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A framework for monitoring overweight and obesity in Australia

2020

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A framework for monitoring overweight and obesity in Australia

2020

Australian Institute of Health and Welfare
Canberra

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Summary

This report describes a conceptual framework for monitoring overweight and obesity in Australia.

At a national level, monitoring is important to understand the health of the population and the need for treatment and services. The objective of a national monitoring framework for overweight and obesity is to guide reporting on prevalence, risk factors, treatment and management, as well as impacts (such as burden of disease) in Australia, across population groups and over time. This framework will support national policy development and public health initiatives.

1 Introduction

Overweight and obesity refers to excess fat accumulation that presents health risks (WHO 2016). It generally arises from sustained energy imbalance when energy intake through eating and drinking is more than energy expended through physical activity (AIHW 2016; Romieu et al. 2017). The causes of overweight and obesity are multifactorial and influenced by individual, social and environmental factors (Butland et al. 2007; Hruby & Hu 2015).

Overweight and obesity is a major public health concern in Australia. Being overweight or obese increases the risk of chronic diseases, such as some cancers, cardiovascular disease (including heart disease and stroke), chronic kidney disease, diabetes, and musculoskeletal conditions (AIHW 2017b; Forouzanfar et al. 2016).

In 2017–18, 67% of adults and 25% of children and adolescents were overweight or obese (ABS 2018). The rate of overweight and obesity (that is, with a body mass index, or BMI, of 25 and over) has risen over recent decades—rates of severe obesity (BMI of 35 and over) have more than doubled since 1995, after adjusting for age (AIHW 2019c). In 2015, overweight and obesity in Australia was the second leading risk factor contributing to disease burden after tobacco use (AIHW 2019a). It is projected that, by 2025, more than three-quarters of Australian adults will be overweight or obese, with rates of severe obesity also expected to be almost 3 times as high as 1995 levels (Hayes et al. 2017; Victorian Health Promotion Foundation 2014). Hence, the future burden of associated chronic illness and disability is likely to increase.

To deal with this significant public health challenge, the Australian Government and state and territory governments through the then Council of Australian Governments (COAG) Health Council agreed, in 2018, to develop a national obesity strategy to guide sustained preventive action over the next 10 years and reduce overweight and obesity in Australia. A National Obesity Strategy Working Group is developing the draft strategy for the COAG Health Council or equivalent to consider.

Why is monitoring important?

Monitoring at a population level is important to understand both the health of the population and access to health services. Data collected through surveys, registries and administrative sources can be used to monitor existing and emerging health conditions, population groups at risk of ill health, current health service use and future demand on the health system. Consistent monitoring will also be beneficial for evaluating the impact and effectiveness of the forthcoming national obesity strategy over time.

Monitoring assists in allocating resources, planning preventative and treatment services and in targeting priority population groups. It also helps to track the development and impact of:

- risk factors
- trends in health issues over time
- improvements in diagnosis
- health promotion activities
- new policies
- programs of work (and to evaluate their influence).

Currently, there is insufficient regular monitoring of overweight and obesity and contributing risk factors in Australia, particularly at a national level. Ongoing monitoring will help to

develop a better understanding of the impact that overweight and obesity have on individuals and society.

Monitoring overweight and obesity is important because of the:

- high prevalence in the population—67% of Australian adults are overweight or obese (ABS 2018)
- role that overweight and obesity plays in contributing to disease burden—8.4% of the total burden of disease in Australia was due to overweight and obesity in 2015 (AIHW 2019b)
- impact on the health and quality of life of people affected by overweight and obesity—the leading risk factor contributing to non-fatal burden (living with disease) in 2015 (AIHW 2019b)
- financial cost to the health system and economy—overweight and obesity cost the Australian economy an estimated \$11.8 billion in 2017–18 (The Obesity Collective 2019).

Monitoring does not usually attempt to investigate the causal mechanisms underlying a health condition or to gather evidence for interventions to best reduce the burden of disease (Commission on Social Determinants of Health 2008), but may identify potential areas for further research. Therefore, the core role of monitoring (and the purpose of this monitoring framework) is to report on national trends and patterns of overweight and obesity in the Australian population, using currently available data to identify gaps in national reporting and to develop data where appropriate. It is expected that the framework will be used to:

- monitor rates, impacts, outcomes and trends
- identify and prioritise data gaps and inconsistencies
- improve communication on the extent of overweight and obesity in Australia
- support the national obesity strategy.

Chapter 2 provides the conceptual framework for monitoring overweight and obesity as well as detail on key reporting areas.

Chapter 3 provides a review of the conceptual framework and key reporting areas for monitoring overweight and obesity.

2 Monitoring framework for overweight and obesity

A national monitoring centre is important to develop, collate and analyse data on overweight and obesity in a consistent way so that they are available to stakeholders in one place. This helps inform prevention, detection, management and treatment practices.

Monitoring overweight and obesity at a national level requires information from a range of sources to measure the risk factors, impacts, treatment and outcomes of overweight and obesity. As with chronic disease monitoring frameworks, the focus of monitoring may differ, depending on the stage or classification of overweight and obesity.

The conceptual framework for monitoring overweight and obesity in Australia (hereafter referred to as the Framework) is not intended to encompass all factors affecting these conditions. Rather, it aims to visualise the key risk factors for overweight and obesity, and their relationship with environmental or individual characteristics and behaviours important for monitoring at a national level (Figure 2.1).

