prevalence of overweight and obesity was 1.5 times as high as for those living in *Major cities* (24%).

## Prevalence by socioeconomic group

The prevalence of overweight and obesity among children and adolescents varies according to socioeconomic group, with children in lower socioeconomic groups more likely to be overweight or obese (Figure 3.3).

In 2014–15, one-third (33%) of boys in the lowest socioeconomic group were overweight or obese, compared with 22% of those in the highest socioeconomic group. Similarly, more than one-third (38%) of girls in the lowest socioeconomic group were overweight or obese, compared with 24% of those in the highest socioeconomic group.

For an explanation of 'socioeconomic groups', see 'Appendix B'.



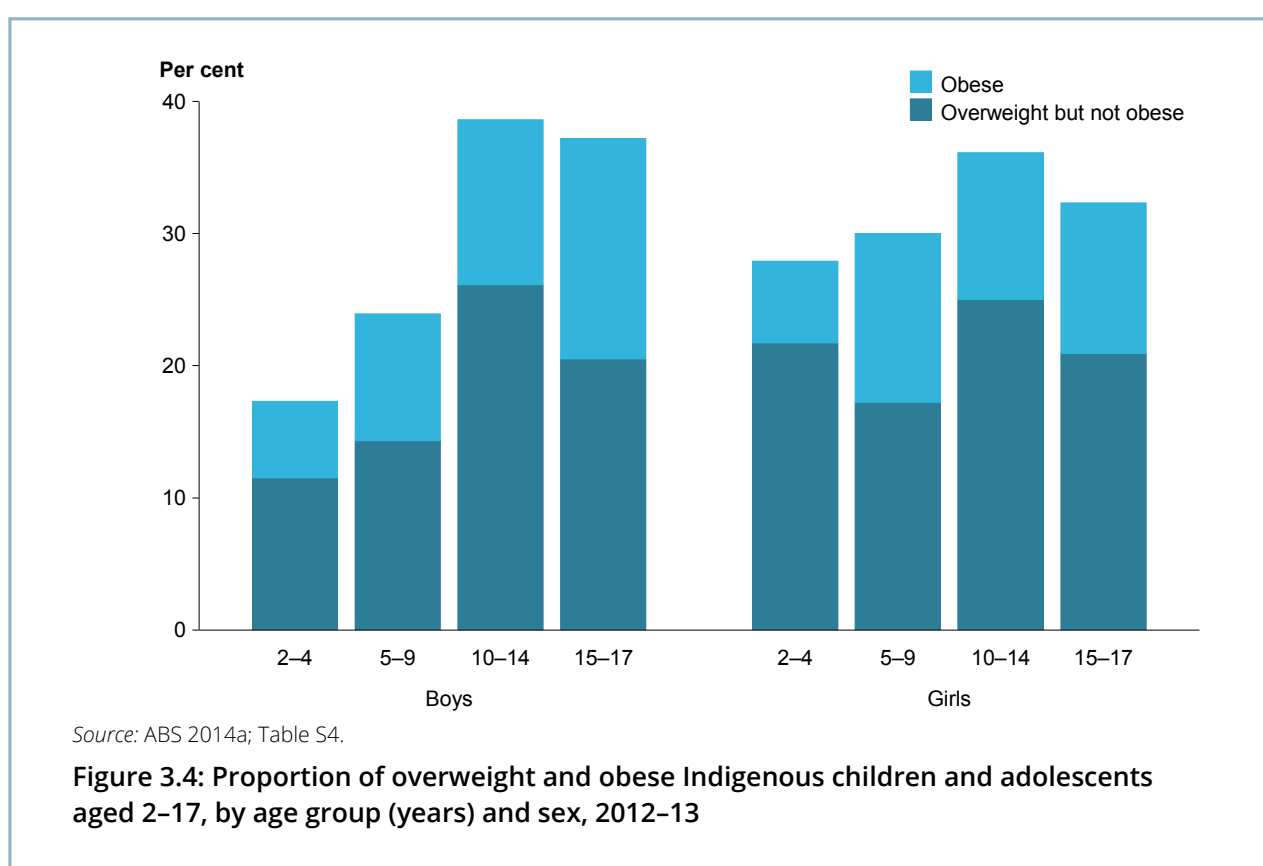
## Prevalence among Indigenous children and adolescents

Aboriginal and Torres Strait Islander children and adolescents are more likely to be overweight or obese than non-Indigenous children and adolescents.

In 2012–13, 30% of Indigenous children and adolescents aged 2–14 were overweight or obese, compared with 25% of their non-Indigenous counterparts. One in 10 (10%) Indigenous children and adolescents aged 2–14 were obese, compared with 7% of their non-Indigenous counterparts (ABS 2014a).

At age 15–17, 35% of Indigenous adolescents were overweight or obese, compared with 24% of non-Indigenous adolescents of the same age, and 14% of Indigenous adolescents were obese, double the proportion (7%) of non-Indigenous adolescents.

Indigenous boys and girls were most likely to be overweight but not obese at age 10–14 (26% for boys, and 25% for girls) (Figure 3.4), and they were most likely to be obese at age 15–17 for boys (17%), and 5–9 for girls (13%).



# 4

## Overweight and obesity among adults

This chapter presents information on the prevalence of overweight and obesity among adults, including trends in prevalence, and variation between different populations. It also includes international comparisons and information on maternal overweight and obesity.

### Prevalence of overweight and obesity in adults

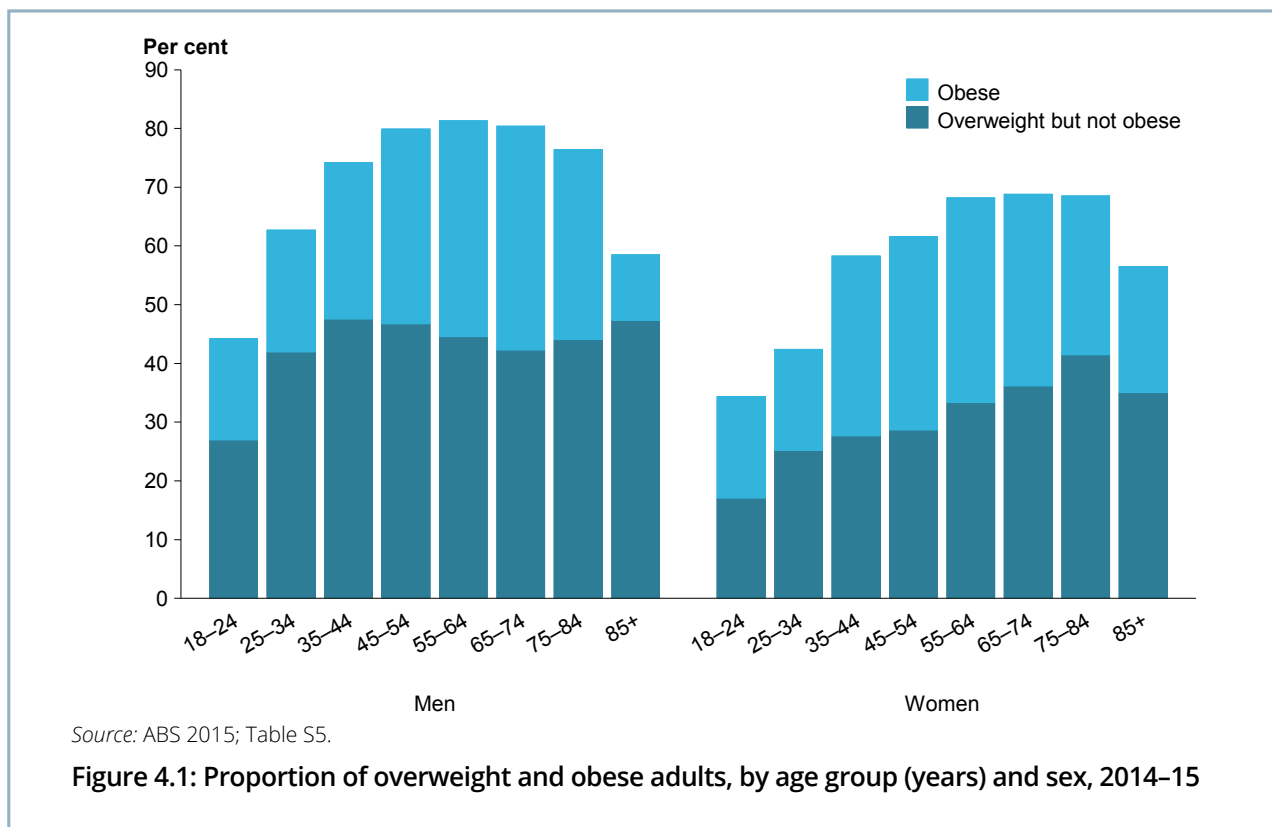
#### Body mass index

In 2014–15, almost two-thirds (63%) of Australians aged 18 and over were overweight or obese (36% overweight but not obese, and 28% obese) (ABS 2015).

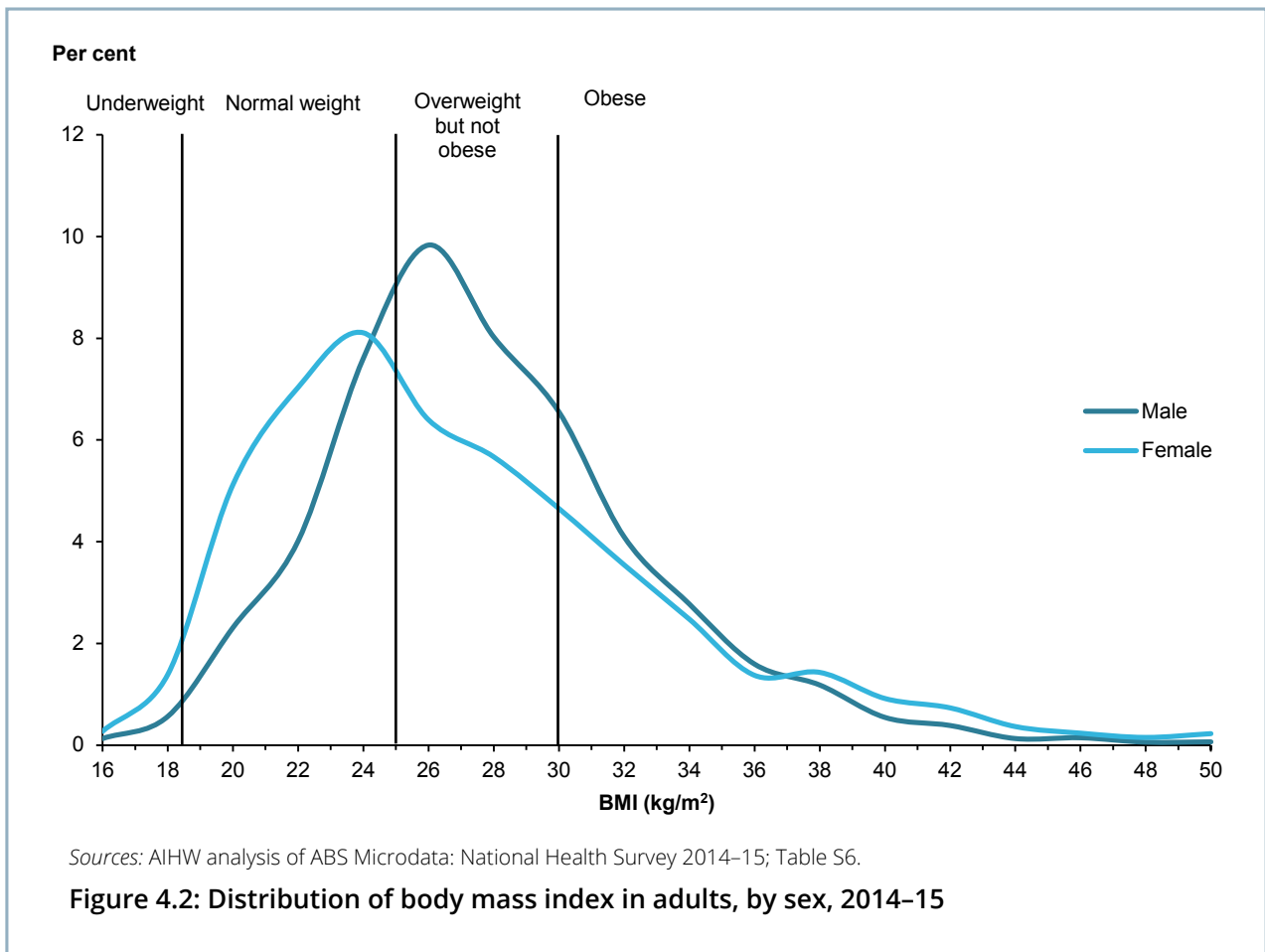
Overall, men had higher rates of overweight and obesity (71%) than women (56%). A greater proportion of men (42%) than women (29%) were overweight but not obese, while a similar proportion of men (28%) and women (27%) were obese.

In 2014–15, 18% of adults were classified as class I obese (BMI of 30.00–34.99 kg/m<sup>2</sup>), 6% as class II (BMI of 35.00–39.99 kg/m<sup>2</sup>), and 3% as class III (BMI of 40.00 kg/m<sup>2</sup> or more).

Men were most likely to be overweight but not obese at age 35–44 (48%), and to be obese at age 65–74 (38%). Women were most likely to be overweight but not obese at age 75–84 (41%), and obese at age 55–64 (35%) (Figure 4.1).



