Australian Government
Australian Institute of Health and Welfare

Cardiovascular disease, diabetes and chronic kidney disease

Australian facts

Risk factors

Cardiovascular disease, diabetes and chronic kidney disease

Australian facts

Risk factors

risk factors
chronic kidney disease
cardiovascular disease
diabetes
stroke

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Preface

Cardiovascular disease, diabetes and chronic kidney disease—Australian facts, produced by the National Centre for Monitoring Vascular Diseases at the Australian Institute of Health and Welfare (AIHW), is a series of reports examining cardiovascular disease (CVD; including conditions such as heart disease, stroke and heart failure), diabetes and chronic kidney disease (CKD), and their interrelationships. Each is a serious disease that contributes significantly to poor health, affects millions of Australians and can lead to further health complications, disability and premature death. They impose a substantial burden on the Australian community and health-care system.

These diseases often arise from similar underlying causes, have similar features and share a number of management and treatment strategies. They are also largely preventable. Modifying and controlling risk factors for these diseases not only reduces the risk of onset of disease but also has a favourable impact on disease progression and the development of complications, with the potential for large health gains in the population.

The purpose of this series of 5 reports, of which this report is the fourth, is to provide a compendium of the most recent information to monitor CVD, diabetes and CKD and their associations. Reports in the series include:

- *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: mortality*
- *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: prevalence and incidence*
- *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: morbidity—hospital care*
- *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: risk factors*
- *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: Indigenous Australians*.

These reports present up-to-date statistics as well as trends, and examine age and sex characteristics. Variations across population groups, by geographical location, by socioeconomic disadvantage and for Aboriginal and Torres Strait Islander people, are also included where possible, reflecting that these diseases and associated risk factors are not uniformly distributed across Australia and affect some more than others.

This is the first time that all 3 diseases and their comorbidities have been brought together in one 'Australian facts' publication series. This approach will highlight the interrelated nature of CVD, diabetes and CKD and their determinants, as well as emphasise the burden of these 3 diseases individually and combined. Knowing more about the relationship between these diseases and common issues of concern can lead to shared prevention, management and treatment strategies, leading to improved health outcomes.

This report builds on the previous publications *Cardiovascular disease: Australian facts 2011* and *Diabetes: Australian facts 2008*.

The *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts* series is intended as a resource for policymakers and decision makers, health professionals, researchers and academics, and the wider community.

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The report was prepared under the guidance of the **National Vascular Diseases Monitoring Advisory Group**, whose members are Erin Lalor (Chair), Alan Cass, Derek Chew, Maria Craig, Wendy Davis, Wendy Hoy, Lisa McGlynn, Tim Mathew, David Parker, Jonathan Shaw, Andrew Tonkin and Bernie Towler.

Valuable input was also received from the cardiovascular disease, diabetes and chronic kidney disease expert advisory groups, whose members are:

Cardiovascular Disease Expert Advisory Group: Andrew Tonkin (Chair), Tom Briffa, Derek Chew, Annette Dobson, Belinda Lister, John Lynch and Mandy Thrift.

Diabetes Expert Advisory Group: Jonathan Shaw (Chair), Janelle Babare, Stephen Colagiuri, Maria Craig, Wendy Davis, Mark Harris, Greg Johnson, Glynis Ross and Sophia Zoungas.

Chronic Kidney Disease Expert Advisory Group: Tim Mathew (Chair), Alan Cass, Steven Chadban, Jeremy Chapman, Joan Cunningham, Bettina Douglas, Wendy Hoy, Stephen McDonald and David Parker.

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Abbreviations

ABS	Australian Bureau of Statistics
ACR	albumin creatinine ratio
AHS	Australian Health Survey
AIHW	Australian Institute of Health and Welfare
ASGS	Australian Statistical Geography Standard
BMI	body mass index
CHD	coronary heart disease
CKD	chronic kidney disease
CURF	confidentialised unit record file
CVD	cardiovascular disease
eGFR	estimated glomerular filtration rate
ESKD	end-stage kidney disease
FPG	fasting plasma glucose
HDL	high-density lipoprotein
IFG	impaired fasting glucose
IGT	impaired glucose tolerance
LDL	low-density lipoprotein
NHFA	National Heart Foundation of Australia
NHMRC	National Health and Medical Research Council
NHMS	National Health Measures Survey
NHS	National Health Survey
NNPAS	National Nutrition and Physical Activity Survey
NSF	National Stroke Foundation
OECD	Organisation for Economic Cooperation and Development
RSE	relative standard error
SEIFA	Socio-Economic Index for Areas
SES	socioeconomic status
WHO	World Health Organization

Symbols

—	nil or rounded to zero
%	per cent
g	gram
kg	kilogram
'000	thousands
m	metre
mL	millilitre
mmol/L	millimole per litre
mmHg	millimetre of mercury
n.a.	not available
. .	not applicable
n.p.	not publishable
>	more than
<	less than
≥	more than or equal to
*	value has relative standard error of 25% to 50% and should be used with caution

Summary

Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: risk factors is the fourth in a series of national reports by the National Centre for Monitoring Vascular Diseases at the Australian Institute of Health and Welfare.

It describes health risk factors and their associations with cardiovascular disease (CVD), diabetes and chronic kidney disease (CKD) using data from the Australian Bureau of Statistics 2011–12 Australian Health Survey. Health risk factors are behaviours or characteristics that increase the likelihood of a person developing a disease. People with multiple risk factors have markedly increased risks.

Risk factors also influence disease severity and reduce the ability to optimise care for people who already have CVD, diabetes or CKD. Healthy lifestyle choices can both reduce disease occurrence and improve disease management.

How many adults had risk factors?

- For **behavioural risk factors**—health-related behaviours— in 2011–12, 95% of adults did not consume recommended amounts of fruit and vegetables in their diets, 56% were inactive or insufficiently active, 20% exceeded lifetime alcohol risk guidelines and 16% smoked daily.
- For **biomedical risk factors**—risk factors present in the body—63% were overweight or obese, 63% had dyslipidaemia (abnormal amounts of lipids such as cholesterol in the blood), 32% had high blood pressure (including 22% with uncontrolled high blood pressure), and 3% had impaired fasting glucose (indicating higher than normal blood glucose levels and known as pre-diabetes).
- Generally, men, people living in *Outer regional and remote* areas and people in low socioeconomic groups had higher rates of risk factors.
- Having **multiple risk factors** increases disease risk. Two-thirds of the adult population (66%) had 3 or more risk factors at the same time, including 10% with 5 or 6 risk factors.

Risk factors among adults with CVD

- Adults with CVD were more likely than adults without CVD to have uncontrolled high blood pressure (2.1 times), be overweight or obese (1.3 times), have dyslipidaemia (1.3 times) and be inactive or insufficiently active (1.2 times).
- Four in 5 adults with CVD (84%) reported having 3 or more risk factors at the same time, including 18% with 5 or 6 risk factors.