Key reporting areas

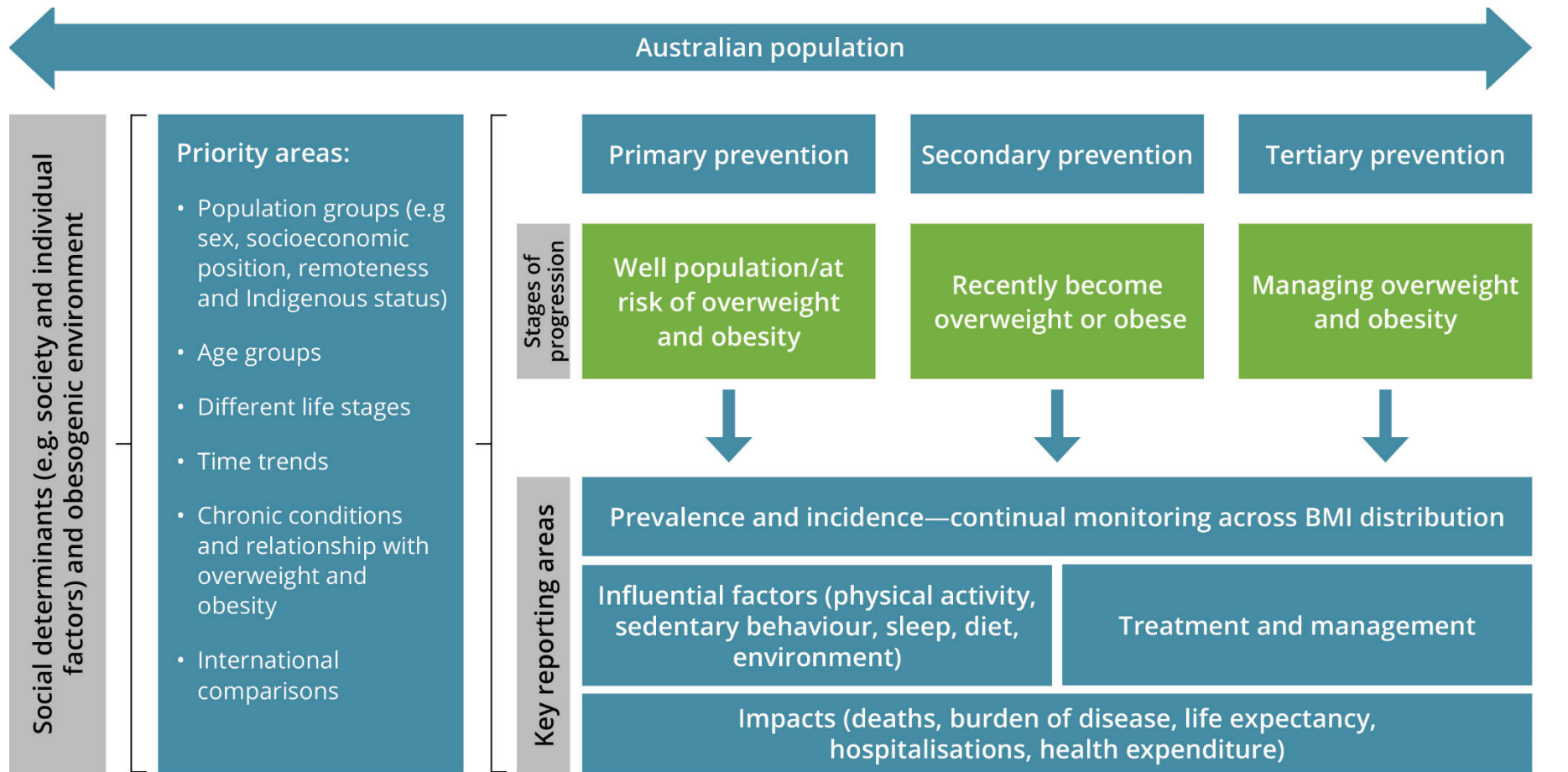
The overall objective of the Framework is to support national surveillance and monitoring of overweight and obesity in Australia.

Reporting on national trends, patterns and factors influencing overweight and obesity for monitoring purposes among key population groups will help to highlight inequalities and to inform policy development (Table 2.1). For example, monitoring is useful for:

- evaluating the population at all stages of overweight and obesity progression, including the well population, those at risk, those who have recently become overweight or obese and those currently being managed
- assessing the modifiable influential factors of overweight and obesity, including risk factors and the obesogenic environment
- providing the foundation for interventions to reduce inequalities in risk factors and health outcomes (for example, for Aboriginal and Torres Strait Islander people)
- assessing the broader impact that overweight and obesity has on outcomes such as wellbeing and quality of life, mortality, burden of disease, medical services and health expenditure
- reporting by priority areas to determine differences and potential inequalities
- providing data for planning and policy development to improve prevention, early detection, management and treatment interventions.

It will be important to communicate the findings of these monitoring activities to key stakeholders—such as experts, advocacy groups and policy makers—to help reduce the health, social and economic burden of overweight and obesity on individuals and society. A core role of the Australian Institute of Health and Welfare (AIHW) is to explore the usefulness of a range of data sets for national population health monitoring purposes. The availability of consistent information over time—including prevalence, disease burden, and for specific population groups—will help to plan health services and evaluate the efficiency of current strategies.

Figure 2.1: Conceptual framework for monitoring overweight and obesity in Australia



Modified from *Preventing chronic disease: a strategic framework* (National Public Health Partnership 2001).