The distribution of BMI values varies between men and women. The proportion of men and women in each BMI category in 2014–15 is represented by the area under the curve in Figure 4.2. The distribution for men is much further to the right, and peaks at higher BMI values than the distribution for women, indicating that overweight and obesity is more common in men (71%) than in women (56%).



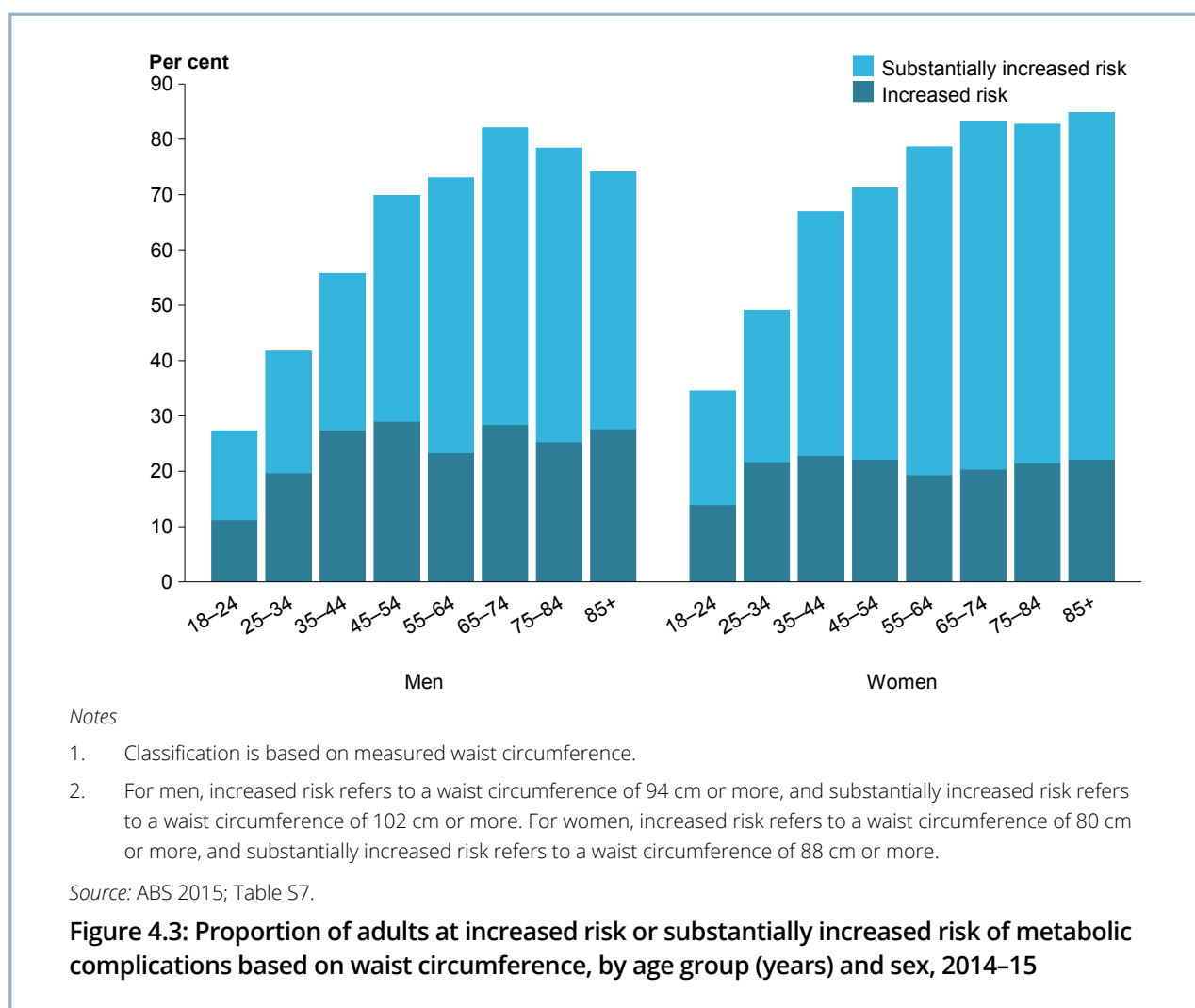
## Waist circumference

Waist circumference is a commonly used measure for assessing risk of poor health due to body fat. Used in conjunction with BMI, it can indicate a person's potential risk of developing chronic conditions, such as heart disease and Type 2 diabetes (ABS 2015; NHMRC 2013b).

Box 1.1 presents waist circumference cut-offs that indicate increased and substantially increased risk of metabolic complications.

In 2014–15, 24% of men and 21% of women aged 18 and over had a waist circumference indicating an increased risk of metabolic complications. Women (45%) were more likely than men (35%) to have a waist circumference that indicated a substantially increased risk.

Waist circumference increased with age for both men and women, with more than three quarters of men (77%) and women (81%) aged 55 and over having a waist circumference that put them at increased or substantially increased risk (Figure 4.3) (ABS 2015).

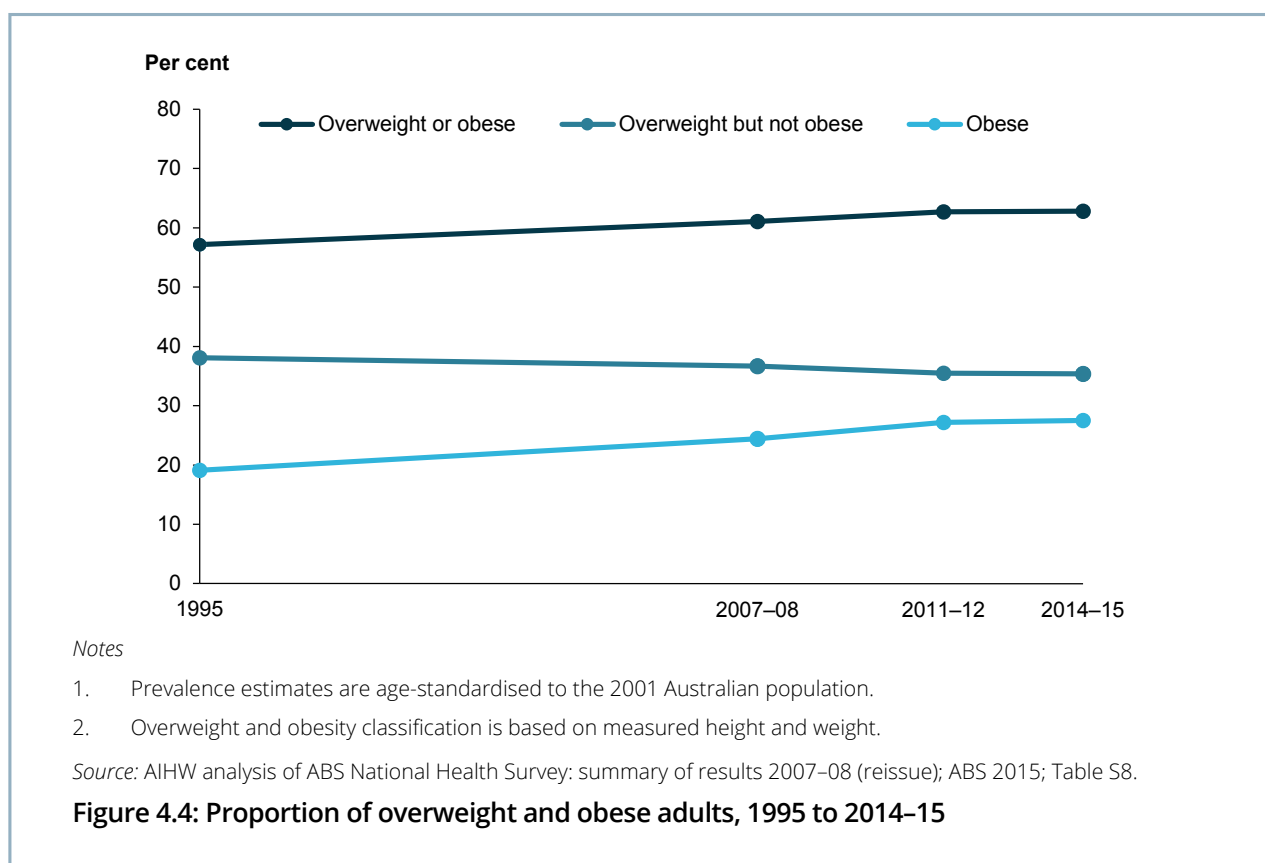


## Trends in prevalence

After adjusting for age, the prevalence of overweight and obesity in adults rose from 57% in 1995 to 61% in 2007–08, and to 63% in 2011–12, remaining steady at 63% in 2014–15 (Figure 4.4).

This trend was also evident in the proportion of adults with a waist circumference measurement indicating an increased risk of metabolic complications. The proportions of men and women with increased-risk waist circumference rose from 55% in 2007–08 to 60% in 2011–12 for men, and from 64% to 66% for women, but remained stable between 2011–12 and 2014–15 (ABS 2015).

The rise in overweight and obesity prevalence between 1995 and 2014–15 was largely driven by a rise in the prevalence of obese adults, from 19% to 28%. The prevalence of adults who were overweight but not obese remained similar over the period (38% in 1995 and 35% in 2014–15).



The prevalence of more severe obesity has also risen over recent decades. Between 1995 and 2014–15, the age-standardised prevalence of class II and class III obesity (BMI of 35.00 kg/m<sup>2</sup> or more) among Australian adults almost doubled, from 5% to 9%.

For men, severe obesity rose the most between 1995 and 2007–08, then remained relatively stable to 2014–15. For women, it rose between 1995 and 2011–12, then remained stable to 2014–15 (Table 4.1).

**Table 4.1: Age-standardised prevalence of class II and class III obesity among adults, 1995 to 2014-15**

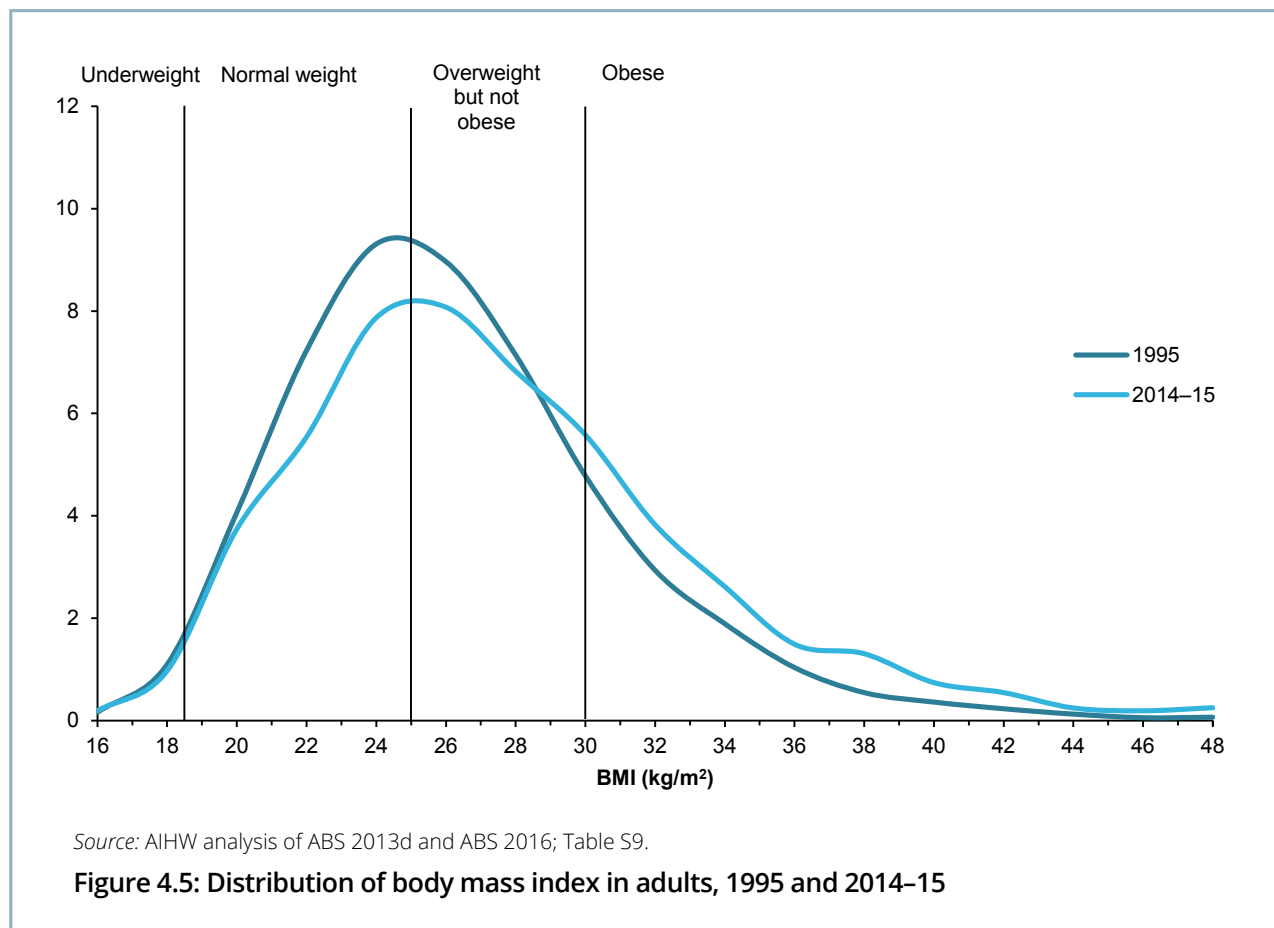
	1995		2007-08		2011-12		2014-15	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Males	3.4	(2.9-4.0)	7.1	(6.1-8.1)	7.9	(7.2-8.6)	8.0	(7.1-8.9)
Females	6.3	(5.5-7.1)	8.7	(7.7-9.7)	11.0	(10.3-11.8)	10.7	(9.8-11.6)
Persons	4.9	(4.4-5.4)	7.9	(7.2-8.6)	9.5	(8.9-10.0)	9.4	(8.7-10.0)

*Notes*

1. Class II and class III obesity refers to a measured body mass index of 35.00 kg/m<sup>2</sup> or more.
2. 95% CI = 95% confidence interval. We can be 95% confident that the true value is within this confidence interval.
3. Prevalence estimates are age-standardised to the 2001 Australian population.