Risk factors among adults with diabetes

- Adults with diabetes were more likely than adults without diabetes to have uncontrolled high blood pressure (2.0 times), be overweight or obese (1.5 times), and have uncontrolled dyslipidaemia (1.2 times).
- Nearly all (94%) reported having 3 or more risk factors at the same time, including 28% with 5 or 6 risk factors.

Risk factors among adults with CKD

- Adults with CKD were more likely than adults without CKD to have uncontrolled high blood pressure (1.9 times), or have elevated blood glucose levels (2.8 times).

1 Introduction

This report on risk factors is the fourth in the series *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts* produced by the National Centre for Monitoring Vascular Diseases at the Australian Institute of Health and Welfare (AIHW). It focuses on factors which may increase the risk of a person developing cardiovascular disease (CVD), type 2 diabetes or chronic kidney disease (CKD). It also examines risk factors among persons who already have these diseases, which if left unchecked can reduce the ability to optimise treatment, increase disease severity, lead to complications and place those persons at risk of developing other chronic diseases.

The risk of developing these diseases is closely associated with smoking, physical inactivity, poor nutrition and the harmful use of alcohol, some of which in turn contribute to overweight and obesity, high blood pressure and high blood cholesterol levels. Each of these risk factors, however, is modifiable. Chronic diseases, once they develop, can often be effectively controlled through behavioural change, medication and other health-care interventions.

Although Australia has had successes in preventing and treating these diseases, their prevalence continues to grow as the population increases and better treatment allows people to live longer. If left unchecked, unfavourable trends in some risk factors, such as overweight and obesity, physical inactivity and insufficient fruit and vegetable consumption, combined with an ageing population, suggest that the burden of CVD, diabetes and CKD will continue to grow.

What are risk factors?

Health risk factors are attributes, characteristics or exposures that increase the likelihood of a person developing a disease or health disorder (WHO 2014c). In addition to affecting the development of disease, health risk factors can also affect the progression and treatment outcomes of diseases and other health conditions.

Behavioural risk factors are health-related behaviours. In this report, behavioural risk factors include:

- tobacco smoking
- insufficient physical activity
- excessive alcohol consumption
- inadequate fruit and vegetable consumption.

Although they can be affected by other factors such as income, employment, geographic location or access to services, individuals have a degree of control over these behaviours. Behavioural risk factors, therefore, are most open to change and are often the focus of health promotion activities and primary health care.

Biomedical risk factors are those that are present in the body. In this report, biomedical risk factors include:

- overweight and obesity
- high blood pressure
- dyslipidaemia (abnormal levels of lipids, such as cholesterol, in the blood)
- impaired fasting glucose (higher than normal levels of glucose in the blood when fasting, known as pre-diabetes).

Biomedical risk factors are often influenced by behavioural risk factors. Overweight and obesity, for example, is influenced by insufficient physical activity and poor diet. Individual biomedical risk factors can directly affect health, and in combination with other behavioural or biomedical risk factors their effects can be amplified. Some chronic conditions are themselves risk factors for other diseases—diabetes, for example, is a risk factor for CVD and CKD.

Risk factors and disease development

For almost all risk factors there is no known point at which risk begins. Rather, there is an increasing effect as the exposure increases. Although the increase in risk often starts at relatively low levels, the usual practice when monitoring is to focus on the riskier end of the spectrum. However, there is also value in monitoring moderate risk to assess trends in the wider population and to identify people who may benefit from preventive interventions that will help to reduce or maintain their risk profile.

Relationships between risk factors and disease can be two-way. Risk factors may contribute to the development of chronic disease, but the onset of chronic disease can itself play a part in modifying risk factors. For example, insufficient physical activity may be the result of diabetes and cardiovascular disease, as well as a risk factor for it.

CVD, type 2 diabetes and CKD share many common risk factors. Table 1 lists these risk factors and the diseases to which they contribute, based on current understanding.

Table 1: Risk factors for developing CVD, type 2 diabetes or CKD

	CVD	Type 2 diabetes	CKD
Behavioural risk factors			
Tobacco smoking	✓	✓	✓
Insufficient physical activity	✓	✓	✓
Excessive alcohol consumption	✓		?
Inadequate fruit and vegetable consumption	✓	✓	✓
Biomedical risk factors			
Overweight and obesity	✓	✓	✓
High blood pressure	✓	✓	✓
Dyslipidaemia	✓	✓	
Impaired glucose regulation	✓	✓	✓

Multiple risk factors

The pathway from risk factors to disease can be simple or multidimensional. The development of one risk factor can lead to the occurrence of another, with multiple factors increasing the risk of developing chronic conditions. High blood pressure and dyslipidaemia, for instance, are often related to diet and overweight. The combination of multiple risk factors at low to medium levels can add to a person being identified as being at high disease risk.

Where more than one risk factor is present, the effects multiply. Although smoking, high blood pressure and inadequate physical activity each double an individual's risk of a major cardiovascular event, an inactive smoker with high blood pressure has around 8 times the risk of a major cardiovascular event, compared with a physically active non-smoker with normal blood pressure (Jamrozik et al. 2008). A group of risk factors, known collectively as the metabolic syndrome, greatly increase the risk of type 2 diabetes. This risk factor group comprises obesity, impaired fasting blood glucose, high blood pressure and dyslipidaemia.

Purpose and structure of this report

This report summarises the latest available data on health risk factors in the Australian adult population, and for persons who have either CVD, diabetes or CKD. It is based on results from the Australian Bureau of Statistics (ABS) 2011–12 Australian Health Survey (Box 1.1).

Box 1.1: The Australian Bureau of Statistics 2011–12 Australian Health Survey

The ABS 2011–12 Australian Health Survey (AHS) collected information from a large sample of households about health-related issues, including health status, risk factors, health-related actions, socioeconomic circumstances, nutrition and physical activity, as well as self-reported long-term health conditions and biomedical information on chronic diseases and nutrient status.

The AHS combined the longstanding National Health Survey (NHS) with two new components—a National Nutrition and Physical Activity Survey (NNPAS) and a National Health Measures Survey (NHMS). The survey components allow for a detailed analysis of risk factors overall and for those with cardiovascular disease, diabetes and chronic kidney disease in the Australian population.

It should be noted that the AHS may not accurately estimate the number of people with these conditions and risk factors, since:

- Non-private dwellings, including people living in institutional care facilities such as hospitals and aged care facilities, were not included in the survey.
- Some respondents may not have known, or were not able to accurately report their health status, while others may have over-reported their condition.

Using data from the AHS to examine differences in risk factor by remoteness does not present a complete picture, because the AHS excludes those living in *Very remote* areas and in discreet Aboriginal and Torres Strait Islander communities. Further aggregation of *Outer regional* with *Remote* areas may mask important differences in remote areas, given the population in *Outer regional* areas is much larger than in *Remote* areas.