Table 2.1: Key reporting areas for overweight and obesity monitoring

Key reporting areas	Key question/s	Major components	Data sources	Breakdown of priority areas
Prevalence and incidence	What is the prevalence and incidence of overweight and obesity, using continuous and categorical measures?	Prevalence Incidence	National, longitudinal and cross-sectional data/studies	<p>Population groups (e.g. sex, socioeconomic position, remoteness, Indigenous status and cultural background)</p> <p>Age groups</p> <p>Different life stages</p> <p>Time trends</p> <p>Chronic conditions and relationship with overweight and obesity</p> <p>International comparisons</p> <p>Social determinants (e.g. society and individual factors)</p> <p>Obesogenic environment</p>
Causes	<p>What proportion of the population experience the modifiable risk factors associated with overweight and obesity?</p> <p>Has there been any change (reduction or increase) in the prevalence of these risk factors associated with overweight and obesity?</p> <p>How much do environmental factors influence overweight and obesity?</p>	<p>Diet (including poor fruit and vegetable intake and sugar-sweetened drink consumption)</p> <p>Physical activity</p> <p>Sedentary behaviour (e.g. time spent sitting and screen time)</p> <p>Sleep</p> <p>Access to amenities (e.g. supermarkets or fresh food, fast food outlets, recreational spaces, public transport)</p> <p>Food system</p> <p>Neighbourhood design</p>	Administrative national, longitudinal and cross-sectional data/studies	
Treatment and management	<p>What are the current approaches to treating and managing overweight and obesity?</p> <p>Can anything be improved or more effective services offered?</p>	Surgery, weight loss programs, referrals to dietitians, pharmacological treatment (e.g. anti-obesity drugs), behavioural and lifestyle interventions	Administrative, national, cross-sectional and longitudinal data/studies	
Impacts	<p>How are individuals impacted by overweight and obesity?</p> <p>How much does overweight and obesity affect quality of life and disability status?</p> <p>What is the burden of overweight and obesity?</p> <p>How much burden could be avoided from reducing overweight and obesity?</p> <p>How many deaths are attributable to overweight and obesity?</p> <p>How much does the current health system spend on overweight and obesity or on health/chronic conditions resulting from it?</p>	<p>Number of deaths, death rates, premature deaths, Years of Life Lost (YLL), Disability Adjusted Life Years (DALY), fatal, non-fatal and total burden, disability/chronic conditions associated with overweight and obesity</p> <p>Health expenditure estimates</p> <p>Individual and national economic costs</p>	Administrative, national, longitudinal, cross-sectional and modelled data/studies	

3 Key measures for monitoring overweight and obesity in Australia

This section describes and provides evidence for the key measures of monitoring overweight and obesity, where there are available data to report on. Reporting this information presents a clearer picture on overweight and obesity to help inform the development and implementation of policies and initiatives.

Prevalence and incidence

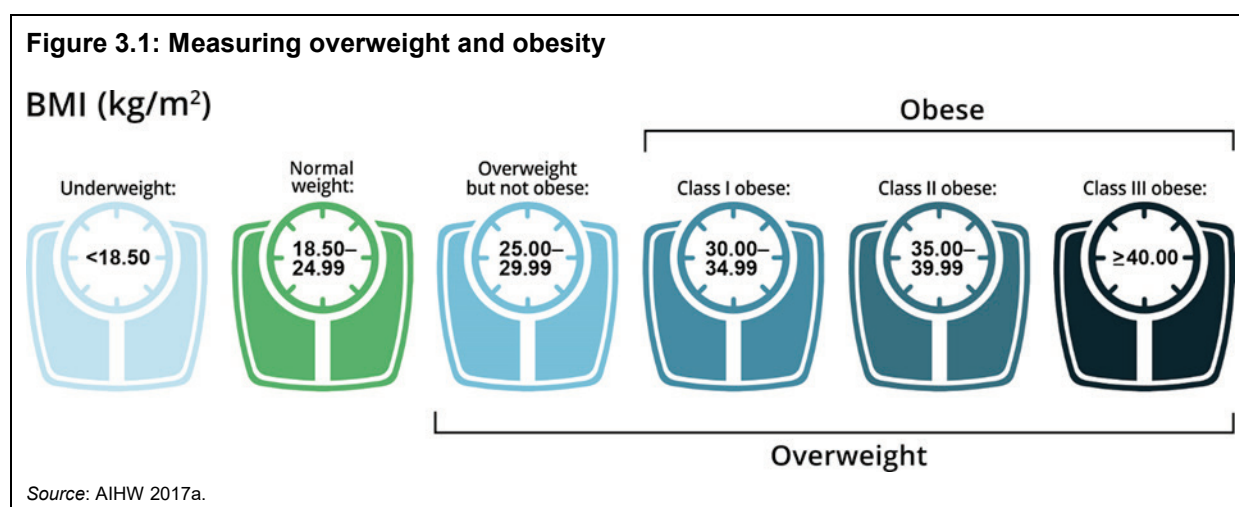
Knowing how many people in a population are overweight or obese is invaluable for policy makers. The frequency of overweight and obesity in the population is reported as either prevalence or incidence. Prevalence is all cases in a population at a point in time whereas incidence is the number of new cases in a population over a given time period. Both measures are useful as they can:

- identify at risk population groups
- help shape effective prevention strategies
- be used to monitor the effectiveness of these strategies
- examine the impact of conditions on the health system.

Prevalence is more commonly used than incidence for monitoring overweight and obesity, as it is difficult to pinpoint onset and people often move in and out of overweight and obese categories.

Measuring overweight and obesity

Several methods can be used to measure the prevalence of overweight and obesity. The measure most commonly used for population level monitoring is BMI, calculated by dividing a person's weight in kilograms by the square of their height in metres (kg/m^2). BMI is considered an appropriate measure at a population level for both adults and children and is an internationally recognised measure (WHO 2000a). However, it can be less useful for monitoring overweight and obesity in individuals. The following standard cut-off points are used for the adult population (aged 18 or over):



Children and adolescents have a separate classification, using age and sex based cut-off points. This is because BMI changes substantially with age, due to growth patterns, and can differ for boys and girls (Cole et al. 2000).

Measuring abdominal obesity—the fat in the abdomen and around internal organs—is a useful tool to assess risk of metabolic complications (such as type 2 diabetes) as well as the distribution of fat in the body. It is a more appropriate measure for individuals and useful for population monitoring. Abdominal obesity can be measured by a variety of methods, including:

- waist circumference
- waist to hip ratio
- skinfold thickness testing
- DEXA scans (dual energy X-ray absorptiometry)
- CT scans (computerised tomography)
- MRI scans (magnetic resonance imaging) (Gonzalez et al. 2017).

It is also useful to look at the population distribution of both BMI and abdominal obesity across the whole continuum of measurements. Knowing how the whole population is distributed across a continuum, and what the differences in distribution are over time or between groups, is just as important for monitoring.

Preventing overweight and obesity

Prevention activities for overweight and obesity differ by population group and stage of overweight and obesity progression. People at risk may include those with a BMI that is borderline to being classified as overweight or obese, or those who may display multiple risk factors associated with increases in weight. Successful preventative actions reduce the personal, family and community consequences of disease, injury and disability while also improving health equity. It allows for the better use of health system resources, producing a healthier workforce, which in turn boosts economic performance (AIHW 2014).