Source: AIHW analysis of ABS 2010; ABS 2013c; ABS 2014b and ABS 2016.

Over time, the distribution of BMI values across the population has shifted to a smaller proportion of adults within the normal range and a larger proportion of obese adults in 2014-15 compared with 1995 (Figure 4.5).



## Prevalence by birth cohort

The prevalence of overweight and obesity and of obesity alone among adults varies by birth cohort.

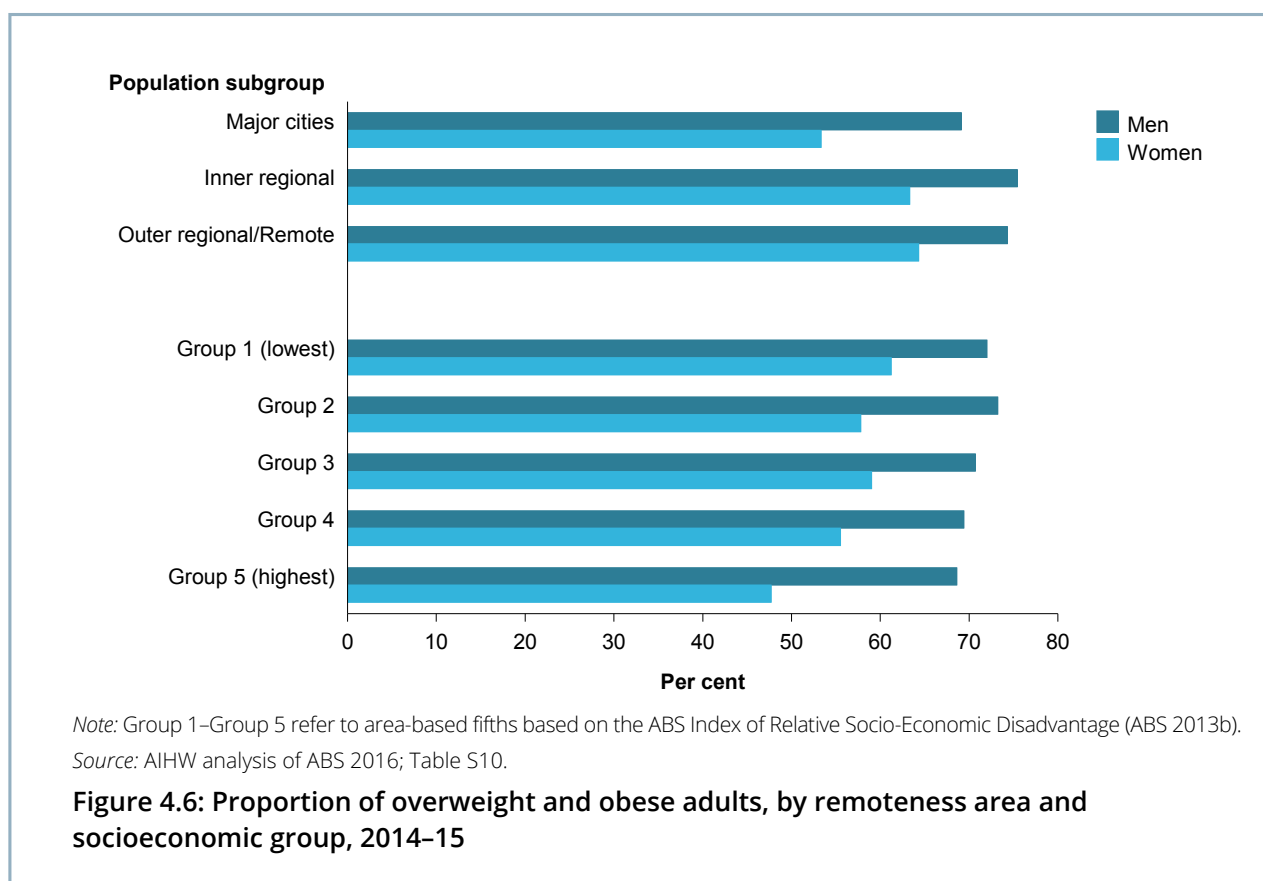
Based on BMI, adults in 2014–15 were significantly more likely to be obese than adults of the same age 20 years earlier in all but 1 age group (AIHW 2017b). The largest relative difference across cohorts was at age 18–21—15% of those born in 1994–1997 were obese at 18–21, almost double the proportion of those born in 1974–1977 (8%) at the same age.

Based on waist circumference, adults at every age in 2014–15 were significantly more likely to be abdominally obese than adults of the same age 20 years earlier. The largest relative difference was again among those aged 18–21—17% of those born in 1994–1997 were abdominally obese at 18–21, more than double the proportion of those born in 1974–1977 (7%) at the same age.

## Prevalence by remoteness area

Although overweight and obesity affects all communities, its prevalence varies by remoteness area, and is higher for adults living outside *Major cities* (Figure 4.6).

In 2014–15, three-quarters of men living in *Inner regional areas* (75%) and *Outer regional/Remote areas* (74%) were overweight or obese, compared with just over two-thirds (69%) of men in *Major cities*. About two-thirds of women in *Inner regional* (63%) and *Outer regional/Remote areas* (64%) were overweight or obese, compared with just over half (53%) of women in *Major cities*.



## Prevalence by socioeconomic group

For women, the prevalence of overweight and obesity varied according to socioeconomic group (Figure 4.6). In 2014–15, about 3 in 5 (61%) women in the lowest socioeconomic group were overweight or obese, compared with less than half (48%) of those in the highest socioeconomic group. But for men, the prevalence of overweight or obesity was similar across socioeconomic groups, ranging from 69% to 73%.

For an explanation of 'socioeconomic groups', see 'Appendix B'.

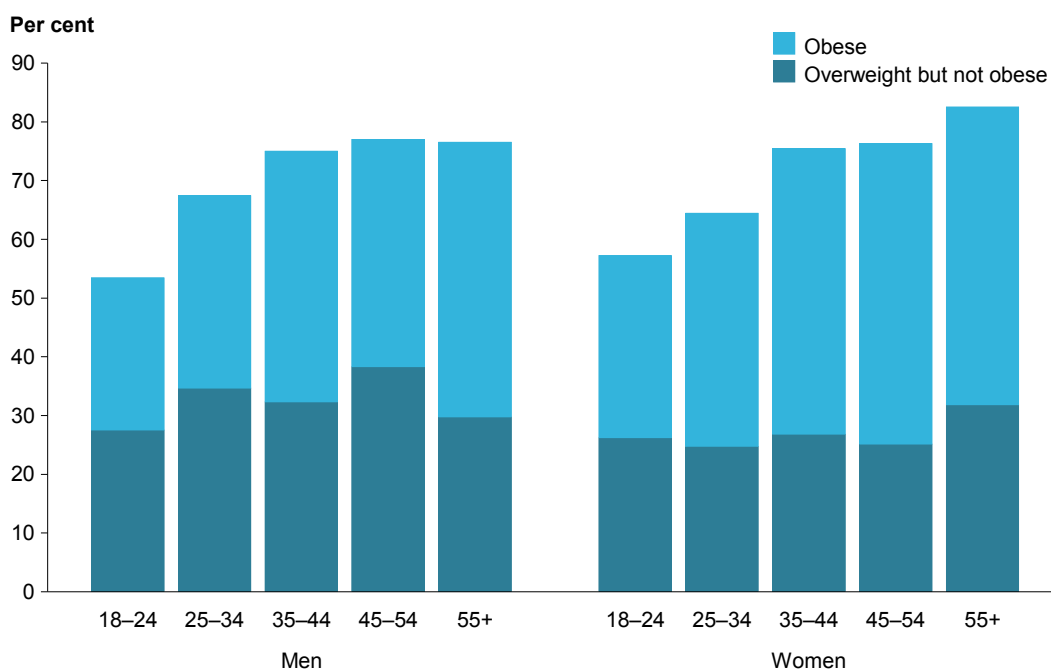
## Prevalence among Indigenous adults

In 2012–13, more than two-thirds (69%) of Aboriginal and Torres Strait Islander adults were overweight or obese (29% overweight but not obese, and 40% obese). Indigenous men (69%) and women (70%) had similar rates of overweight and obesity (ABS 2014a).

One-third (32%) of Indigenous men and more than one-quarter (27%) of Indigenous women were overweight but not obese, while 36% of Indigenous men, and 43% of Indigenous women were obese.

Indigenous men were most likely to be overweight but not obese at age 45–54 (38%), and to be obese at 55 and over (47%). Indigenous women were most likely to be overweight but not obese at 55 and over (32%), and were more likely to be obese, rather than overweight but not obese, at all ages. This was most noticeable in women aged 45–54, who were more than twice as likely to be obese (51%) than overweight but not obese (25%) (Figure 4.7).

In 2012–13, after adjusting for differences in age structure, Aboriginal and Torres Strait Islander adults were 1.2 times as likely to be overweight or obese as non-Indigenous adults, and 1.6 times as likely to be obese (ABS 2014a).



Source: ABS 2014a; Table S11.

**Figure 4.7: Proportion of overweight and obese Indigenous adults, by age group (years) and sex, 2012–13**

## Prevalence by Primary Health Network area

There are 31 Primary Health Network (PHN) areas across Australia, and reporting at these smaller, local areas can provide results that could be masked in national-or state/territory-level results.

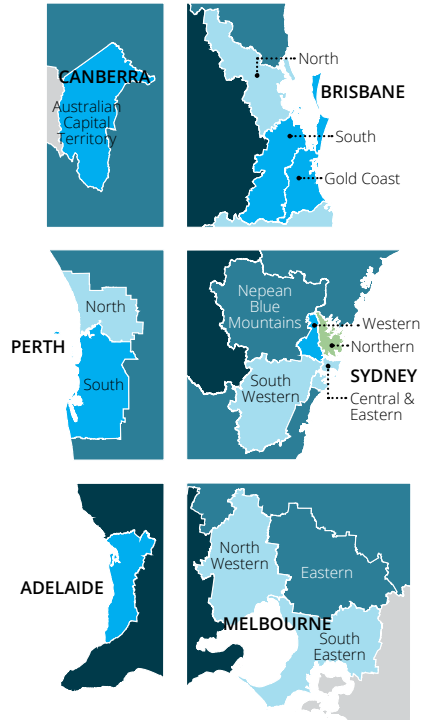
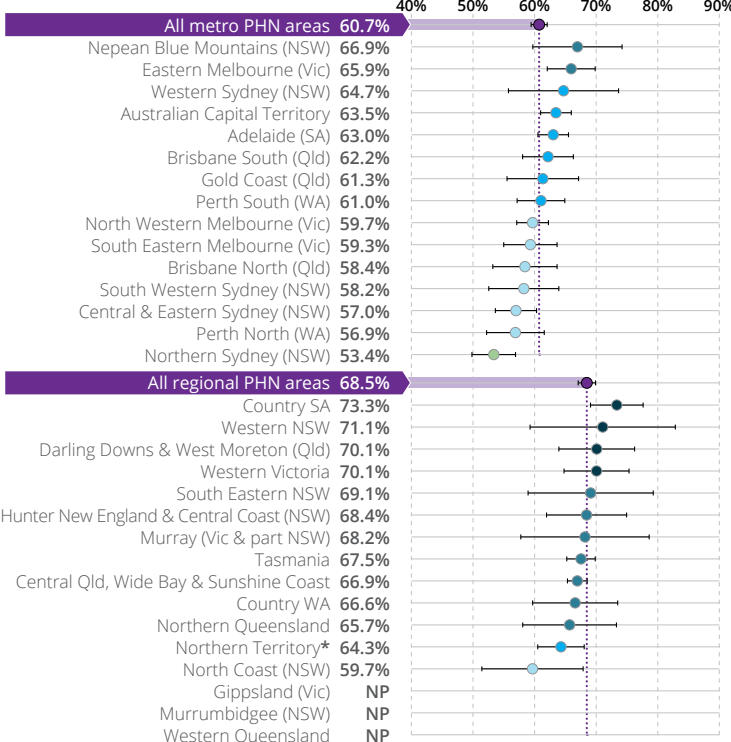
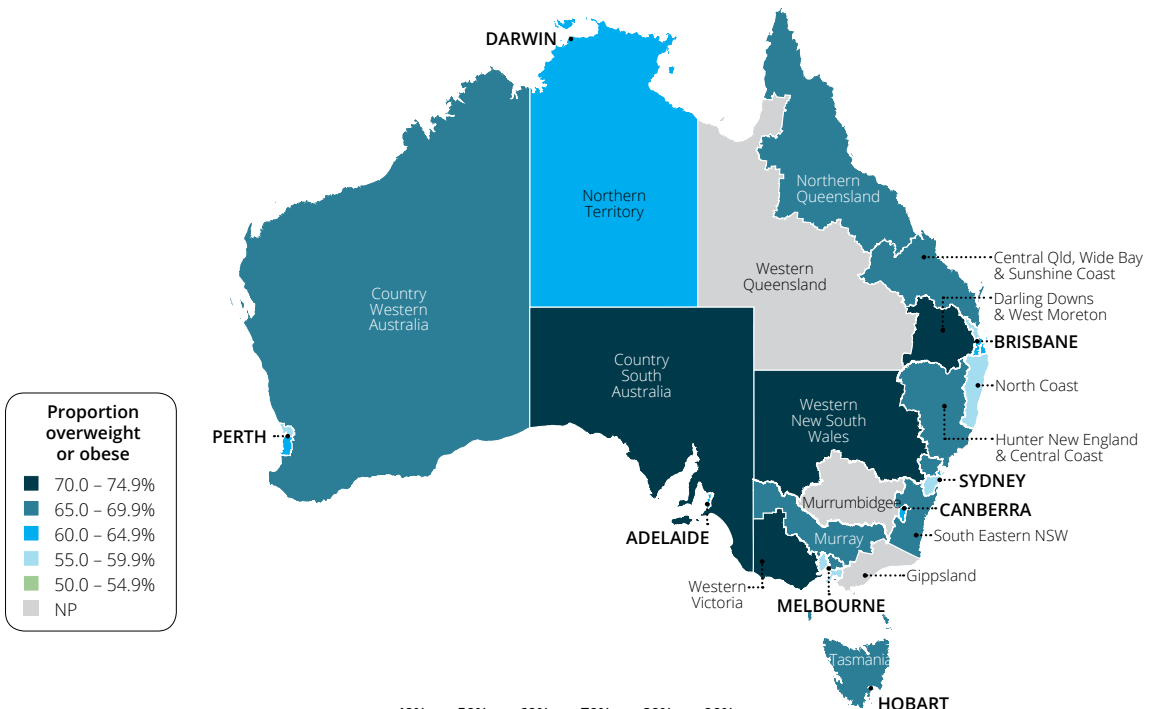
PHNs commission and connect health services within PHN area boundaries, which are defined by the Department of Health (Department of Health 2016). The information in this section relates to the population living within the area covered by a particular PHN.