The data file structure and weighting methods used in the AHS preclude some analyses and affect the comparability of some risk factors from different survey components.

For more details, refer to appendices A and B.

Chapter 2 examines the prevalence of each risk factor by sex, age group, geographic location and socioeconomic group. Risk factor prevalence in Australia is compared with other countries where possible. Information is also presented on multiple risk factors. Significance testing using 95% confidence intervals indicates whether rates derived from the survey data are statistically different.

Chapters 3 to 5 repeat the analysis for persons who have CVD, diabetes or CKD, in each case comparing their risk factor profile with persons who do not have the condition.

As the data in this report are based on a national cross-sectional survey and therefore represent a snapshot at one point in time, caution should be used in attributing cause and effect to risk factors and chronic conditions. Risk factors present at the time of the survey may or may not have contributed to the condition. Persons with health conditions may be recently diagnosed, or may have been receiving treatment to modify their condition and risk factors for some time. Similarly, the presence of CVD, diabetes or CKD should not be attributed to the number of risk factors a person has.

2 Prevalence of selected risk factors

Tobacco smoking

Tobacco smoking increases the risk of chronic diseases including CVD, diabetes and CKD. Smoking is the single most important preventable cause of ill health and death in Australia (AIHW 2012a). People who smoke, or who are exposed to smoking, inhale a range of toxic and cancer-causing chemicals. The addictive substance in cigarettes is nicotine, but a range of other noxious substances, such as carbon monoxide and cadmium, are also inhaled (USDHHS 2010).

Smoking damages blood vessels, increases the risk of plaques and clots, and reduces the blood's oxygen levels. Smoking is associated with an elevated risk of developing type 2 diabetes (Willi et al. 2007), and studies support a causal relationship between smoking and diabetes (Xie et al. 2009). It can also affect kidney function and accelerate the progression to renal failure. Smoking contributes to more hospitalisations and deaths than alcohol and illicit drug use combined.

Harmful effects are also associated with inhaling environmental tobacco smoke, known as 'passive smoking' (Eriksen & Whitney 2013; WHO 2013). Passive smoking is not covered further in this report.

Box 2.1: What is tobacco smoking?

Tobacco smoking is the smoking of tobacco products, including packet cigarettes, roll-your-own cigarettes, cigars or pipes (ABS 2013b).

The ABS 2011–12 Australian Health Survey collected information on tobacco smoking from respondents aged 15 and over. People were asked whether they had ever smoked, whether they were ex-smokers or had never smoked, and about the frequency of their smoking and the quantity and type of tobacco smoked.

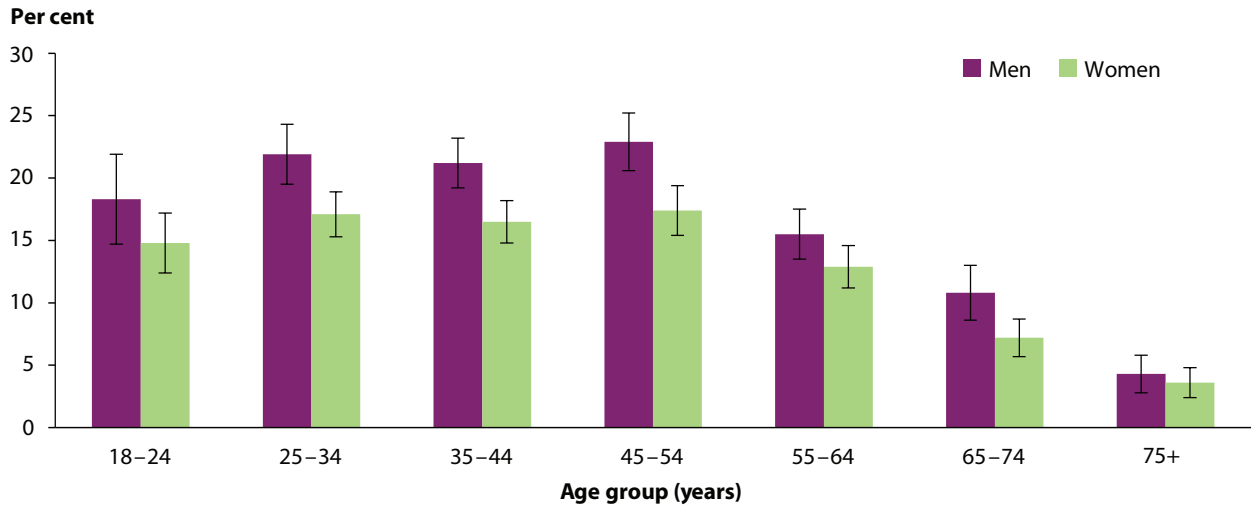
Since daily smoking presents the greatest health risk, this section focuses on adults aged 18 and over who reported that they were daily smokers at the time of the survey.

Sex and age

In 2011–12, an estimated 3.1 million people aged 18 and over were current smokers, of whom 2.8 million (16% of the adult population) smoked daily (Table C2). Overall, a higher proportion of men (18%) smoked daily than women (14%).

For men and women, there was no statistically significant difference in the proportion of daily smokers in each of the age groups between 18–24 and 45–54. At age 45–54, 23% of men and 17% of women smoked daily. Among older people, daily smoking was at its lowest level at age 75 and over—4% for both men and women. A higher proportion of men than women smoke daily in each age group (Figure 2.1).

Among young people aged 15–17, 4% reported smoking daily.



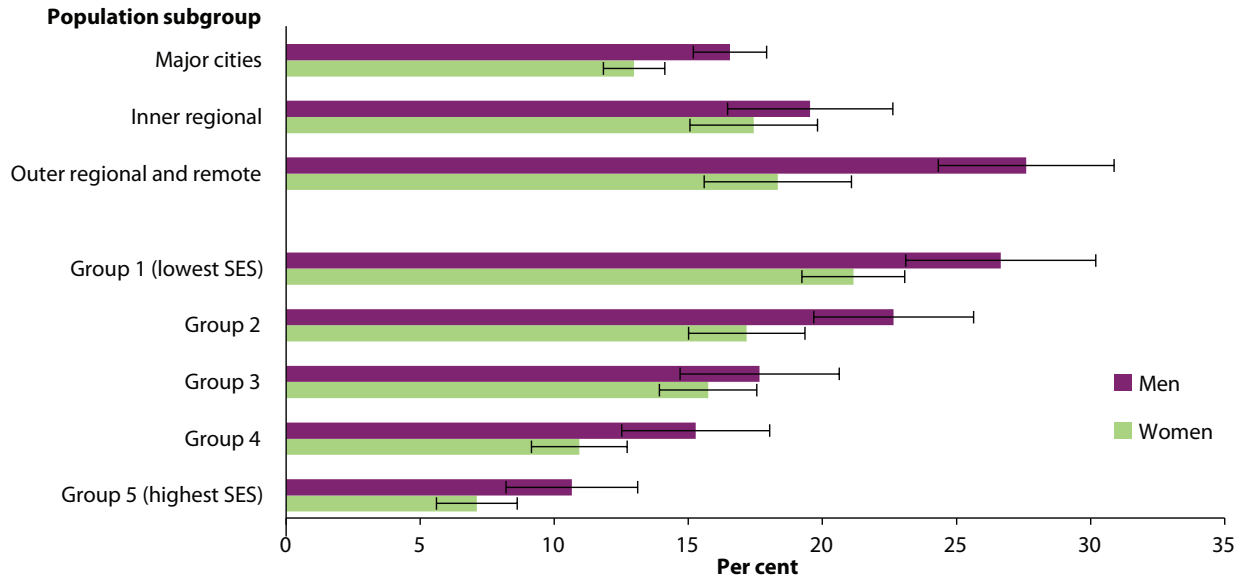
Source: ABS 2013b; Table C2.