Primary prevention activities aim to prevent people from developing health conditions (Tasmanian Department of Health 2013; WHO 2004). Using primary prevention interventions for the well and at risk population groups can be effective in maintaining and increasing healthy behaviours to decrease the short- and long-term demand for treatment services (South Australia Department of Health 2011). Monitoring can identify the prevalence of risk factors for overweight and obesity to aid prevention efforts.

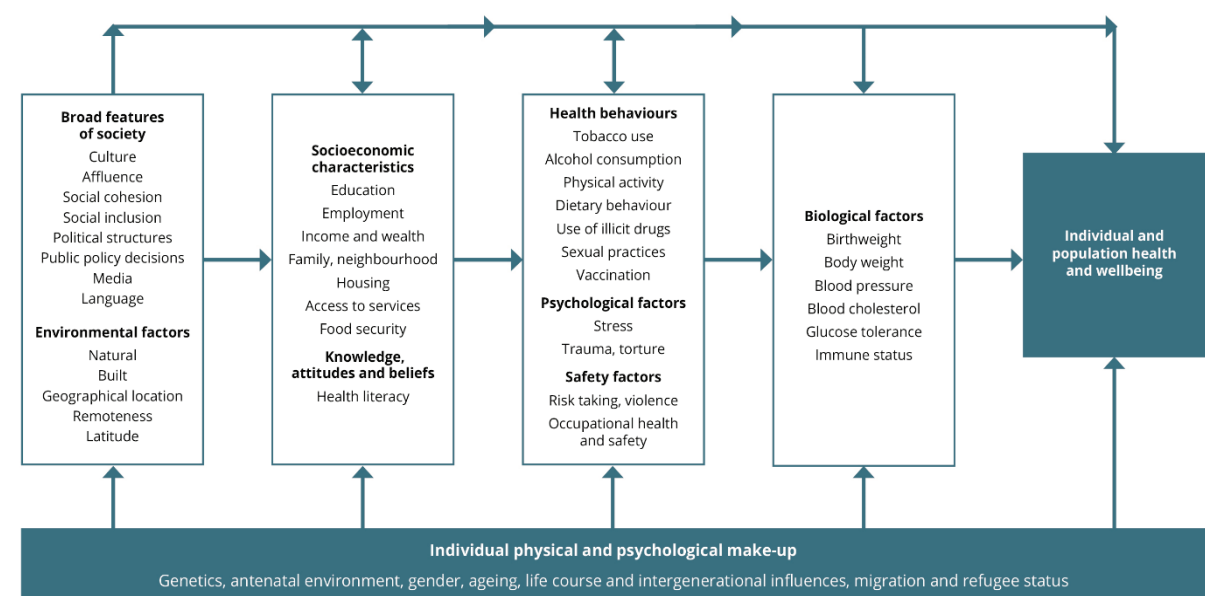
Secondary and tertiary prevention are more focused on people who have recently become, or are actively managing overweight or obesity. Secondary prevention is aimed at early detection and preventing progression, and, tertiary prevention at managing and reducing the consequences of established overweight and obesity (Tasmanian Department of Health 2013; WHO 2004). Primary health care is an important part of the health system for people to access secondary and tertiary prevention. It helps to manage behavioural risk factors and interventions by having health-care professionals ask, assess, advise/agree, assist and arrange services for patients (Harris & Lloyd 2012; Grima & Dixon 2013). Prevention can help to minimise the health and economic impacts associated with future progression. It is important to monitor not only the people who have recently become, or are managing, overweight or obesity, but also the treatment and management services provided to help evaluate prevention, treatment and management practices.

Factors influencing overweight and obesity

Key factors that can influence the development of overweight and obesity in both the well and at risk population groups are shown in Figure 3.2. These can be the broad societal factors—social determinants—which can directly or indirectly affect overweight and obesity and associated risk factors. They also include risk factors, such as diet, physical activity and sedentary behaviour, and the obesogenic environment, which can also be influenced by social factors.

Risk factors are characteristics that increase the chance of a person’s developing an adverse health outcome, such as overweight and obesity. The factors that cause an individual to become overweight or obese are complex (NHMRC 2013b). Many factors act either alone or together to increase the chances of developing overweight and obesity; for example, genetics, environment, behaviours, societal factors (Figure 3.2).

Figure 3.2: Framework for determinants of health



Note: Blue shading highlights selected social determinants of health.

Source: AIHW 2020.

While both societal and individual health factors can increase the risk of a person developing overweight or obesity, some factors have more direct effects than others. Key risk factors that are known to have a direct impact on overweight and obesity are detailed in the sections that follow.

Diet

A healthy diet that balances the appropriate amounts of nutrients, food groups, energy (kilojoules) and fibre is important in preventing weight gain (NHMRC 2013a; OECD 2019b). The Australian Dietary Guidelines outline the recommended daily intakes for a healthy diet (NHMRC 2013a). Healthy diets—those high in whole grains, vegetables, fruit, nuts, yoghurt, legumes, lean meats and fish—reduce the risk of overweight and obesity. In contrast, diets high in refined grains, processed and red meat and sugar-sweetened drinks increase the risk of overweight and obesity (Mozaffarian et al. 2011; NHMRC 2013b; Schlesinger et al. 2019).

The majority of Australians do not meet the dietary guidelines. Most (95%) are not eating enough fruits and vegetables, 9.1% consume sugar-sweetened drinks daily, and discretionary foods account for around one-third of energy intake for adults, with intake generally higher in children (ABS 2018; AIHW 2018). Overweight and obesity has also been associated with higher alcohol consumption, particularly heavy and binge drinking, which contributes to increased energy intake and subsequent weight gain (Fazzino et al. 2017; Traversy & Chaput 2015).

There is good evidence that the food environment in which people live (for example, access to fast food; proximity to, and number of, supermarkets), has an impact on their food choices and subsequent risk of overweight and obesity (Dornelles 2019; Townshend & Lake 2017). In particular, lower socioeconomic areas have been associated with less healthy food environments and subsequent higher overweight and obesity risk (Chennakesavalu & Gangemi 2018). For more detail, see the following section 'Obesogenic environment'.