In 2014–15, of measured PHN areas, the Country South Australia PHN area had the highest prevalence of overweight and obesity, at almost three-quarters of adults (73%) (Figure 4.8). The Northern Sydney PHN area had the lowest prevalence, with just over half of adults being overweight or obese (53%). Four PHN areas had proportions of overweight and obese adults of 70% or more—Country South Australia, Western New South Wales, Darling Downs and West Moreton (Queensland), and Western Victoria.

The prevalence of overweight and obesity among adults varied between metropolitan and regional PHN areas. In 2014–15, regional PHN areas had higher proportions of adults who were overweight and obese (69%) than metropolitan PHN areas (61%).

There was no significant difference between the proportion of overweight but not obese adults in metropolitan (36%) and regional (34%) PHN areas. But the difference was significant for obesity alone—more than one-third (35%) of adults in regional PHN areas were obese, compared with about one-quarter (24%) in metropolitan PHN areas (AIHW 2016e).

For more information on measuring overweight and obesity rates at PHN area level, see 'Appendix C'.



— 95% confidence interval. NP: Not available for publication but included in totals where applicable.

\* Interpret with caution: >25% of the population live in very remote areas and discrete Aboriginal & Torres Strait Islander communities, and are excluded from the survey.

**Notes**

1. Survey excludes adults living in non-private dwellings, very remote areas, and discrete Aboriginal and Torres Strait Islander communities.
2. 'Metro PHN areas' have ≥85% of the population in 'major cities', as defined by the Australian Bureau of Statistics. All others are classified as 'regional PHN areas'.

Source: Australian Institute of Health and Welfare analysis of the Australian Bureau of Statistics National Health Survey 2014–15.

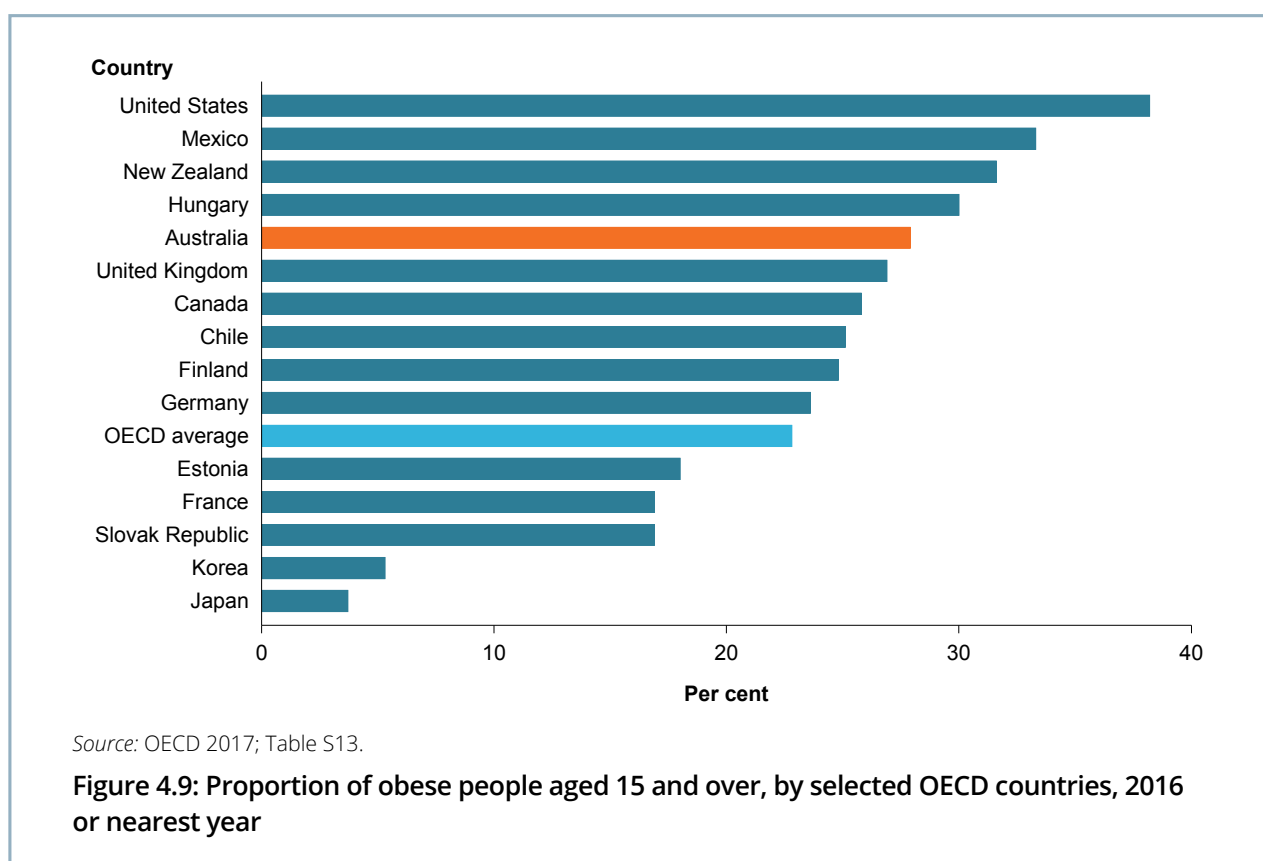
**Figure 4.8: Estimated proportion of overweight and obese adults, by Primary Health Network areas, 2014–15**

## International comparisons

Among 22 Organisation for Economic Cooperation and Development (OECD) countries, more than half (57%) of people aged 15 and over are overweight or obese (based on measured data for 2016 or the closest available year) (OECD 2017).

Of those countries, Australia's obesity rate (28% of the population aged 15 and over) was the 5th highest, behind the United States of America (38%), Mexico (33%), New Zealand (32%), and Hungary (30%), and was higher than the 23% average rate. Japan had the lowest rate of obesity (4%) (Figure 4.9).

Comparability of the data might be affected by the OECD's method of reporting on data for 2016 or the *closest year available*. Among the OECD countries included in Figure 4.9, the year of data used ranged from 2007 for France to 2016 for Mexico and New Zealand.

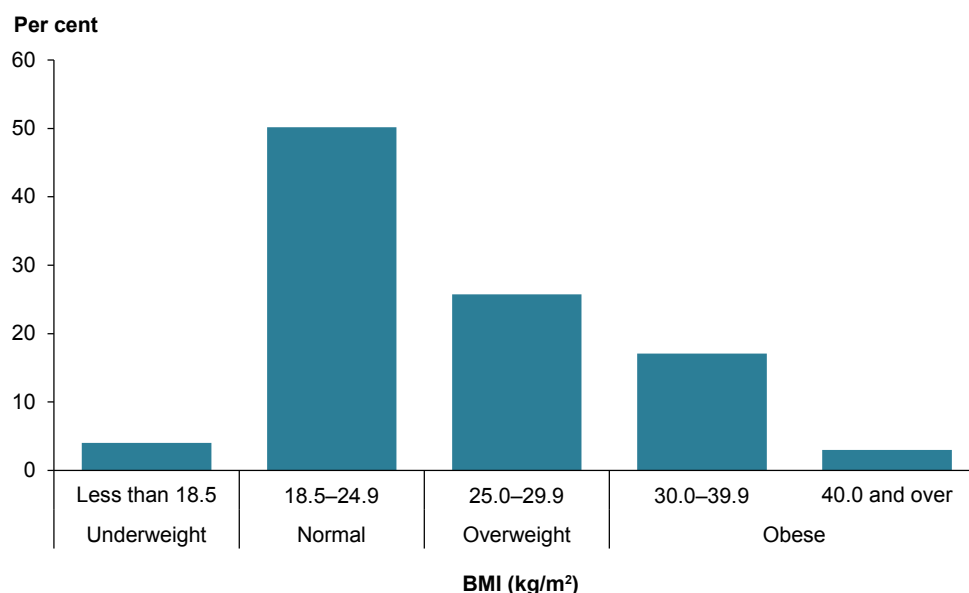


## Maternal overweight and obesity

Obesity during pregnancy is typically defined as a BMI of 30.00 kg/m<sup>2</sup> or more at the first antenatal consultation, which is ideally within the first 10 weeks of pregnancy. Obesity during pregnancy contributes to higher morbidity and death for mothers and babies. For example, obese pregnant women have a higher risk of thromboembolism (blood clots), gestational diabetes, pre-eclampsia, post-partum haemorrhage (blood loss), and wound infections (CMACE & RCOG 2010).

A recent study in Sweden found maternal overweight and obesity is also associated with higher infant death rates. Compared with mothers of normal weight, mothers who were overweight but not obese, and obese class I had a 25% and 27% increased risk of infant death, respectively. The risk doubled for mothers who were obese class II and class III (Johansson et al. 2014).

In Australia in 2014, almost half (46%) of women who gave birth were overweight or obese (excluding those in New South Wales, as data were unavailable) (Figure 4.10). About one quarter (26%) were overweight, and one-fifth (20%) were obese (AIHW 2016b).



### Notes

1. BMI data exclude New South Wales.
2. BMI source data and methods used for collection in states and territories are not uniform.

Source: AIHW 2016b; Table S14.

**Figure 4.10: Proportion of women who gave birth, by body mass index, Australia (excluding New South Wales), 2014**



# 5

## Impact of overweight and obesity

This chapter provides an overview of the health and economic impacts of overweight and obesity.

### Health impacts

#### Chronic conditions

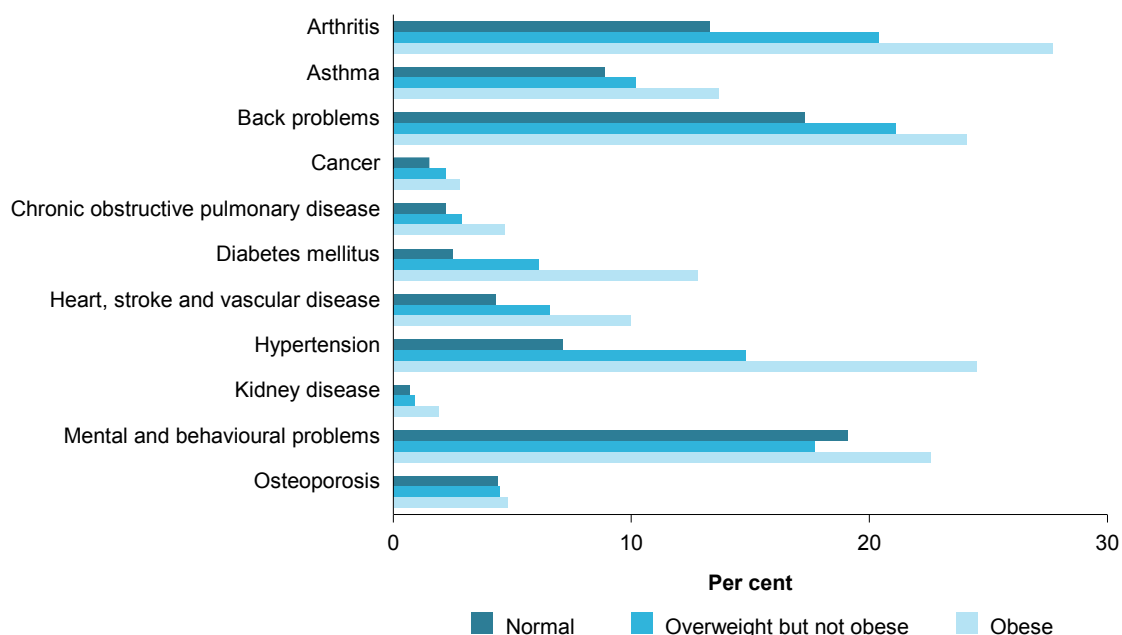
Obese children are at a higher risk of breathing difficulties, fractures, hypertension, insulin resistance, and early markers of cardiovascular disease (WHO 2016a). Overweight and obese children are also more likely to become obese adults, and to develop chronic conditions at younger ages, including cardiovascular disease and type 2 diabetes (Sahoo et al. 2015).