Figure 2.1: Daily smokers, by age and sex, 2011–12

Inequalities

The proportion of the population who smoked daily varied across the areas they lived in. In 2011–12, the proportion of adult daily smokers living in *Outer regional and remote* areas was 1.5 times as high as in *Major cities* (23% compared with 15%, respectively). In *Major cities*, 17% of men and 13% of women smoked daily compared with 28% of men and 18% of women living in *Outer regional and remote* areas (Figure 2.2).

The proportion of the population who smoked daily also varied by the socioeconomic status (SES) of the area they lived in. In 2011–12, the proportion of adult daily smokers in the lowest socioeconomic group was 2.6 times that of the highest socioeconomic group. In the lowest socioeconomic group, 27% of men and 21% of women smoked daily, compared with 11% of men and 7% of women in the highest socioeconomic group (Figure 2.2).



Note: Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

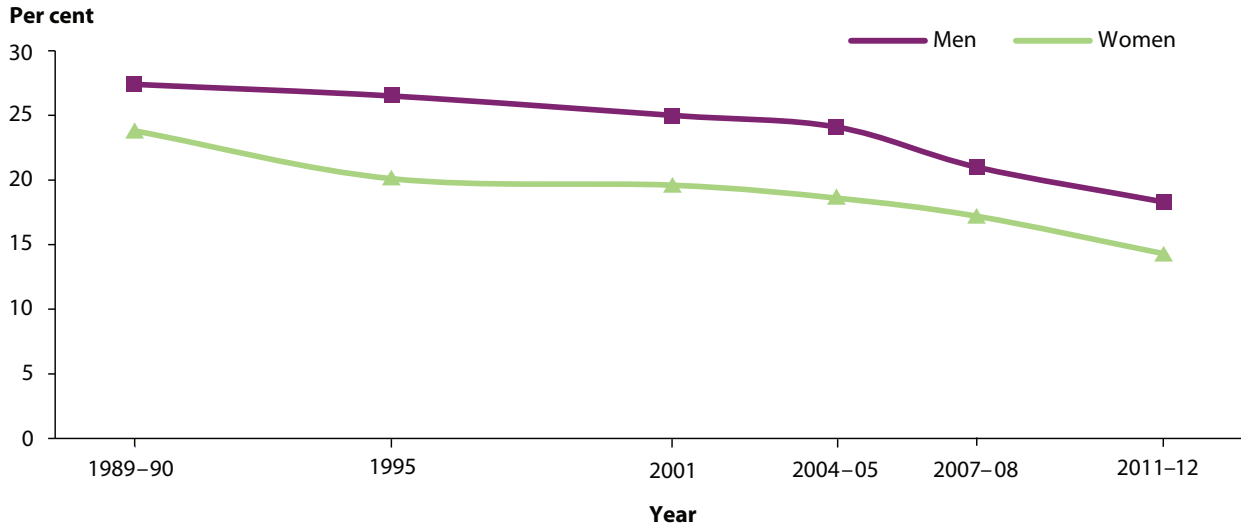
Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; Table C2.

Figure 2.2: Daily smokers, persons aged 18 and over, by selected population characteristics, 2011–12

Trends

Daily smoking rates among Australian adults have been declining steadily for many decades—since the 1940s for men and the 1980s for women (Scollo & Winstanley 2012). In 1989–90, 26% of persons aged 18 and over smoked daily, the proportion falling to 22% in 2001, and 16% in 2011–12 (Figure 2.3).

Stronger smoke-free laws, tobacco price increases and greater exposure to mass media campaigns since 2004 have played a substantial role in reducing smoking prevalence among adults (Wakefield et al. 2014).



Note: Age-standardised to the 2001 Australian population.

Sources: ABS 2013c; AIHW 2012b; Table C2.

Figure 2.3: Daily smokers, persons aged 18 and over, by sex, 1989–90 to 2011–12

International comparisons

Daily smoking rates in Australia are among the lowest in the world. In 2011 (or the nearest available year), 15% of the population aged 15 and over in Australia smoked, compared with 15% in the United States, 16% in Canada, and 20% in the United Kingdom. Australia's rate was well below the average across 34 OECD countries (21%) (OECD 2013). Sweden had the lowest smoking rate (13%), and Spain the highest (24%).

Insufficient physical activity

Participating in physical activity provides many benefits for physical and mental health at all ages. Sufficient physical activity can help prevent or minimise the risks of cardiovascular disease, type 2 diabetes and CKD. It can also help to manage biomedical risk factors such as body weight, high blood pressure and high cholesterol.

If the energy going into the body via food and drink is not balanced by energy expenditure via activity and internal bodily functions, the excess energy is stored as body fat. Over a sustained period, this can result in a person becoming overweight or obese. Regardless of a person's weight, insufficient physical activity is a risk factor in its own right (Brown et al. 2013).

Box 2.2: What is physical activity?

Physical activity is any bodily movement produced by the muscles which results in energy expenditure. Although most measures of physical activity focus on deliberate activity during leisure time, other forms of activity such as walking or cycling for transport, work-related activity, and daily household tasks such as housework or gardening all contribute to total physical activity.

Australia's Physical Activity and Sedentary Behaviour Guidelines (Department of Health 2014c) recommend that adult Australians aged 18–64:

- be active on most, preferably all, days every week
- accumulate 150 to 300 minutes of moderate intensity physical activity or 75 to 150 minutes of vigorous intensity physical activity, or an equivalent combination of both moderate and vigorous activities, each week
- do muscle-strengthening activities on at least 2 days each week
- minimise the amount of time spent in prolonged sitting
- break up long periods of sitting as often as possible.

There are different guidelines for children and young people (see Box 2.3), for older adults and for people living with chronic conditions.