Obesogenic environment

The term 'obesogenic environment' has been used to describe an environment that promotes obesity among individuals and populations (Swinburn et al. 1999). It encompasses physical, economic, political, and sociocultural factors (Figure 3.3). 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).

For more information, see *A picture of overweight and obesity in Australia* (AIHW 2017a).

Figure 3.3: Environmental factors that influence an individual's energy intake and expenditure



Source: AIHW 2017a.

Physical activity and sedentary behaviours

Physical activity, sedentary behaviours and sleep are all behaviours that interact along a continuum and influence health outcomes (Tremblay et al. 2016).

Engaging in physical activity has important benefits in improving and maintaining health and body composition (Duncan et al. 2012; Jakicic 2018). Physical activity guidelines internationally recommend at least 150 minutes of moderate to vigorous physical activity per week (WHO 2010). There is good evidence indicating a positive relationship between reduced weight gain, weight loss and the combination of physical activity at or above the guidelines and healthy dietary modification (2018 Physical Activity Guidelines Advisory Committee 2018; Duncan et al. 2012; Jakicic 2018). Growing evidence also suggests that incorporating physical activity throughout the day, as well as breaking up time spent being sedentary, can lead to better health outcomes (Jakicic et al. 2018; Owen et al. 2010).

Research shows the best weight loss outcomes are achieved by combining physical activity with a healthy diet, rather than through physical activity or dietary modification alone (Jakicic et al. 2018).

The opposite of physical activity is sedentary behaviour—such as watching TV, reading or sitting at work. An increase in time spent on screen-based activities and other sedentary behaviours is associated with poorer health outcomes, metabolic risk, increased waist circumference and overweight and obesity, independent of physical activity (Healy et al. 2008; Tremblay et al. 2010). Modifying the built environment with accessible recreational facilities, safe walk and cycle ways, public transport and parks can enable incidental and structured physical activity (Salvo et al. 2018).

Sleep

Having enough uninterrupted sleep each night that is not too long or too short in duration is important to maintain weight and regulate appetite. Sleeping for less than the recommended time provides more time to eat energy-dense foods and engage in sedentary behaviours, while also affecting insulin, glucose and cortisol levels and increasing appetite (Miller et al. 2018). Studies have shown that children (aged 9–13) who sleep for fewer than 10 hours per night are almost twice as likely to be overweight, and nearly 2.5 times as likely to be obese, than children who sleep for 10 or more hours per night (Morrissey et al. 2016). Short sleep duration has also been identified as a risk factor for future overweight and obesity in children (Fatima et al. 2015). Adults who sleep for 5 or fewer hours per night are 55% more likely to be obese than those who sleep for longer than 5 hours per night (Chaput & Tremblay 2012).

Treatment and management

There is no one approach to treat and manage overweight and obesity—approaches often need to be highly individualised to suit the circumstances and needs of the individual. Treatment and management of overweight and obesity can be considered as secondary and tertiary prevention interventions. As discussed earlier, these interventions relate to detecting, preventing progression and managing people who have established overweight and obesity.

Primary health care is important for treating and managing overweight and obesity, while also reducing health-related expenditure and promoting more sustainable health systems (Australian Health Ministers' Advisory Council 2017). Primary health care provides services for monitoring of health and weight over time, referral to weight loss programs or specialist obesity services, advice on physical activity and healthy eating, or other educational services (Harris & Spooner 2014; NHMRC 2013b). Evidence suggests that the most effective treatment model for people who are overweight or obese is a multidisciplinary care arrangement that includes general practitioners, allied health professionals, nurses and social workers (AMA 2016).

Referral to a dietitian provides overweight and obese people with individual education and counselling for nutrition and lifestyle modifications. Between 2010–2015, in a study using Australian data, the most common reason for a referral to a dietitian was overweight and obesity (27%) (Mulquiney et al. 2018).

Bariatric surgery is a treatment option recommended only for those unable to reduce weight through other lifestyle and behavioural interventions who have either a BMI of 35 and over and serious comorbidities, or a BMI of 40 and over (Medical Services Advisory Committee 2011). In 2014–15, there were more than 22,700 weight loss surgery hospitalisations in Australia, of which around 20,000 occurred in private hospitals. Between 2005–06 and

2014–15, the number of weight loss surgery hospitalisations increased from around 9,300 to 22,700; it was more common in females particularly those aged 35–54 (AIHW 2017c).

Data for Australia also show that access to publicly funded specialist obesity services or bariatric surgery for those with clinically severe obesity is limited to only a very small fraction of people (fewer than 2,000) (Atlantis et al. 2018).

Impacts of overweight and obesity

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

Benefits of a 5–10% reduction in weight include a decrease in type 2 diabetes progression and cardiovascular risk factors, as well as improved blood lipid profiles and blood pressure (Ryan & Yockey 2017).

Burden of disease

Burden of disease analysis is valuable for monitoring the level and distribution of population health over time and between groups. Information on the impact of various risk factors on the health of the population can be used to measure the proportion each contributes to the burden of disease. These estimates show how much of the disease burden could have been averted if the population's actual exposure to the risk had been modified to the lowest level.

In 2015, overweight and obesity contributed towards 30 diseases, in particular:

- 54% of type 2 diabetes burden
- 44% of osteoarthritis burden
- 40% of chronic kidney disease burden
- 25% of coronary heart disease burden
- 24% of asthma burden
- 21% of stroke burden (AIHW 2019a, 2019b).

Between 1995 and 2017–18, obesity increased in the Australian population, shifting the BMI distribution towards higher BMI categories (AIHW 2019c). AIHW analysis indicates that, compared with the scenario where overweight and obesity continue to rise, 14% of disease burden due to overweight and obesity in the year 2020 could have been avoided if everyone in the population at risk in 2011 had reduced their BMI by 1 (around 3 kg for a person of average height) and maintained that loss until 2020 (AIHW 2017b).