Overweight and obesity among adults increases the likelihood of developing many chronic conditions, including some cancers, cardiovascular disease, asthma, back pain and problems, chronic kidney disease, dementia, diabetes, gallbladder disease, gout, and osteoarthritis (AIHW 2017a).

In 2014–15, Australian adults who were overweight or obese reported higher rates of many chronic conditions than adults of normal weight (Figure 5.1). For several conditions, obese adults were more likely to report that they had a chronic condition than adults who were overweight but not obese, who in turn reported higher rates than adults of normal weight (ABS 2015).

With a BMI of more than 20.00 kg/m<sup>2</sup>, it has been reported that the severity of morbidity associated with selected chronic conditions rises as BMI increases, and there may be an increased risk of complications due to chronic conditions, such as coronary heart disease (NIH 1998).

### Chronic condition



#### Notes

1. Overweight and obesity classification is based on measured height and weight.
2. Chronic condition prevalence estimates are based on people with a current medical condition that has lasted, or is expected to last, for 6 months or more, unless otherwise stated.
3. Arthritis includes rheumatoid arthritis, osteoarthritis, other, and type unknown.
4. Back problems (dorsopathies) includes sciatica, disc disorders, back pain/problems not elsewhere classified, and curvature of the spine.
5. Cancer refers to malignant neoplasms.
6. Chronic obstructive pulmonary disease includes bronchitis and emphysema.
7. Diabetes mellitus includes type 1 and type 2 diabetes, and type unknown. Estimates include people who reported they had diabetes, but that it was not current at the time of interview.
8. Heart, stroke, and vascular disease includes angina, heart attack, other ischaemic heart diseases, stroke, other cerebrovascular diseases, oedema, heart failure, and diseases of the arteries, arterioles, and capillaries. Estimates include people who reported they had angina, heart attack, other ischaemic heart diseases, stroke, or other cerebrovascular diseases, but that these conditions were not current at the time of interview.
9. Mental and behavioural problems includes organic mental problems, alcohol and drug problems, mood (affective) problems, anxiety-related problems, and other mental and behavioural problems.

Source: ABS 2015; Table S15.

**Figure 5.1: Prevalence of chronic conditions in adults, by weight status, 2014–15**

## Mortality

Being overweight or obese is associated with a higher death rate when looking at all causes (di Angelantonio et al. 2016). A large investigation into the effect of obesity on mortality found that compared with people with a normal BMI (18.50–24.99 kg/m<sup>2</sup>), the life expectancy of those with class I obesity (30.00–34.99 kg/m<sup>2</sup>) was reduced by 2–4 years, and by 8–10 years for those with class III obesity (40.00–44.99 kg/m<sup>2</sup>) (NHMRC 2013b).

Chronic diseases associated with overweight and obesity include many of the leading causes of death in Australia, such as some cancers, coronary heart disease, stroke, and chronic kidney disease (AIHW 2016a).

A study of the mortality risk for cancer sites associated with overweight and obesity across the Asia–Pacific region found that—after adjusting for age and smoking status—the risk of death rose significantly with increasing BMI for cancers of the colon, rectum, prostate, ovary, cervix, and breast in women aged 60 and over. Across these cancer sites, the risk of death associated with a BMI increase of 5.00 units for those with a BMI of 18.50 kg/m<sup>2</sup> or higher varied from a 13% rise for rectal cancer to a 45% rise for cervical cancer (Parr et al. 2010).

## Burden of disease

In 2011, 7% of the total burden of disease in Australia was due to overweight and obesity, with 63% of this due to fatal burden (see Box 5.1). Men (7.3%) had a greater burden of disease from overweight and obesity than women (6.6%) (AIHW 2017a).

The burden of disease attributable to overweight and obesity differs by disease—for example, 53% of the burden of diabetes was due to overweight and obesity, while 45% of the burden of osteoarthritis was due to overweight and obesity.

### Box 5.1: What is burden of disease analysis?

Burden of disease analysis assesses and compares the impact of different diseases, conditions, or injuries ('diseases' for simplicity), as well as risk factors on a population.

The Australian Burden of Disease Study 2011 quantified the fatal and non-fatal effects of more than 200 diseases in a consistent manner, to present them as a summary measure of health called the disability-adjusted life years (DALY). The DALY combines the estimates of years of life lost due to premature death (YLL), and years lived in ill health or with disability (YLD), to count the total years of healthy life lost as a result of diseases.

This health loss represents the difference between the current health status of the population, and the ideal situation where everyone lived a long life, free of disease.

Burden of disease estimates capture both the quantity and quality of life, and reflect the magnitude, severity, and impact of disease and injury in a population in the given year. The analysis also estimates the contribution of various risk factors to health loss, known as the attributable burden.

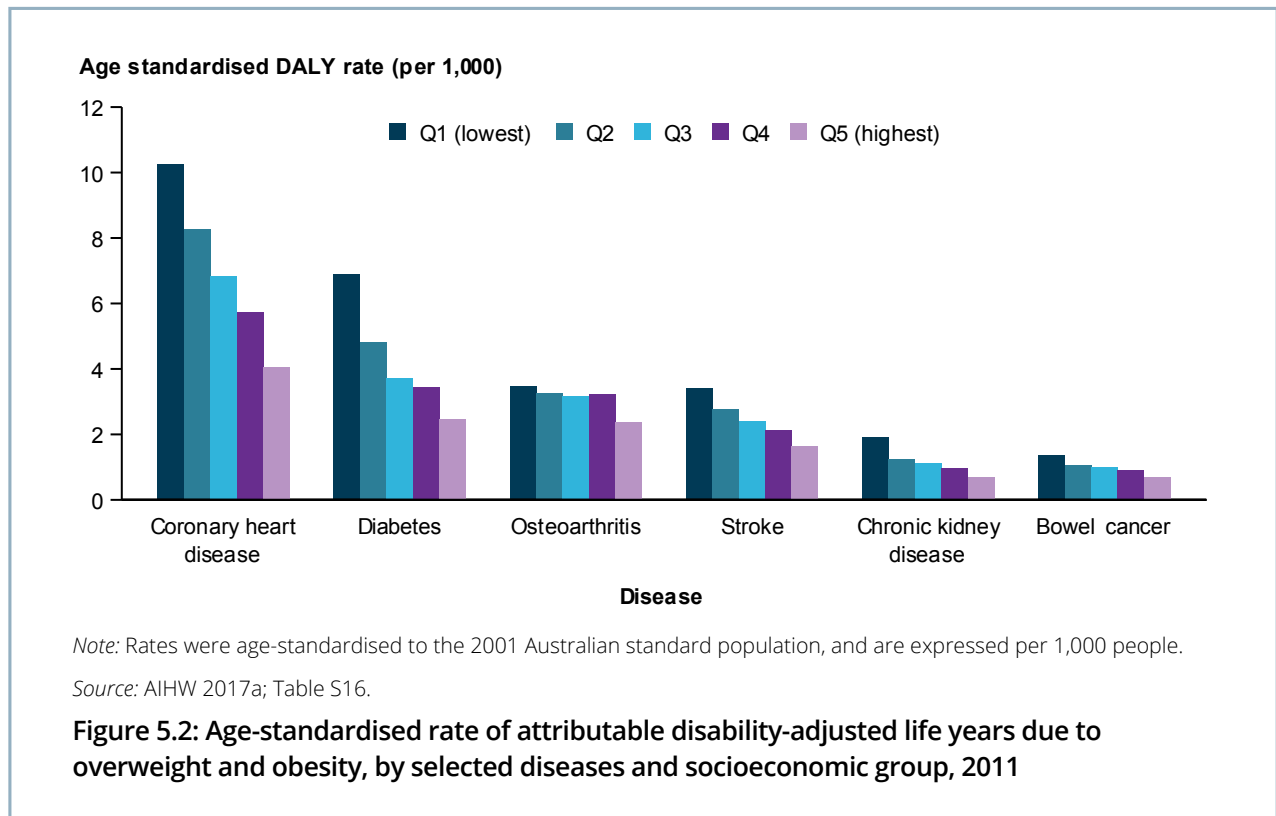
Attributable burden reflects the direct relationship between a risk factor—overweight and obesity in this report—and a disease outcome. It is the amount by which disease burden would be reduced if exposure to the risk factor had been avoided or reduced to the lowest possible exposure.

For detailed information about the Australian Burden of Disease Study 2011, and further information on the methods used to calculate disease burden, see:

1. *Australian Burden of Disease Study: methods and supplementary material (AIHW 2016d)*
2. *Australian Burden of Disease Study: impact and causes of illness and death in Australia 2011 (AIHW 2016c)*
3. *Impact of overweight and obesity as a risk factor for chronic conditions: Australian Burden of Disease Study (AIHW 2017a).*

About 38% of the burden of disease attributable to overweight and obesity was from cardiovascular diseases. Within this disease group, coronary heart disease accounted for 27% of disease burden, and stroke accounted for 10%. Following coronary heart disease, diabetes (17%), osteoarthritis (12%), and chronic kidney disease (5%) were the diseases accounting for most of the burden due to overweight and obesity. Attributable burden from cardiovascular diseases was twice as high in males (80,394 DALY) as in females (37,890) (AIHW 2017a).

The burden of disease attributable to overweight and obesity was higher for those in lower socioeconomic groups. For the 6 selected linked diseases shown in Figure 5.2, the burden due to overweight and obesity generally decreased with increasing socioeconomic group (i.e. relatively lower socioeconomic disadvantage).



If all Australians at risk of disease due to overweight or obesity reduced their BMI by a small amount, and sustained that weight loss, there would be substantial gains to population health.

If those who were overweight or obese in 2011 reduced their BMI by 1.00 kg/m<sup>2</sup>—about 3 kilograms for a person of average height—the overall health impact of excess weight would fall by 14% by 2020 (AIHW 2017a).

If the prevalence of overweight and obesity were to continue to rise at the current rate, the disease burden due to overweight and obesity would be 6.3% (22,070 DALY) greater than if the rate remained at 2011 levels.

## Economic impacts

Illnesses associated with overweight and obesity have a significant impact on the Australian economy.

Direct financial costs to the health system include higher health-care costs, and higher demand on health-care services (such as general practitioners, specialists, allied health professionals, pharmaceuticals, administration, and other direct costs).

Indirect costs include productivity losses, carer costs, welfare payments, forgone taxation revenue, and other costs, such as aids, equipment transport, and accommodation, respite, and other government programs (Access Economics 2008).

In 2014–15, more than 124,600 procedures related to weight-loss surgery were billed to Medicare—in public and private hospitals, and in non-hospital settings. The total costs for these Medicare-billed procedures were about \$62.8 million, with about \$25.7 million in benefits paid by Medicare, and about \$37.1 million paid in out-of-pocket costs by patients and/or health insurers (AIHW 2017c).

Access Economics estimated that in 2008, the financial cost of overweight and obesity to Australia was \$8.3 billion—primarily associated with productivity costs (\$3.6 billion or 44%), health system costs (\$2.0 billion or 24%), and carer costs (\$1.9 billion or 23%) (Access Economics 2008a).

More recently, PwC Australia estimated that obesity cost the Australian economy \$8.6 billion in 2011–12 (in 2014–15 dollars). This included an estimated \$3.8 billion in direct costs and \$4.8 billion in indirect costs, but did not account for further costs from reduced wellbeing and forgone earnings.

The report estimated that, if no further action is taken to slow the rise in obesity, there will be \$87.7 billion in additional costs due to obesity over a 10-year period (2015–16 to 2024–25).

PwC Australia also estimated that by 2024–25, a higher proportion of people will be obese class III (BMI of 40.00 kg/m<sup>2</sup> or more), which can lead to higher health risks and costs (PwC Australia 2015).



# 6 Approaches for reducing overweight and obesity

The complex nature of overweight and obesity—influenced by the interplay between a person’s biological and genetic characteristics, and the effect of lifestyle factors—means a comprehensive and multifaceted approach is needed to target improvements, and reduce its prevalence.

It has been suggested that efforts to tackle overweight and obesity need to be systemic and sustained, recognising that individual and population health approaches are complementary, and should ideally be integrated (Bauman et al. 2016).

Governments of all levels, business and community leaders, school, childcare, and health-care professionals and individuals must work together to create a supportive environment that encourages healthy behaviours that prevent obesity (CDC 2015).

Australia’s peak intergovernmental forum, the Council of Australian Governments (COAG)—which works to promote policy reforms that are of national significance or need a coordinated response across all Australian governments—endorsed the Australian National Healthcare Agreement in November 2008 (SCRGSP 2009).

COAG agreed to benchmarks to increase the proportion of Australian children and adults at a healthy body weight by 5 percentage points, over the 2009 baseline, by 2018. A 2016 COAG performance report showed that Australia is on track to meet this benchmark for children, but not for adults (PMC 2016).

Overweight and obesity affects the whole community throughout the life stages. Several intervention points at different life stages have been proposed, including during childhood, adolescence, early adulthood, pregnancy, and menopause (WHO 2000).

This chapter outlines strategies to reduce overweight and obesity, including laws and regulations, tax and price interventions, community-based interventions, and social marketing.