In the ABS 2011–12 Australian Health Survey, people were asked to report the intensity, the duration and the number of sessions spent on physical activity during the week preceding the survey.

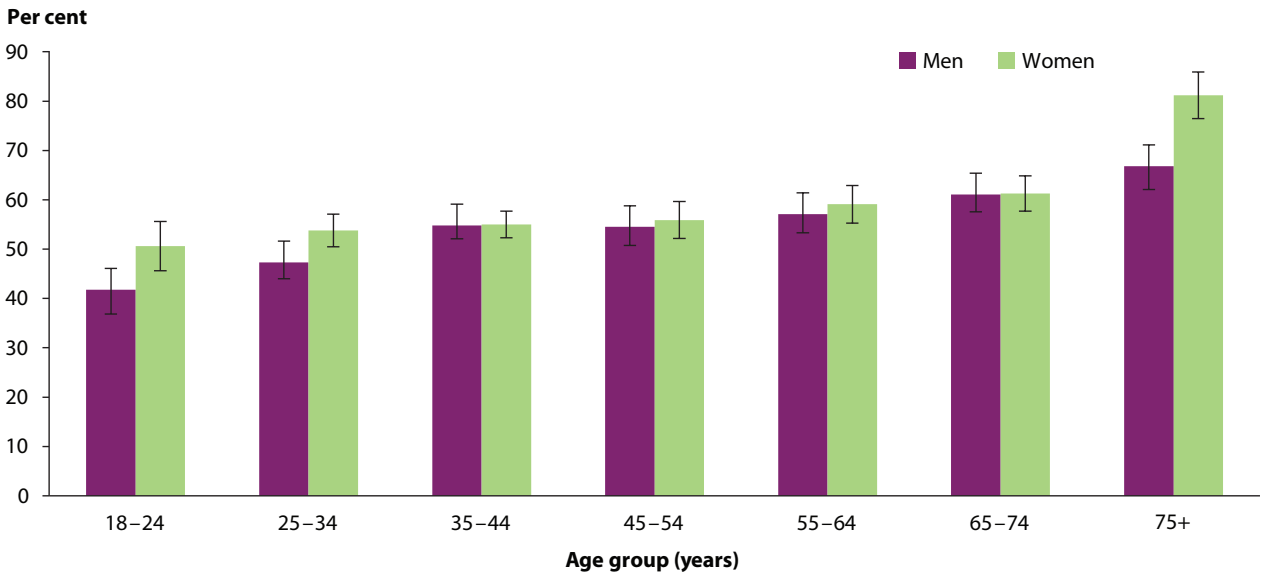
The level of physical activity in this report is based on the following sufficient physical activity measure based on the number of minutes and sessions of activity reported for the last week (ABS 2013f):

- inactive—no walking, moderate or vigorous intensity physical activity
- insufficiently active—some activity but not enough to reach the levels required for health benefit
- sufficiently active for health—at least 150 minutes of moderate or vigorous physical activity over 5 or more sessions per week.

Sex and age

In 2011–12, 56% of the adult population was not sufficiently active for health benefits, with 19% physically inactive and 37% insufficiently active (see Appendix Table C1). This equates to an estimated 9.5 million adults not meeting physical activity guidelines. Women (58%) were more likely to be physically inactive or insufficiently active than men (53%) (see Appendix Table C3).

Physical inactivity increased with age. The proportion of people who were inactive or insufficiently active was lowest for 18–24 year olds, with 42% of men and 51% of women. For those aged 75 and over, 81% of women and 67% of men were inactive or insufficiently active (Figure 2.4).



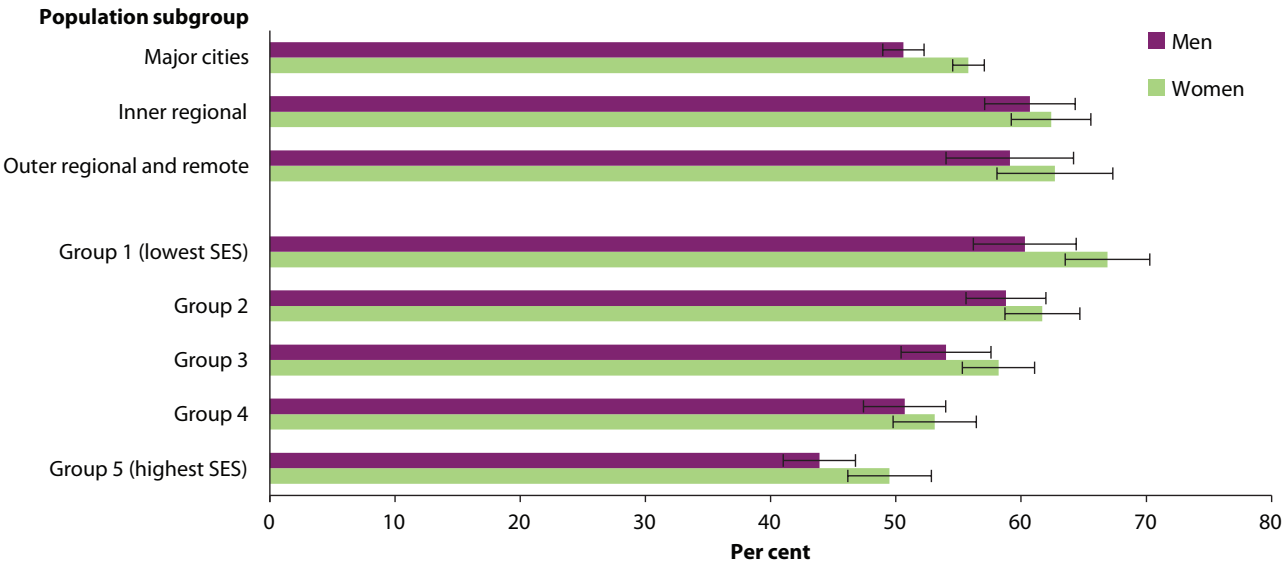
Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (Core component)'; Table C3.

Figure 2.4: Inactive or insufficiently active, by age and sex, 2011–12

Inequalities

Persons living in *Inner regional* or *Outer regional and remote* areas were, on average, less active than those living in *Major cities.* Over 60% of people living in *Inner regional* and *Outer regional and remote* Australia were inactive or insufficiently active, compared with 53% living in *Major cities* (Figure 2.5).

The proportion of people who were inactive or insufficiently active increased with socioeconomic disadvantage. In 2011–12, 60% of men and 67% of women from the lowest socioeconomic group were inactive or insufficiently active, compared with 44% of men and 50% of women from the highest socioeconomic group (Figure 2.5).