Hospitalisations and deaths

Hospitalisation and deaths are measurable outcomes of overweight and obesity in individuals as well as at a population level. Research in adults aged 45 and over shows that admission rates to, and total days spent in, hospital increase once BMI is above normal range. About 13% of total hospital admissions in adults aged 45–79 were attributed to overweight and obesity, contributing nearly \$1 in every \$6 spent on hospital costs in Australia (Korda et al. 2015).

Being overweight or obese is associated with a higher mortality rate. A large investigation into the effect of obesity on mortality found that life expectancy—compared with that for

people with a normal BMI—reduced by 2–4 years for moderately obese people and by 8–10 years for people who were severely obese (Prospective Studies Collaboration 2009).

As well as a reduced life expectancy, people who are overweight or obese have fewer years of healthy life. Compared with normal-weight people, severely obese people lost around 7–8 disease-free years, mildly obese people about 3–4, and overweight people about 1 (Nyberg et al. 2018). Overall, Australians with more severe obesity are likely to experience more years of life lost than people of a healthy weight (Lung et al. 2019).

Health expenditure

It is useful to monitor the amount of money spent on health to help assess the impact of policy changes, variations in health service use, or inequalities in risk factors and disease outcomes between groups. In 2016, the average annual direct health-care cost per person in Australia was higher for those who were obese (\$1,676) than for those of a normal weight (\$1,359) (Lee et al. 2018).

Analysis of health expenditure data in Australia from 2011–12 (which included costs associated with comorbidities and obesity) shows a total direct cost of \$3.8 billion and a total indirect cost of \$4.8 billion (PwC Australia 2015). Based on increases in the consumer price index since (CPI) 2011–12, it is estimated that, in 2017–18, direct costs rose to \$5.4 billion and indirect costs to \$6.4 billion (The Obesity Collective 2019). However, projecting future obesity costs likely underestimates the actual costs, as health inflation is generally higher than general inflation (CPI) (AIHW 2019e).

If no further action is taken to reduce the prevalence of obesity, it is projected that the accumulated total health expenditure over the 10 years to 2025 will be \$87.7 billion (PwC Australia 2015). Additionally, being overweight is likely to cause considerable cost to both individuals and society in the next 30 years, impacting workforce and labour market output and productivity (such as absenteeism, reduced productivity when at work, unemployment and early retirement) as well as health expenditure (OECD 2019b).

Priority areas

The areas for monitoring mentioned earlier can be looked at within particular priority groups or specific population groups. More detail is provided on each of these groups in the sections that follow.

Age groups (children and young adults, older people)

Establishing long-term healthy eating habits and energy regulation is critical in the early years of life to prevent overweight and obesity (Haire-Joshu & Tabak 2016; NHMRC 2013b). Overweight or obese children are more likely to develop chronic conditions (such as cardiovascular disease and diabetes) at a younger age, and to remain overweight or obese into adulthood (WHO 2019). Adolescence is often associated with irregular meal times, increased inactivity and changes in food preferences or choices (Gill 2013). Along with key physiological changes occurring during this phase, adolescents are more susceptible to increased fat deposition (Gill 2013). Older people are more likely to gain weight due to decreased mobility and functional limitations (NHMRC 2013b); as metabolic rate slows, both the loss of muscle mass and the redistribution of body fat increase (Cetin & Nasr 2014).

Different life stages (pregnancy, menopause, parenthood)

Women who are overweight or obese during pregnancy are more likely to retain weight after delivery. Additionally, children of mothers who are obese or have gestational diabetes during pregnancy are more likely to be large for their gestational age at birth, and at increased risk of metabolic disease (such as heart disease, type 2 diabetes and obesity) in later life (Farpour-Lambert et al. 2018; Haire-Joshu & Tabak 2016; Mamun et al. 2010; WHO 2016).

Menopause is associated with increased weight gain particularly in women who have low physical activity levels or poor diets. A decline in oestrogen can also cause changes in fat distribution and increased susceptibility to store abdominal fat (Atapattu 2015; Kozakowski et al. 2017; Proietto 2017).

Major life changes occur when people transition into parenthood. Research indicates that weight gain is higher for first-time parents who are either younger or older than average (Umberson et al. 2011). Parents are more susceptible to gaining weight due to decreased time to exercise and sleep as well as increased stress after becoming parents (Corder et al. 2020; Saxbe et al. 2018).

Different cultural backgrounds (Culturally and Linguistically Diverse, Indigenous, ethnic backgrounds)

Many factors can increase the likelihood of people from diverse backgrounds developing overweight and obesity, including:

- genetic and physiological traits
- adopting different cultural traits/nutrition transition
- knowledge of, and cultural beliefs about, food
- difficulty accessing affordable food, preferences or lifestyle choices
- difficulty understanding dietary guidelines
- social disadvantage
- exposure to advertising (NHMRC 2013b).

Research shows that longer duration of residence and greater adoption of Australian culture are associated with higher BMIs in immigrants and children from culturally and linguistically diverse backgrounds (Hardy et al. 2018; Menigoz et al. 2016).

There is evidence that some Asian populations have lower BMIs at a given body fat percentage than Europeans (WHO 2000b; WHO Expert Consultation 2004). Hence mortality as well as health risks (such as cardiovascular disease or type 2 diabetes) occur in these Asian population groups at a lower BMI and a smaller waist circumference than European counterparts (WHO 2000b; WHO Expert Consultation 2004). Pacific Islander populations have a higher prevalence of overweight and obesity based on standard BMI cut-offs; however, due to increased lean body mass, higher BMI cut-offs are suggested to define overweight and obesity (WHO 2000b; WHO Expert Consultation 2004). Therefore, WHO cut-off points do not provide an equal estimate of risk to health for all population groups, which has led to BMI cut-offs being developed for Asian and Pacific populations, which some countries have adopted for their health monitoring (James et al. 2002; Pan & Yeh 2008; WHO 2000b; WHO Expert Consultation 2004).

International comparisons

Comparing health and health-care data between Australia and other countries can reveal where Australia performs well or where there is room to improve. International data comparisons support policy planning and decision-making and promotes health-related research and analysis.

More than half the population is overweight in 34 of the 36 Organisation for Economic Cooperation and Development (OECD) countries, and almost 1 in 4 people are obese (OECD 2019a).