These strategies overlap in some instances, as, for example, a law or regulation might also relate to public education. Individual approaches might incorporate prevention—maintaining an energy balance in the body, and avoiding persistent, small positive energy imbalances that over time result in excess weight gain—or treatment, such as creating a negative energy balance through lower energy intake and more physical activity, or more substantial treatments, such as weight loss surgery (Institute of Medicine (US) Committee on an Evidence Framework for Obesity Prevention Decision Making 2010).

This chapter includes examples of approaches implemented by the Australian and state and territory governments; however, it is not possible to cover all such approaches in this report.

## Laws and regulations

Laws and regulations targeting overweight and obesity include requirements to display nutritional information on menus, restrictions on the marketing of less healthy foods to children, and the regulation of health claims on foods and drinks.

Nationally, Food Standards Australia New Zealand develops and administers the Australia New Zealand Food Standards Code, which includes regulations on the nutrient content and health claims that businesses can make on food labels and in advertising.

Among the states and territories, several jurisdictions have menu labelling regulations. For example, larger retail food outlets in New South Wales must display kilojoule values next to each item on their menus. An evaluation of this initiative found a significant decrease in kilojoules purchased—from 3,355 kJ to 2,836 kJ—over the evaluation period (NSW Food Authority 2013).

Laws and regulations also govern advertising for unhealthy food products in Australia. Nationwide, the Children's Television Standards 2009 regulate food advertising to children on television (Jolly 2011).

Further, 2 self-regulatory food industry codes were introduced in 2009 on advertising unhealthy foods to children on television—the Responsible Children's Marketing Initiative for Food and Beverage Grocery Manufacturers, and the Quick Service Restaurant Initiative for Fast-food Companies (Watson et al. 2017).

Many different state and territory laws and regulations are also in place addressing marketing of unhealthy foods, but these vary between jurisdictions. For example, in the Australian Capital Territory, advertising of unhealthy foods and drinks on Government operated buses is prohibited (Sacks 2017). In Victoria, legislation regulates food advertisements, including banning or restricting words, statements, or pictures that might appear on food labels (MacKay 2011).

More information on regulations and policies across the states and territories is available in 'Appendix D'.

## Tax and price interventions

Examples of tax and price interventions related to overweight and obesity include:

- taxes on less healthy foods and drinks (such as energy-dense, nutrient-poor foods)
- exemption of healthier foods from a goods and services or value added tax
- subsidies, such as agricultural and transport subsidies for certain foods (Lee et al. 2013; Bauman et al. 2016).

The WHO Commission on Ending Childhood Obesity has recommended that governments use fiscal policies such as taxes to reduce the consumption of unhealthy products like sugar sweetened non-alcoholic drinks to tackle overweight and obesity (WHO 2016b).

In Australia, the goods and services tax (GST) is not applied to most basic foods, including healthier foods such as fruit, vegetables, bread, and fish (ATO 2017a). The GST is applied to foods such as confectionary, carbonated drinks, cookies, ice cream, and hot takeaway foods (ATO 2017b).

## Community-based interventions

Interventions to tackle overweight and obesity also take place in various community settings, such as schools and workplaces.

Across Australia, the National Healthy School Canteens project began in 2008. It offers guidance and training to help canteen managers make healthier food and drink choices available in school canteens. The National Healthy School Canteens guidelines and resources are based on the Australian Dietary Guidelines (Department of Health 2014c).

Another national initiative is the Healthy Workers project, which began in 2008 to encourage healthy behaviours in workplaces, and reduce the risk of chronic disease. The initiative provides funds for health promotion programs in workplaces that focus on modifiable lifestyle behaviours, including increasing physical activity and fruit and vegetable intake. The National Healthy Workers Portal also provides employers with information and resources to help make workplaces healthier (Department of Health 2014b).

Among states and territories, an example is the Victorian Government's Achievement Program. It supports early childhood services, schools, and workplaces in improving health and wellbeing, using a whole-of-setting approach, and focusing on health priority areas such as nutrition and physical activity (Achievement Program 2015).

In the Australian Capital Territory, the Healthy Children's initiative provides programs and campaigns aimed at children and families across the territory. These programs aim to promote healthy eating and physical activity in the home, early child education and care services, and in schools. They include Kids at Play, Ride or Walk to School, Fresh Tastes: Healthy Food at School, It's Your Move, and Healthy Food @ Sport (ACT Health 2017b).

Grants have also been provided to community-based organisations, through the Australian Capital Territory Health Promotion Grants Program. The funding supports programs that aim to improve outcomes in overweight and obesity, as well as healthy ageing, and reducing smoking and alcohol-related harm (ACT Health 2017a).

In New South Wales, the Healthy Kids website provides resources for children, adolescents, teachers, health professionals, parents, and carers. It is a joint initiative between the New South Wales Ministry of Health, Department of Education, Office of Sport, and the Heart Foundation. Information is structured around their 5 key messages:

- get active for an hour or more each day
- choose water as a drink
- eat more fruit and vegetables
- turn off the television or computer and get active
- eat fewer snacks, and select healthier alternatives (Healthy Kids 2017).

## Health promotion

Public education or health promotion approaches to overweight and obesity include social marketing campaigns.

There have been several national overweight and obesity-related social marketing campaigns.

The current Girls Make Your Move campaign aims to increase physical activity among young women (Department of Health 2017c). The campaign includes a website, and advertising on television, online, on social media, in print media, and in out of home media.

Another example is LiveLighter, a public health education program developed originally in Western Australia in 2012 to encourage people to live well, be physically active, and maintain a healthy weight. In addition to mass media advertising, the program engages with Australian adults through social media, using digital platforms, and with printed tools and resources (LiveLighter 2017).

The Healthy Weight Guide is an interactive website with comprehensive information on maintaining a healthy weight. It provides information and tools for different groups, such as parents, breastfeeding mothers, teenagers, Aboriginal and Torres Strait Islander people, people aged 65 and over, and more. It enables users to set weight loss goals, plan and record meals and physical activity, and track their progress (Department of Health 2017a).

The Health Star Rating system is a national voluntary labelling system to compare the nutritional profile of products within the same category (for example, breakfast cereals). Ratings range from 0.5 star to 5 stars, with a higher star rating indicating a healthier choice between products in the same category. The system was developed by the Australian and state and territory governments, in collaboration with industry, public health groups, and consumer groups (Department of Health 2017b).

A progress review done 2 years after the system began found that, of consumers who were aware of the system, more than half reported it was a factor in which product they bought. It also found that some companies had reformulated products (including reducing sodium/salt, sugar, and/or saturated fat content) to get a higher star rating (Health Star Rating Advisory Committee 2017).

## Weight loss surgery

While excess weight is commonly managed using dietary intervention and exercise, for those who are morbidly obese or who are obese and have other conditions related to their excess weight, weight loss surgery might be appropriate.

By restricting the amount of food eaten or altering the process of food digestion so that fewer calories are absorbed, weight loss surgery, also known as bariatric surgery, helps obese patients lose weight, and lowers the risk of medical problems associated with obesity (AIHW 2017c).

In 2013, the National Health and Medical Research Council released their Clinical Practice Guidelines for the Management of Overweight and Obesity in Adults, Adolescents and Children in Australia. The guidelines state that bariatric surgery might be appropriate for some adults with class II or class III obesity and comorbidities that might improve with weight loss (NHMRC 2013b).

Weight loss surgery is becoming more common in Australia. In 2014–15 there were more than 22,700 weight loss surgery hospitalisations (those with 1 or more weight loss surgery procedure/s), more than double the 9,300 hospitalisations in 2005–06.

Female patients accounted for nearly 4 in 5 (79% or nearly 18,000) of the weight loss surgery hospitalisations in 2014–15, compared with nearly 4,800 hospitalisations for male patients.

# Appendix A: Classification of overweight and obesity for children and adolescents

The Australian standard definitions of overweight and obesity have been developed based on the work of Cole et al. (2000).

At the population level, overweight and obesity in children and adolescents is determined by comparing calculated BMI (weight in kg/height in metres<sup>2</sup>) against the relevant age and sex of the child/adolescent, as shown in Table A1 (Department of Health 2009).

**Table A1: Classification of overweight and obesity for children and adolescents**

Age (years)	BMI equivalent to 25.00 in adults		BMI equivalent to 30.00 in adults	
	Males	Females	Males	Females
2.0	18.41	18.02	20.09	19.81
2.5	18.13	17.76	19.80	19.55
3.0	17.89	17.56	19.57	19.36
3.5	17.69	17.40	19.39	19.23
4.0	17.55	17.28	19.29	19.15
4.5	17.47	17.19	19.26	19.12
5.0	17.42	17.15	19.30	19.17
5.5	17.45	17.20	19.47	19.34
6.0	17.55	17.34	19.78	19.65
6.5	17.71	17.53	20.23	20.08
7.0	17.92	17.75	20.63	20.51
7.5	18.16	18.03	21.09	21.01
8.0	18.44	18.35	21.60	21.57
8.5	18.76	18.69	22.17	22.18
9.0	19.10	19.07	22.77	22.81
9.5	19.46	19.45	23.39	23.46
10.0	19.84	19.86	24.00	24.11
10.5	20.20	20.29	24.57	24.77
11.0	20.55	20.74	25.10	25.42
11.5	20.89	21.20	25.58	26.05
12.0	21.22	21.68	26.02	26.67
12.5	21.56	22.14	26.43	27.24
13.0	21.91	22.58	26.84	27.76
13.5	22.27	22.98	27.25	28.20
14.0	22.62	23.34	27.63	28.57
14.5	22.96	23.66	27.98	28.87
15.0	23.29	23.94	28.30	29.11
15.5	23.60	24.17	28.60	29.29
16.0	23.90	24.37	28.88	29.43
16.5	24.19	24.54	29.14	29.56
17.0	24.46	24.70	29.41	26.69
17.5	24.73	24.85	29.70	29.84
18.0	25.00	25.00	30.00	30.00

Source: Department of Health 2009.

## Appendix B: Defining socioeconomic groups

Socioeconomic groups can be defined using the Index of Relative Socioeconomic Disadvantage (IRSD).

The IRSD scores each area by summarising attributes of their populations, such as low income, low educational attainment, high unemployment, and jobs in relatively unskilled occupations. Areas can then be ranked by their IRSD score, and are classified into groups based on their rank. Areas used in this report were calculated from ABS Statistical Area Level 1 (ABS 2011).

Any number of groups may be used—5 is common, and if 5 are used, then the IRSD commonly describes the population living in the 20% of areas with the greatest overall level of disadvantage as ‘living in the lowest socioeconomic group’. The 20% at the other end of the scale—the top fifth—is described as ‘living in the highest socioeconomic areas’ or the ‘highest socioeconomic group’ (ABS 2013b).

# Appendix C: Measuring overweight and obesity rates at Primary Health Network area level

Overweight and obesity rates broken down by Primary Health Network (PHN) area are subject to suppression rules to ensure robust reporting. Rates are reported as a percentage, measuring the number of overweight or obese adults in the total adult population in a given area.

As an indication of the accuracy of these percentages, 95% confidence intervals (CIs) were produced. These were calculated by the ABS using relative standard error estimates of the proportion.

Data for PHN areas were suppressed in some cases:

- If there was the likelihood of a non-representative sample—where the survey sample count in the PHN area was small (less than 20% of the expected number of adults), and the relative standard error was 25%–50%—the result for the PHN area was suppressed.
- If there was rate instability—where the survey sample count in a PHN area was marginal (20%–40% of the expected number of adults)—then the 2014–15 rate was compared with the 2011–12 rate, and the PHN area suppressed if extreme variation was seen. Extreme variation between 2011–12 and 2014–15 was defined as a percentage point change within the top tenth, resulting in a 2014–15 estimate that was the highest or lowest rate across all PHN areas.

As a result, 2014–15 rates for 28 of the 31 PHN areas were able to be reported. Results for Gippsland (Victoria), Murrumbidgee (New South Wales), and Western Queensland were suppressed.

PHN area boundaries align well with the ABS remoteness category of *Major cities* (ABS 2011). A PHN area was categorised as a metropolitan PHN area if at least 85% of the population was in the *Major cities* category. All other PHN areas were categorised as regional PHN areas (AIHW 2016e).

# Appendix D: State and territory policy actions and infrastructure support actions

Table D1 summarises selected policy actions targeting food environments, and relevant infrastructure support actions for all the states and territories, as at 30 June 2016.

This table has been adapted from a report by Sacks for the Food-EPI Australia project team (Sacks 2017).