Note: Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

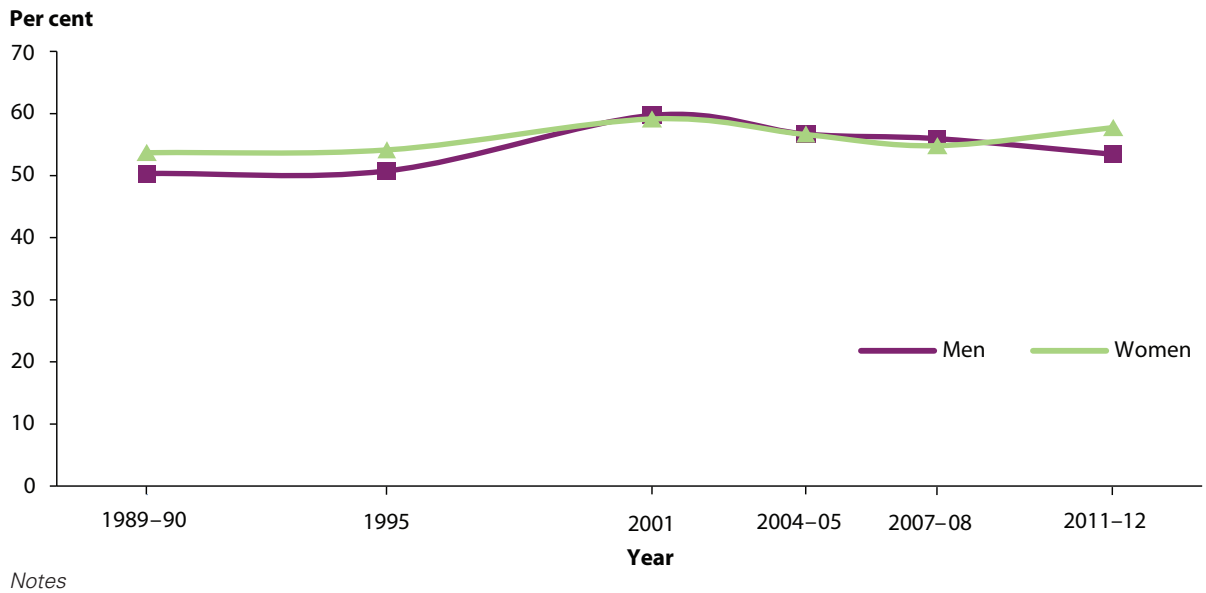
Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; Table C3.

Figure 2.5: Inactive or insufficiently active, persons aged 18 and over, by selected population characteristics, 2011–12

Trends

There are currently no trend data for the level of physical activity in the adult population, using the measures in the ABS 2011–12 AHS. This section presents trends in the proportion of adults who were inactive or insufficiently active based on a derived measure of intensity, duration and session from past national health surveys (for more details refer to Appendix B).

Between 1989–90 and 2011–12 there was little change in the proportion of adults who were inactive or insufficiently active (Figure 2.6). While this pattern was observed for men, for women there was a slight increase in the proportion who were inactive or insufficiently active, from 54% in 1989–90 to 57% in 2011–12.



Notes

1. Age-standardised to the 2001 Australian population.
2. To enable comparison with 2011–12, data from 1989–90 to 2007–08 which are based on duration, session and intensity information over a 2-week recall period were averaged over a week. They exclude incidental physical activity such as walking for transport (see Appendix B).

Sources: AIHW analysis of the ABS 1989–90, 1995, 2001,2004–05, 2007–08 NHS CURFs and 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; Table C3.

Figure 2.6: Inactive or insufficiently active, persons aged 18 and over by sex, 1989–90 to 2011–12

Box 2.3: Physical activity and sedentary behaviour among children and young people

The Australian Government has produced guidelines on recommended levels of physical activity and sedentary behaviour for children and young people:

Infants, toddlers and preschoolers (0–5)

- Physical activity in infants—particularly supervised floor-based play in safe environments—should be encouraged from birth.
- Toddlers (1–3) and preschoolers (3–5) should be physically active every day for at least 3 hours, spread throughout the day.
- For children aged 2–5, sitting and watching television and the use of other electronic media (DVDs, computers and other electronic games) should be limited to less than 1 hour per day.
- All children 0–5 should not be sedentary, restrained or kept inactive for more than 1 hour at a time, with the exception of sleeping (DoHA 2010).

Children (5–12) and young people (13–17)

- Accumulate at least 60 minutes of moderate to vigorous physical activity every day.
- Include a variety of aerobic activities, including some vigorous intensity activity.
- On at least 3 days per week, engage in activities that strengthen muscle and bone.
- To achieve additional health benefits, engage in more activity.
- Limit use of electronic media for entertainment (e.g. television, seated electronic games and computer use) to no more than 2 hours a day.
- Break up long periods of sitting as often as possible (Department of Health 2014a, 2014b).

The ABS 2011–12 Australian Health Survey indicates that 29% of children (5–11) but only 8% of young people (12–17) undertook the recommended physical activity every day. In addition, 36% of children and 21% of young people used electronic media for entertainment for no more than 2 hours a day, as recommended.

Toddlers and preschoolers (aged 2–4) spent an average of around 6 hours per day engaged in physical activity. This age group also spent almost one and a half hours per day on average (83 minutes) watching TV or DVDs, or playing electronic games.

Children and young people aged 5–17 spent, on average, one and a half hours (91 minutes) per day on physical activity and over 2 hours a day (136 minutes) in screen-based activity. Physical activity decreased and screen-based activity increased as age increased. The proportions of boys and girls in this age group meeting the physical activity recommendation were similar (20% and 19% respectively). Girls were more likely to meet the screen-based activity recommendation (34%) than boys (25%).

Just over half (51%) of all children and young people (5–17) had at least one type of screen-based item (e.g. TV, computer or game console) in their bedroom.

Sources: ABS 2013b; ABS 2013f.

Excessive alcohol consumption

Most Australians drink alcohol at levels that cause few adverse effects (NHMRC 2009). Regular consumption of alcohol at high levels, however, increases the risk of alcohol-related harm and can contribute to the development of chronic conditions such as liver disease, some cancers, oral health problems and cardiovascular disease. Alcohol consumption can also play a part in excess intake of kilojoules, contributing to excess body weight. Reducing alcohol consumption reduces the risk of developing these conditions and other health problems.

Moderate alcohol consumption is associated with a reduced risk of cardiovascular disease, through affecting the atherosclerosis process and heart rhythm, and increasing levels of HDL cholesterol—the good cholesterol (Brien et al. 2011). The National Health and Medical Research Council (NHMRC) advises that the potential cardiovascular benefit of alcohol may be achieved by drinking no more than 2 standard drinks per day, but these same benefits can also be gained by other means, such as exercise or modifying diet (NHMRC 2009).

Box 2.4: What is excessive alcohol consumption?

Alcohol consumption refers to the consumption of drinks containing ethanol, commonly referred to as alcohol. The quantity, frequency or regularity with which alcohol is drunk provides a measure of the level of alcohol consumption.