Australia's measured obesity rate (30% of the population aged 15 and over) was the fifth highest among these OECD countries, based on data for 2017 or the closest available year—behind the United States of America (40%), Chile (34%), Mexico (33%) and New Zealand (32%); Japan had the lowest rate of obesity (4.4%). Australia ranked eighth highest for the overweight but not obese population aged 15 and over (35%) (OECD 2019a).

People with chronic conditions

Some chronic conditions can increase the risk of weight gain and fat storage, examples include Cushing disease, hypothyroidism and Polycystic ovary syndrome (CDC 2019; Ferrau & Korbonits 2015; Sam 2007; Sanyal & Raychaudhuri 2016; Vilmann et al. 2012).

Weight gain and a higher BMI are closely linked to developing type 2 diabetes (Al-Goblan et al. 2014). Evidence suggests that managing obesity can delay the progression from pre-diabetes to type 2 diabetes (American Diabetes Association 2017). Losing weight and intensive lifestyle interventions have been shown to decrease the incidence of diabetes by 58% (Van Gaal & Scheen 2015). Additionally, sustaining this weight loss over time can improve glycaemic control and reduce the need for medications (American Diabetes Association 2017).

Evidence also suggests a reciprocal negative relationship between chronic pain and overweight and obesity. People with chronic pain are more likely to be overweight or obese and overweight or obese people are also more likely to experience chronic pain (Okifuji & Hare 2015). Moreover, people with chronic pain are more likely to experience functional limitations, sedentary lifestyles, poor sleep and side effects from medications, which can influence weight gain (Okifuji & Hare 2015). Studies suggest that obesity may be secondary to lifestyle adaptations associated with chronic pain, rather than a causal factor (McVinnie 2013).

Other research indicates a relationship between mental health conditions and obesity (Kivimäki, Batty et al. 2009; Kivimäki, Lawlor et al. 2009; Luppino et al. 2010; Mannan et al. 2016a, 2016b; Milaneschi et al. 2019). A stronger relationship between depression leading to obesity than obesity leading to depression is demonstrated (Kivimäki, Batty et al. 2009; Kivimäki, Lawlor et al. 2009; Luppino et al. 2010; Mannan et al. 2016a, 2016b). In particular, adolescents with depression had a 70% increased risk of being obese, while adults had a 37% increased risk compared with people without depression (Mannan et al. 2016a, 2016b). Almost two-thirds of people with schizophrenia and over half with bipolar disorder were obese 20 years after their first hospitalisation (Strassnig et al. 2017). Patients undergoing bariatric surgery are also found to be more likely to have a mental health condition, with 23% reporting a mood disorder such as depression and 17% diagnosed with an eating disorder (Dawes et al. 2016). Some medications such as steroids and antidepressants used to treat chronic conditions can also contribute to weight gain (CDC 2019; Kivimäki, Batty et al. 2009).

Social determinants

Regular collection of data on health inequalities and influences of social determinants on health are crucial to inform evidence-based programs and policies aimed at closing health gaps.

People with higher education levels are less likely to be obese, while a higher BMI has been associated with employment in less skilled professions and lower annual household income (Backholer et al. 2012; Devaux et al. 2011; Tyrrell et al. 2016).

Low health literacy levels are also associated with excess body weight and may be an influencing factor in one's ability to maintain a normal weight or to succeed in losing excess body weight (Michou et al. 2018).

People living in rural and remote areas and who live in lower socioeconomic areas have increased barriers to participating in physical activity. This is due to decreased opportunities to partake in recreational sport and less access to active living spaces (such as parks and walking or cycling paths) or recreational facilities (Ball et al. 2015; NRHA 2011). These people are also more likely to experience barriers to purchasing fresh food due to factors such as availability and cost (Chapman et al. 2014; Queensland Health and Queensland Treasury 2012).

Food security, which determines whether a person has limited or uncertain availability of nutritionally adequate and safe food, can increase overweight and obesity. Data show that the risk of obesity is 20–40% higher in people who are food insecure. This could be due to increased consumption of cheap energy-dense foods that are high in fat and sugar, as well as health awareness or beliefs and lifestyle behaviours (Burns 2004).

Time trends

Measuring all of the key measures of overweight and obesity over time is important for population health monitoring. Trend data show whether things are changing for better or worse and the impacts on health outcomes and health services (for example, increasing or decreasing prevalence, hospitalisations or deaths).

Comparing key measures of overweight and obesity over time shows essentially this—whether the situation is getting better or worse. Trends are useful across all key monitoring areas for assessing prevalence, impacts on health outcomes and health service demand or availability. These are important for developing and evaluating prevention and intervention initiatives.

Appendix A: Data sources for monitoring overweight and obesity

There are a variety of different data sources for overweight and obesity, at a national, state and local level and by different population groups. Table A1 presents a summary of the main data sources available, many other specific sources can be found in *Data sources for monitoring overweight and obesity in Australia* report (AIHW 2019d).

Table A1: Summary of data sources for monitoring overweight and obesity

Collection method	Information source	What do the data report on?	Measures collected	AIHW reports
National surveys and studies	National Health Survey	Prevalence of overweight and obesity	Age and sex	<i>Overweight and obesity: an interactive insight</i>
	Australian Health Survey	BMI distribution	Population groups	<i>Overweight and obesity in Australia: an updated birth cohort analysis</i>
	Australian Burden of Disease Study	Burden of disease	Socioeconomic disadvantage Time series	<i>Australian Burden of Disease Study: impact and causes of illness and death in Australia 2015</i> <i>Impact of overweight and obesity as a risk factor for chronic conditions</i>
Administrative data	National Hospital Mortality Database	Deaths		<i>Weight loss surgery in Australia 2014–15: Australian hospital statistics</i>
	National Hospitals Data Collection	Hospitals		
	Medicare Benefits Schedule (MBS)	Medical attendances for weight loss procedures (can also be linked to other data)		
	Pharmaceutical Benefits Schedule (PBS)	Prescriptions dispensed for approved weight management medications (can also be linked to other data)		
Longitudinal data	Longitudinal Survey of Australia Children (LSAC)	Examines the impact on 2 cohorts of children every 2 years, on the impact of social and cultural environments on developmental outcomes	Medicare Centrelink NAPLAN ABS	<i>Overweight and obesity among Australian children and adolescents</i>
	Household, Income and Labour Dynamics in Australia Survey (HILDA)	Economic and personal well-being, labour market dynamics and family life. Follows Australians from 2001		