**Table D1: Selected state and territory policy actions targeting food environments**

	<b>Policy actions targeting food environments</b>	<b>Infrastructure support actions</b>
<b>New South Wales</b>	<ul style="list-style-type: none"> <li>Larger retail food outlets must display kilojoule values next to each item on menus. The state supports continued monitoring and evaluation of menu labelling.</li> </ul>	<ul style="list-style-type: none"> <li>Regular surveys of self-reported BMI from adults and children are conducted.</li> </ul>
<b>Victoria</b>	<ul style="list-style-type: none"> <li>The Healthy Eating Advisory Service provides resources to support childcare centres, schools, health services, and sports centres to provide healthy foods and drinks.</li> </ul>	<ul style="list-style-type: none"> <li>Victoria has an independent statutory health promotion agency—VicHealth—whose strategic imperatives include the promotion of healthy eating.</li> <li>Multiple targeted strategies, policies, and initiatives at state and local level aim to create healthier food environments in schools, childcare centres, workplaces, food outlets, sporting clubs, businesses, and local government.</li> </ul>
<b>Queensland</b>	<ul style="list-style-type: none"> <li>Large fast food chains must display an average energy content on menus, and overall average daily energy intake.</li> <li>The state incorporates health as a key consideration as part of the Planning Act 2016, and provides detailed resources (Active Healthy Communities) for local councils on ways to limit access to unhealthy fast food outlets.</li> <li>The state provides detailed information and resources (Active Healthy Communities) for local government on ways to promote healthy food choices through the built environment and encourage outlets that sell healthy food.</li> </ul>	<ul style="list-style-type: none"> <li>A lobby register includes mandatory reporting of the type and purpose of lobbying conduct, and real-time disclosure of political donations, to restrict commercial influence on health policy development.</li> <li>Regular surveys of self-reported BMI from adults and children are conducted.</li> <li>The Health and Wellbeing Strategy outlines key evaluation questions, with an associated guidelines – specific evaluation framework being developed. All programs must be evaluated.</li> </ul>

*continued...*

Table D1 (continued): Selected state and territory policy actions targeting food environments

	Policy actions targeting food environments	Infrastructure support actions
<b>Western Australia</b>	<ul style="list-style-type: none"> <li>• School principals must develop whole-of-school food provision policies.</li> <li>• The Healthier Workplace WA program provides free services to support workplaces state-wide to make cultural, environmental, and policy changes that support and encourage positive lifestyle behaviours among employees.</li> </ul>	<ul style="list-style-type: none"> <li>• Key strategic health promotion documents identify priority groups, and the Western Australian government has highlighted a strategic focus on improving nutrition in vulnerable groups, with several targeted initiatives.</li> <li>• The Health and Wellbeing Surveillance System collects annual data on key nutrition indicators. The Nutrition Monitoring Survey series collects data every 3 years on community perceptions and attitudes of nutrition.</li> <li>• The state provides sustained funding for research that improves food environments, and reduces obesity, non-communicable diseases, and their related inequalities.</li> <li>• An independent statutory health promotion agency is in place in Western Australia—Healthway—whose role includes the promotion and facilitation of good health and activities which encourage healthy lifestyles.</li> <li>• The state funds several obesity and non-communicable diseases prevention social marketing campaigns, and online and community programs, including LiveLighter, which has been adopted in multiple states/territories.</li> <li>• The state provides ongoing support resources to educators to include food and nutrition in school curricula.</li> </ul>
<b>South Australia</b>	<ul style="list-style-type: none"> <li>• Large fast food chains must display an average energy content on menus, and overall average daily energy intake.</li> <li>• The Healthy Kids Menus Initiative aims to increase the provision of and access to healthy menu options for children in South Australian restaurants, cafes, hotels and clubs.</li> </ul>	<ul style="list-style-type: none"> <li>• Mechanisms are in place to incorporate population health considerations into policy development processes across the South Australian government.</li> <li>• Regular surveys of self-reported BMI from adults and children are conducted.</li> </ul>

*continued...*

Table D1 (continued): Selected state and territory policy actions targeting food environments

	Policy actions targeting food environments	Infrastructure support actions
<b>Tasmania</b>	<ul style="list-style-type: none"> <li>• Policies are in place in schools to promote healthy food choices.</li> </ul>	<ul style="list-style-type: none"> <li>• The Move Well Eat Well initiative promotes a healthier Tasmania, through a comprehensive, straightforward guide to creating a healthier environment for children in early childhood services and primary schools.</li> </ul>
<b>Australian Capital Territory</b>	<ul style="list-style-type: none"> <li>• Advertising of unhealthy food on Government-operated buses is prohibited.</li> <li>• Large fast food chains must display an average energy content on menus, and overall average daily energy intake.</li> <li>• Advertising and promotion of red/amber foods or drinks is restricted at ACT Health facilities and activities. The territory government actively explores options that reduce promotion of unhealthy foods in children's settings.</li> <li>• Policies that are in place in schools to promote healthy food choices include a requirement for license agreements with canteen operators, and active monitoring.</li> </ul>	<ul style="list-style-type: none"> <li>• The Healthy Weight Initiative aims to combat the rise of obesity and overweight in the territory, led by the Chief Minister with regular reporting of progress.</li> <li>• The Towards Zero Growth: Healthy Weight Action Plan outlines clear targets for obesity rates, and details policy and program initiatives across health and non-health sectors, and has established a taskforce and dedicated implementation groups.</li> <li>• Extensive monitoring of unhealthy food marketing to children, and nutritional quality of food in public sector settings is done.</li> <li>• Regular surveys of self-reported BMI from adults and children are conducted.</li> <li>• Ongoing support and provision of resources are provided to educators for food and nutrition to be included in school curricula.</li> </ul>
<b>Northern Territory</b>	<ul style="list-style-type: none"> <li>• The Northern Territory has an ongoing formal commitment to support some remote community stores in encouraging in-store availability of healthy foods, and discouraging the availability of unhealthy foods.</li> </ul>	<ul style="list-style-type: none"> <li>• The Northern Territory government provides sustained funding for research that improves foods environments, reduces obesity, non-communicable diseases, and their related inequalities.</li> </ul>

# Glossary

**Aboriginal or Torres Strait Islander:** A person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander.

**birth cohort:** A group of people born in the same year or years.

**body mass index (BMI):** An international index used to classify underweight, overweight, and obesity. BMI is calculated by dividing a person's weight in kilograms by the square of their height in metres ( $\text{kg}/\text{m}^2$ ).

**discretionary foods:** Described in the *Australian Dietary Guidelines* as “foods and drinks not necessary to provide the nutrients the body needs, but that may add variety. However, many of these are high in saturated fats, sugars, salt and/or alcohol, and are therefore described as energy dense. They can be included sometimes in small amounts by those who are physically active, but are not a necessary part of the diet”.

**obesity:** Marked degree of overweight, defined for population studies as a BMI of  $30.00 \text{ kg}/\text{m}^2$  or more. Obesity is split into 3 classes of severity, which are:

- class I—a BMI between  $30.00$  and  $34.99 \text{ kg}/\text{m}^2$
- class II—a BMI between  $35.00$  and  $39.99 \text{ kg}/\text{m}^2$
- class III—a BMI of  $40.00 \text{ kg}/\text{m}^2$  or more.

**obesogenic environment:** A term used to describe an environment that promotes obesity among individuals and populations. It includes physical, economic, political, and sociocultural factors.

**overweight:** Defined for the purpose of population studies as a BMI of  $25.00 \text{ kg}/\text{m}^2$  or more.

**overweight but not obese:** Defined for the purpose of population studies as a BMI between  $25.00$  and  $29.99 \text{ kg}/\text{m}^2$ .

**risk factor:** Any factor that causes or increases the likelihood of a health disorder or other unwanted condition or event.

# References

- ABS (Australian Bureau of Statistics) 2009. National Health Survey: summary of results, 2007–2008 (reissue). ABS cat. no. 4364.0. Canberra: ABS.
- ABS 2010. Information paper: National Health Survey, basic and expanded CURF, 2007–08, expanded confidentialised unit record file, DataLab. ABS cat. no. 4324.0. Canberra: ABS. Findings based on use of ABS microdata.
- ABS 2011. Australian Statistical Geography Standard: volume 5—Remoteness Structure. ABS cat. no. 1270.0.55.005. Canberra: ABS.
- ABS 2013a. Australian Health Survey: updated results, 2011–2012. ABS cat. no. 4364.0.55.003. Canberra: ABS.
- ABS 2013b. Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia, 2011. ABS cat. no. 2033.0.55.001. Canberra: ABS.
- ABS 2013c. Microdata: National Nutrition Survey, 1995, basic confidentialised unit record file, DataLab. ABS cat. no. 4807.0.30.001. Canberra: ABS. Findings based on use of ABS microdata.
- ABS 2014a. Australian Aboriginal and Torres Strait Islander Health Survey: updated results, 2012–13. ABS cat. no. 4727.0.55.006. Canberra: ABS.
- ABS 2014b. Microdata: Australian Health Survey, core content—risk factors and selected health conditions, 2011–12, expanded confidentialised unit record file, DataLab. ABS cat. no. 4324.0.55.003. Canberra: ABS. Findings based on use of ABS microdata.
- ABS 2015. National Health Survey: first results, 2014–15. Canberra: ABS.
- ABS 2016. Microdata: National Health Survey, 2014–15, expanded confidentialised unit record file, DataLab. ABS cat. no. 4324.0.55.001. Canberra: ABS. Findings based on use of ABS microdata.
- Access Economics 2008. The growing cost of obesity in 2008: three years on. Sydney: Access Economics.
- Achievement Program 2015. How the Achievement Program works. Melbourne: Cancer Council Victoria. Viewed 14 July 2017, <[www.achievementprogram.health.vic.gov.au/health-professionals/how-it-works](http://www.achievementprogram.health.vic.gov.au/health-professionals/how-it-works)>.
- ACT Health 2017a. ACT Health Promotion Grants Program. Canberra: ACT Health. Viewed 14 July 2017, <[www.health.act.gov.au/healthy-living/health-promotion-grants-program](http://www.health.act.gov.au/healthy-living/health-promotion-grants-program)>.
- ACT Health 2017b. Healthy Children and Young People. Canberra: ACT Health. Viewed 14 July 2017, <[www.health.act.gov.au/healthy-living/healthy-children-and-young-people](http://www.health.act.gov.au/healthy-living/healthy-children-and-young-people)>.
- AIHW (Australian Institute of Health and Welfare) 2012. Australia's food and nutrition. Cat. no. PHE 163. Canberra: AIHW.
- AIHW 2016a. Australia's health 2016. Australia's health series no. 15. Cat. no. AUS 199. Canberra: AIHW.
- AIHW 2016b. Australia's mothers and babies 2014—in brief. Perinatal statistics series no. 32. Cat. no. PER 87. Canberra: AIHW.
- AIHW 2016c. Australian Burden of Disease Study: impact and causes of illness and death in Australia 2011. Australian Burden of Disease Study series no. 3. Cat. no. BOD 4. Canberra: AIHW.
- AIHW 2016d. Australian Burden of Disease Study 2011: methods and supplementary material. Australian Burden of Disease Study series no. 5. Cat. no. BOD 6. Canberra: AIHW.
- AIHW 2016e. Healthy Communities: Overweight and obesity rates across Australia, 2014–15. Cat. no. HPF 2. Canberra: AIHW.
- AIHW 2017a. Impact of overweight and obesity as a risk factor for chronic conditions: Australian Burden of Disease Study. Australian Burden of Disease Study series no. 11. Cat. no. BOD 12. Canberra: AIHW.
- AIHW 2017b. Overweight and obesity in Australia: a birth cohort analysis. Cat. no. PHE 215. Canberra: AIHW.

AIHW 2017c. Weight loss surgery in Australia 2014–15: Australian hospital statistics. Cat. no. HSE 186. Canberra: AIHW.

ATO (Australian Taxation Office) 2017a. GST-free food. Canberra: Australian Government. Viewed 25 July 2017, <[www.ato.gov.au/Business/GST/In-detail/Your-industry/Food/GST-and-food/?anchor=GSTfreefood#GSTfreefood](http://www.ato.gov.au/Business/GST/In-detail/Your-industry/Food/GST-and-food/?anchor=GSTfreefood#GSTfreefood)>.

ATO 2017b. Taxable food. Canberra: Australian Government. Viewed 25 July 2017, <[www.ato.gov.au/Business/GST/In-detail/Your-industry/Food/GST-and-food/?anchor=Taxablefood#Taxablefood](http://www.ato.gov.au/Business/GST/In-detail/Your-industry/Food/GST-and-food/?anchor=Taxablefood#Taxablefood)>.

Banks E, Jorm L, Rogers K, Clements M & Bauman A 2011. Screen-time, obesity, ageing and disability: findings from 91 266 participants in the 45 and Up Study. *Public Health Nutrition* 14:34–43.

Bauman A, Bellew B, Boylan S, Crane M, Foley B, Gill T et al. 2016. Obesity prevention in children and young people aged 0–18 years: a rapid evidence review brokered by the Sax Institute. Sydney: Physical Activity Nutrition Obesity Research Group, The University of Sydney.

Boone JE, Gordon-Larsen P, Adair LS & Popkin BM 2007. Screen time and physical activity during adolescence: longitudinal effects on obesity in young adulthood. *International Journal of Behavioral Nutrition and Physical Activity* 4. doi: 10.1186/1479-5868-4-26.

Cairns G, Angus K, Hastings G & Caraher M 2013. Systematic reviews of the evidence on the nature, extent and effects of food marketing to children. A retrospective summary. *Appetite* 62:209–15.

CDC (Centers for Disease Control and Prevention) 2015. Strategies to prevent obesity. Atlanta: CDC. Viewed 23 June 2017, <[www.cdc.gov/obesity/strategies](http://www.cdc.gov/obesity/strategies)>.

CDC 2016. Childhood obesity causes and consequences. Atlanta: CDC. Viewed 23 June 2017, <[www.cdc.gov/obesity/childhood/causes.html](http://www.cdc.gov/obesity/childhood/causes.html)>.

CMACE & RCOG (Centre for Maternal and Child Enquiries & Royal College of Obstetricians and Gynaecologists) 2010. Management of women with obesity in pregnancy. CMACE/RCOG Joint Guideline. Viewed 23 June 2017, <[www.rcog.org.uk/globalassets/documents/guidelines/cmacercojointguidelinemanagementwomenobesitypregnancya.pdf](http://www.rcog.org.uk/globalassets/documents/guidelines/cmacercojointguidelinemanagementwomenobesitypregnancya.pdf)>.