National Health and Medical Research Council (NHMRC) guidelines for alcohol consumption provide advice on reducing the risks to health from drinking alcohol. For healthy men and women, drinking no more than 2 standard drinks on any day reduces the lifetime risk of harm from alcohol-related disease or injury. Drinking no more than 4 standard drinks on a single occasion reduces the risk of alcohol-related injury arising from that occasion.

Alcohol-related risk is defined as follows:

- lifetime risk for alcohol consumption of more than 2 standard drinks per day
- single occasion risk for alcohol consumption of more than 4 standard drinks at a single occasion.

Note that one standard drink contains 10g of alcohol (12.5 mL of pure alcohol) (NHMRC 2009).

In the ABS 2011–12 Australian Health Survey, alcohol risk was derived from an individual's average daily consumption over the 3 most recent days they had consumed alcohol in the week before the interview. Results in this report relate to lifetime risk of alcohol-related harm or injury as defined above, since it is more closely associated with the development of CVD and other chronic diseases (Begg et al. 2008; Mann et al. 2004).

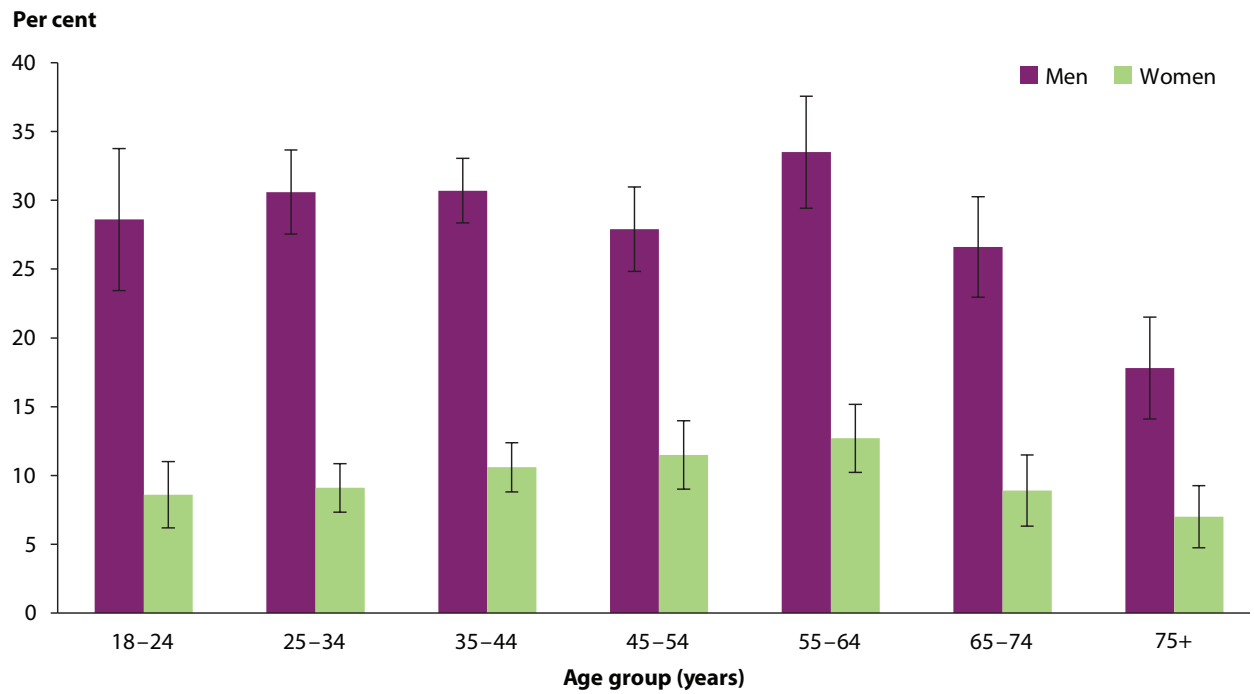
Sex and age

In 2011–12, an estimated 3 million people aged 18 and over (20%), consumed more than 2 standard drinks per day on average, exceeding the lifetime alcohol risk guidelines (see Appendix Table C1).

Overall, men were 3 times as likely to be at lifetime risk of harm due to alcohol than women (29% and 10% respectively).

Around 30% of men aged between 18 and 64 exceeded the lifetime alcohol risk guidelines. Among older men the proportion fell sharply, with 18% of those aged 75 and over exceeding recommended levels. For men, the highest level (34%) was for those aged 55–64.

For women there was a similar pattern but at lower levels, with 13% of women aged 55–64 exceeding the lifetime alcohol risk guidelines, falling to 7% of women aged 75 and over (Figure 2.7).

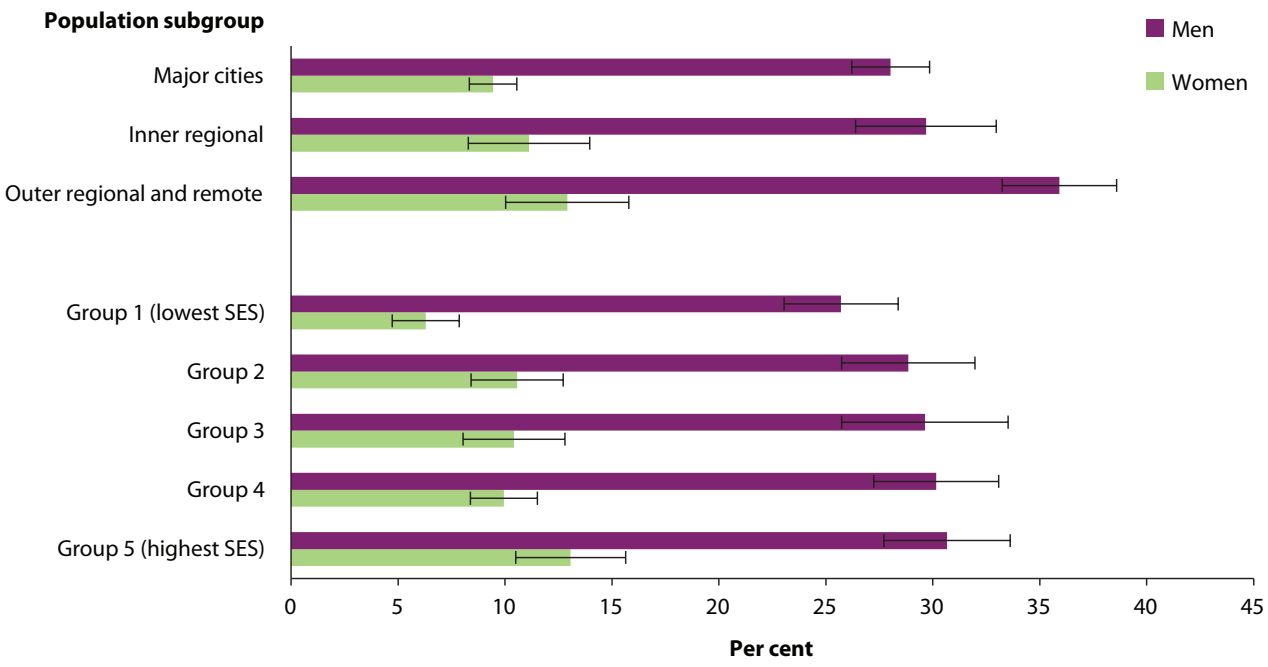


Source: ABS 2012; Table C4.