(continued)

Table A1 (continued): Summary of data sources for monitoring overweight and obesity

Collection method	Information source	What do the data report on?	Measures collected	AIHW reports
Linked data	Multi-Agency Data Integration Project (MADIP)	Medicare Benefits Schedule (MBS), National Health Survey (NHS), Pharmaceutical Benefits Schedule (PBS), Apprentice and Trainee and Higher education, Personal Income Tax, 2016 Census of Population and Housing, Deaths Registration, Migration, Australian Census Longitudinal Dataset, Australian Early Development Census	Health care, education, government payments, personal income tax, and population demographics	
	45 and up study, Sax Institute	A large group of people have been followed over the long term to understand how Australians are ageing. This study answers important health and quality-of-life questions and helps to manage and prevent illness through improved knowledge of conditions such as cancer, heart disease, depression, obesity and diabetes.	Demographic data, lifestyle habits (including physical activity), smoking and alcohol consumption, current medications, history of disease, surgical procedures, functional capacity, psychological distress, social support and employment status	
Private sector (secondary use) data	Supermarket data Bank transaction data	Food purchasing transaction data	Geographic location, food purchasing frequency, quantities and amount spent	

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Abbreviations

AIHW	Australian Institute of Health and Welfare
BMI	body mass index
COAG	Council of Australian Governments
OECD	Organisation for Economic Co-operation and Development

Glossary

Australian Dietary Guidelines: Guidelines providing information on the types and amounts of foods, food groups and dietary patterns that can promote health and wellbeing, reduce the risk of diet-related conditions and chronic disease.

bariatric surgery: Surgery on the stomach and/or intestines that help with weight loss in people with severe obesity.

body mass index (BMI): The most commonly used method of assessing whether a person is normal weight, underweight, **overweight or obese**. It is calculated by dividing the person's weight (in kilograms) by their height (in metres) squared—that is $\text{kg} \div \text{m}^2$. For both men and women, underweight is a BMI below 18.5, acceptable weight is from 18.5 to less than 25, overweight but not obese is from 25 to less than 30, and obese is 30 and over. Sometimes overweight and obese are combined—defined as a BMI of 25 and over.

burden of disease (and injury): The quantified impact of a disease or injury on a population, using the disability-adjusted life year (DALY) measure.

cardiovascular disease: Any disease of the circulatory system, namely the heart (cardio) or blood vessels (vascular). Includes heart attack, angina, stroke and peripheral vascular disease. (Also known as circulatory disease).

chronic kidney disease: A term that refers to all conditions of the kidney, lasting at least 3 months, where a person has had evidence of kidney damage and/or reduced kidney function, regardless of the specific cause.

comorbidities: A situation where a person has 2 or more health problems at the same time.

Cushing disease: A condition where the body produces too much cortisol. People with the disease often display symptoms such as weight gain, facial rounding and muscle weakness.

diabetes (diabetes mellitus): A chronic condition, characterised by high blood levels of glucose. It is caused by deficient production of insulin (the hormone that helps to metabolise glucose) or resistance to its action. There are 2 main types of diabetes—type 1 diabetes, where there is a complete deficiency of insulin; and type 2 diabetes, which is marked by a relative insufficiency of insulin or resistance to its action.

discretionary foods: Foods and drinks that are not necessary to provide the nutrients the body needs but, may add variety. 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.

food security: A situation that exists when all people at all times have access to sufficient, safe and nutritious food to maintain a healthy and active lifestyle.

food system: A system that involves multiple activities including the production, processing, transport and consumption of food.

hypothyroidism: A condition characterised by low thyroid hormone production (often referred to as underactive thyroid). Low thyroid hormone slows the body's metabolism and can often lead to weight gain.

incidence: The number of new cases (of an illness or event, and so on) occurring during a given period. Compare with **prevalence**.

mortality: The number or rate of deaths in a population during a given time period.

obese: Marked degree of overweight, defined for population studies as a **body mass index** of 30 or over. See also **overweight**.

overweight: A term defined for the purpose of population studies as a body mass index of 25 or over. See also **obese**.

prevalence: The number or proportion (of cases, instances, and so forth) in a population at a given time. For example, in relation to cancer, the number of people alive who had been diagnosed with cancer in a prescribed period (usually 1, 5, 10 or 26 years). Compare with **incidence**.

Polycystic ovary syndrome (PCOS): A hormonal disorder that is particularly common in women of reproductive age, where women have high levels of male hormones and menstrual problems. PCOS is often associated with **overweight** and **obesity**, insulin resistance, risk factors for **cardiovascular disease** and metabolic disorders.

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

sedentary behaviour: Prolonged sitting or lying down during the day (excluding time spent sleeping), where low levels of energy are expended.

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Related publications

Other publications relating to overweight and obesity that might be of interest are:

- AIHW (Australian Institute of Health and Welfare) 2020. Overweight and obesity among children and adolescents. Cat no. PHE 274. Canberra: AIHW.
- AIHW 2020. Overweight and obesity on Australia – an updated birth cohort analysis. Cat no. PHE 268. Canberra: AIHW.
- AIHW 2019. Overweight and obesity: an interactive insight. Cat. no. PHE 251. Canberra: AIHW.
- AIHW 2017. A picture of overweight and obesity in Australia. Cat. no. PHE 216. Canberra: AIHW.



Overweight and obesity is a major health issue for both Australian adults and children. In 2017–18, 67% of adults and 25% of children and adolescents were overweight or obese. The framework developed by the AIHW to monitor overweight and obesity aims to describe, at a national level, the key risk factors for overweight and obesity, and their relationship with environmental, individual, social and behavioural characteristics, as well as health outcomes.

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