Cole TJ, Bellizzi MC, Flegal KM & Dietz WH 2000. Establishing a standard definition for child overweight and obesity worldwide: international survey. *BMJ* 320:1240–3.

Department of Health 2009. About overweight and obesity. Canberra: Department of Health. Viewed 23 June 2017, <[www.health.gov.au/internet/main/publishing.nsf/content/health-pubhlth-strateg-hlthwt-obesity.htm](http://www.health.gov.au/internet/main/publishing.nsf/content/health-pubhlth-strateg-hlthwt-obesity.htm)>.

Department of Health 2014a. Australia's physical activity and sedentary behaviour guidelines. Canberra: Department of Health. Viewed 8 September 2017, <[www.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-strateg-phys-act-guidelines](http://www.health.gov.au/internet/main/publishing.nsf/Content/health-pubhlth-strateg-phys-act-guidelines)>.

Department of Health 2014b. Healthy Workers Initiative: about. Canberra: Department of Health. Viewed 14 July 2017, <[www.healthyworkers.gov.au/internet/hwi/publishing.nsf/Content/about](http://www.healthyworkers.gov.au/internet/hwi/publishing.nsf/Content/about)>.

Department of Health 2014c. National Healthy School Canteens: guidelines for healthy foods and drink supplied in school canteens. Canberra: Department of Health.

Department of Health 2016. Primary Health Networks. Canberra: Department of Health,. Viewed 11 September 2017, <[www.health.gov.au/internet/main/publishing.nsf/Content/PHN-Home](http://www.health.gov.au/internet/main/publishing.nsf/Content/PHN-Home)>.

Department of Health 2017a. About the Healthy Weight Guide. Canberra: Department of Health. Viewed 14 July 2017, <<http://healthyweight.health.gov.au>>.

Department of Health 2017b. Health Star Rating: frequently asked questions. Canberra: Department of Health. Viewed 6 September 2017, <<http://healthstarrating.gov.au/internet/healthstarrating/publishing.nsf/Content/frequently-asked-questions-consumers>>.

Department of Health 2017c. Girls Make Your Move. Canberra: Australian Government. Viewed 17 August 2017, <<https://campaigns.health.gov.au/girlsmove>>.

- di Angelantonio E, Bhupathiraju SN, Wormser D, Gao P, Kaptoge S, de Gonzalez AB et al. 2016. Body-mass index and all-cause mortality: individual-participant-data meta-analysis of 239 prospective studies in four continents. *The Lancet* 388:776–86.
- Escalante Y, García-Hermoso A, Backx K & Saavedra JM 2013. Playground designs to increase physical activity levels during school recess. *Health Education & Behavior* 41:138–44.
- Espinel P & King L 2009. A framework for monitoring overweight and obesity in NSW. Sydney: NSW Department of Health; Physical Activity Nutrition Obesity Research Group.
- Glanz K, Sallis JF, Saelens BE & Frank LD 2007. Nutrition Environment Measures Survey in Stores (NEMS-S). *American Journal of Preventive Medicine* 32:282–9.
- Health Star Rating Advisory Committee 2017. Two year progress review report on the implementation of the Health Star Rating system: June 2014–June 2016. Australia: Commonwealth of Australia.
- Healthy Kids 2017. Healthy Kids: about us. Viewed 14 July 2017, <[www.healthykids.nsw.gov.au/home/about-us.aspx](http://www.healthykids.nsw.gov.au/home/about-us.aspx)>.
- Humpel N, Owen N & Leslie E 2002. Environmental factors associated with adults' participation in physical activity: a review. *American Journal of Preventive Medicine* 22:188–99.
- Institute of Medicine (US) Committee on an Evidence Framework for Obesity Prevention Decision Making 2010. Bridging the evidence gap in obesity prevention: a framework to inform decision making. Washington DC: National Academies Press.
- Johansson S, Villamor E, Altman M, Bonamy AK, Granath F & Cnattingius S 2014. Maternal overweight and obesity in early pregnancy and risk of infant mortality: a population based cohort study in Sweden. *BMJ* 349. doi:<https://doi.org/10.1136/bmj.g6572>.
- Jolly DR 2011. Marketing obesity? Junk food, advertising and kids. Research paper no. 9 2010–11. Canberra: Department of Parliamentary Services, Parliamentary Library.
- Kelly B, King ML, Chapman K, Boyland E, Bauman AE & Baur LA 2015. A hierarchy of unhealthy food Promotion effects: identifying methodological approaches and knowledge gaps. *American Journal of Public Health* 105:e86–95.
- Lachowycz K & Jones AP 2011. Greenspace and obesity: a systematic review of the evidence. *Obesity Reviews* 12:e183–9.
- Lee A, Mhurchu C, Sacks G, Swinburn B, Snowdon W, Vandevijvere S et al. 2013. Monitoring the price and affordability of foods and diets globally. *Obesity Reviews* 14:82–95.
- LiveLighter 2017. LiveLighter: background. LiveLighter. Viewed 19 September 2017, <<https://livelighter.com.au/About/Background>>.
- Mackay S AN, Martin J & Swinburn B 2011. A comprehensive approach to protecting children from unhealthy food advertising. Melbourne: Obesity Policy Coalition.
- Moore LV, Diez Roux AV, Nettleton JA & Jacobs JDR 2008. Associations of the local food environment with diet quality—a comparison of assessments based on surveys and geographic information systems: The Multi-Ethnic Study of Atherosclerosis. *American Journal of Epidemiology* 167:917–24.
- NHMRC (National Health and Medical Research Council) 2013a. Australian Dietary Guidelines. Canberra: NHMRC.
- NHMRC 2013b. Clinical practice guidelines for the management of overweight and obesity in adults, adolescents and children in Australia. Melbourne: NHMRC.
- NIH (National Institutes of Health) 1998. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: the evidence report. Bethesda: US Department of Health and Human Services.
- NSW Centre for Public Health Nutrition & NSW Health 2003. Report on the weight status of NSW, 2003. Sydney: NSW Centre for Public Health Nutrition & NSW Health.

- NSW Food Authority 2013. Evaluation of kilojoule menu labelling. Silverwater: NSW Food Authority.
- OECD (Organisation for Economic Co-operation and Development) 2017. OECD health statistics 2017. Paris: OECD. Viewed 22 August 2017, <[www.oecd.org/els/health-systems/health-data.htm](http://www.oecd.org/els/health-systems/health-data.htm)>.
- Okely A, Salmon J, Vella S, Cliff D, Timperio A, Tremblay M et al. 2012. A systematic review to update the Australian Physical Activity Guidelines for Children and Young People. Australia: Commonwealth of Australia.
- Parr CL, Batty GD, Lam TH, Barzi F, Fang X, Ho SC et al. 2010. Body-mass index and cancer mortality in the Asia-Pacific Cohort Studies Collaboration: pooled analyses of 424,519 participants. *The Lancet Oncology* 11:741–52.
- Parry S & Straker L 2013. The contribution of office work to sedentary behaviour associated risk. *BMC Public Health* 13. doi:<https://doi.org/10.1186/1471-2458-13-296>.
- PMC (Department of the Prime Minister and Cabinet) 2016. Council of Australian Governments: report on performance 2016. Canberra: Department of the Prime Minister and Cabinet.
- PwC Australia 2015. Weighing the cost of obesity: a case for action. Australia: PwC Australia.
- Sacks G 2017. Policies for tackling obesity and creating healthier food environments: scorecard and priority recommendations for Australia governments. Melbourne: Deakin University.
- Sahoo K, Sahoo B, Choudhury AK, Sofi NY, Kumar R & Bhadoria AS 2015. Childhood obesity: causes and consequences. *Journal of Family Medicine and Primary Care* 4:187–92.
- SCRGSP (Steering Committee for the Review of Government Service Provision) 2009. National Agreement performance information 2008–09: National Healthcare Agreement. Canberra: Productivity Commission.
- Swinburn B, Egger G & Raza F 1999. Dissecting obesogenic environments: the development and application of a framework for identifying and prioritizing environmental interventions for obesity. *Preventive Medicine* 29:563–70.
- Symons M 2007. One continuous picnic. Melbourne: Melbourne University Press.
- Thorp AA, Owen N, Neuhaus M & Dunstan DW 2011. Sedentary Behaviors and Subsequent Health Outcomes in Adults. *American Journal of Preventive Medicine* 41:207–15.
- van der Ploeg H, Chey T, Korda R, Banks E & Bauman A 2012. Sitting time and all-cause mortality risk in 222 497 Australian adults. *Archives of Internal Medicine* 172:494–500.
- Ward P, Coveney J, Verity F, Carter P & Schilling M 2012. Cost and affordability of healthy food in rural South Australia. *Rural and Remote Health* vol. 12, 1–10.
- Watson W, Lau V, Wellard L, Hughes C & Chapman K 2017. Advertising to children initiatives have not reduced unhealthy food advertising on Australian television. *Journal of Public Health*. doi:<https://doi.org/10.1093/pubmed/fox004>.
- WHO (World Health Organization) 2000. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. WHO Technical Report Series 894:i–xii, 1–253.
- WHO 2016a. Obesity and overweight. Geneva: WHO. Viewed 23 June 2017, <[www.who.int/mediacentre/factsheets/fs311/en](http://www.who.int/mediacentre/factsheets/fs311/en)>.
- WHO 2016b. Report of the commission on ending childhood obesity. Geneva: WHO.
- WHO 2016c. Urban green spaces and health. Copenhagen: WHO.
- Wilmot EG, Edwardson CL, Achana FA, Davies MJ, Gorely T, Gray LJ et al. 2012. Sedentary time in adults and the association with diabetes, cardiovascular disease and death: systematic review and meta-analysis. *Diabetologia* 55:2895–905.
- Zheng M, Rangan A, Meertens B & Wu J 2017. Changes in typical portion sizes of commonly consumed discretionary foods among Australian adults from 1995 to 2011–2012. *Nutrients* 9:E577.

# List of tables

<b>Table 4.1:</b> Age-standardised prevalence of class II and class III obesity among adults, 1995 to 2014–15.....	19
<b>Table A1:</b> Classification of overweight and obesity for children and adolescents.....	37
<b>Table D1:</b> Selected state and territory policy actions targeting food environments .....	40

# List of figures

<b>Figure 3.1:</b> Proportion of overweight and obese children and adolescents aged 2–17, by age group (years) and sex, 2014–15.....	11
<b>Figure 3.2:</b> Proportion of overweight and obese children and adolescents aged 5–17, 1995 to 2014–15.....	12
<b>Figure 3.3:</b> Proportion of overweight and obese children and adolescents aged 2–17, by remoteness area and socioeconomic group, 2014–15 .....	13
<b>Figure 3.4:</b> Proportion of overweight and obese Indigenous children and adolescents aged 2–17, by age group (years) and sex, 2012–13.....	14
<b>Figure 4.1:</b> Proportion of overweight and obese adults, by age group (years) and sex, 2014–15.....	15
<b>Figure 4.2:</b> Distribution of body mass index in adults, by sex, 2014–15 .....	16
<b>Figure 4.3:</b> Proportion of adults at increased risk or substantially increased risk of metabolic complications based on waist circumference, by age group (years) and sex, 2014–15 .....	17
<b>Figure 4.4:</b> Proportion of overweight and obese adults, 1995 to 2014–15.....	18
<b>Figure 4.5:</b> Distribution of body mass index in adults, 1995 and 2014–15.....	19
<b>Figure 4.6:</b> Proportion of overweight and obese adults, by remoteness area and socioeconomic group, 2014–15.....	20
<b>Figure 4.7:</b> Proportion of overweight and obese Indigenous adults, by age group (years) and sex, 2012–13 .....	21
<b>Figure 4.8:</b> Estimated proportion of overweight and obese adults, by Primary Health Network areas, 2014–15 .....	23
<b>Figure 4.9:</b> Proportion of obese people aged 15 and over, by selected OECD countries, 2016 or nearest year .....	24
<b>Figure 4.10:</b> Proportion of women who gave birth, by body mass index, Australia (excluding New South Wales), 2014.....	25
<b>Figure 5.1:</b> Prevalence of chronic conditions in adults, by weight status, 2014–15.....	28
<b>Figure 5.2:</b> Age-standardised rate of attributable disability-adjusted life years due to overweight and obesity, by selected diseases and socioeconomic group, 2011 .....	30


# List of boxes

<b>Box 1.1:</b> Measuring overweight and obesity.....	2
<b>Box 2.1:</b> What should Australians eat? .....	6
<b>Box 2.2:</b> How active should Australians be?.....	7
<b>Box 5.1:</b> What is burden of disease analysis? .....	29

# Related publications

The following recent AIHW publications also relate to overweight and obesity:

- AIHW 2017. Overweight and obesity in Australia: a birth cohort analysis. Cat. no. PHE 215. Canberra: AIHW.
- AIHW 2016. Healthy Communities: Overweight and obesity rates across Australia, 2014–15. Cat. no. HPF 2. Canberra: AIHW.
- AIHW 2017. Impact of overweight and obesity as a risk factor for chronic conditions: Australian Burden of Disease Study. Australian Burden of Disease Study series no. 11. Cat. no. BOD 12. Canberra: AIHW.
- AIHW 2017. Weight loss surgery in Australia 2014–15: Australian hospital statistics. Cat. no. HSE 186. Canberra: AIHW.



This report provides an overview of overweight and obesity in Australia—a major public health issue that has significant health and financial costs. Almost one-quarter of children and two-thirds of adults are overweight or obese, and rates continue to rise, largely due to a rise in obesity, which cost the economy \$8.6 billion in 2011–12.



Stronger evidence,  
better decisions,  
improved health and welfare