Figure 2.7: Excessive alcohol consumption, persons at lifetime risk of harm, by age and sex, 2011–12

Inequalities

The proportion of adults at lifetime risk of harm due to excessive alcohol consumption differed across geographic areas. In 2011–12, adults in *Outer regional and remote* areas were 1.3 times as likely to exceed alcohol consumption guidelines as those in *Major cities* (24% compared with 19%, respectively). In *Major cities*, 28% of men and 9% of women exceeded alcohol consumption guidelines compared with 36% of men and 13% of women living in *Outer regional and remote* areas (Figure 2.8).



Note: Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

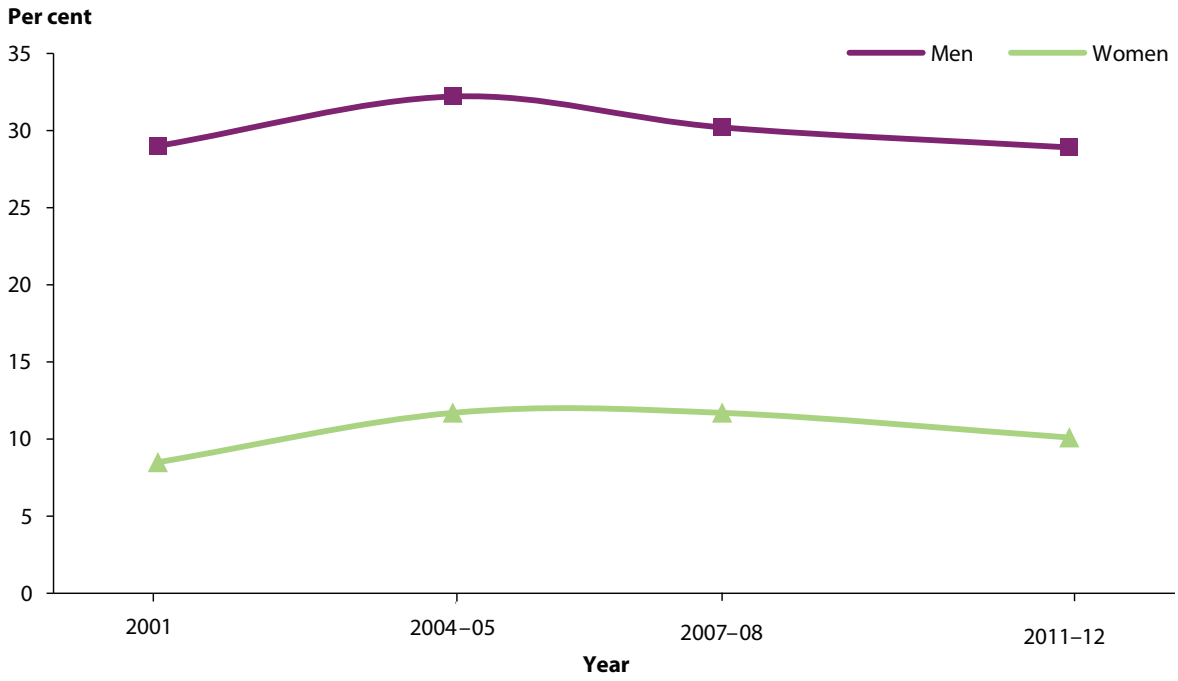
Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, National Health Survey, 2011–12'; Table C4.

Figure 2.8: Excessive alcohol consumption, persons aged 18 and over at lifetime risk of harm, by selected population characteristics, 2011–12

The proportion of adults at lifetime risk of harm due to excessive alcohol consumption varied across socioeconomic groups. In 2011–12, adults in the highest socioeconomic group were 1.4 times as likely to exceed alcohol consumption guidelines as those in the lowest socioeconomic group (22% compared with 16%). Women in the highest socioeconomic group were twice as likely to exceed alcohol consumption guidelines as those in the lowest socioeconomic group (13% compared with 6%), but for men the proportions were similar (31% and 26% respectively) (Figure 2.8).

Trends

The proportion of adults at lifetime risk of harm due to excessive alcohol consumption increased between 2001 and 2004–05 but has remained largely unchanged since then. Between 2001 and 2004–05, the proportion exceeding alcohol consumption guidelines increased from 29% to 32% for men and from 8.5% to 12% for women. From 2004–05 to 2011–12, the proportion declined slightly in men (from 32% to 29%) but has remained similar for women (Figure 2.9).



Note: Age-standardised to the 2001 Australian population.

Source: ABS 2012; Table C4.

Figure 2.9: Excessive alcohol consumption, persons aged 18 and over at lifetime risk of harm, by sex, 2001 to 2011–12

International comparisons

International comparisons of alcohol consumption are gauged by annual sales. In Australia in 2011, alcohol consumption averaged 10.0 litres per person aged 15 and over. Consumption was 8.6 litres per capita in the United States, 8.0 in Canada and 10.0 in the United Kingdom. Alcohol consumption in Australia was higher than the average across 34 OECD countries, which was 9.4 litres per person. Turkey had the lowest average (1.5 litres per capita) and Estonia the highest (12.3 litres per capita) (OECD 2013).

Although average adult alcohol consumption per capita gives useful comparisons, it does not identify the number of persons at risk from harmful drinking patterns.

Inadequate fruit and vegetable consumption

Diet plays an important role in health and wellbeing. Fruit and vegetables as components of a healthy diet are nutrient dense, relatively low in energy and good sources of vitamins, minerals and dietary fibre (NHMRC 2013b). The consumption of fruit and vegetables can also replace the intake of less beneficial foods.

Poor diet with inadequate fruit and vegetable consumption is a risk factor for CVD, type 2 diabetes and CKD, largely through its adverse effect on body weight contributing to overweight or obesity. Diets high in fruit and vegetables lower the risk of chronic conditions such as coronary heart disease (CHD), stroke and high blood pressure (AIHW 2011; NHMRC 2013b). Greater consumption of fruit and vegetables, along with wholegrain products, is also associated with lower comorbidity of these conditions (Ruel et al. 2014).

Food purchases are influenced by factors such as income, price, access and availability as well as culture and knowledge. Grocery prices in independent stores, for example, increase with remoteness, affecting the availability and affordability of healthier alternatives for persons living in remote areas (AIHW 2012c).

Box 2.5: What is adequate fruit and vegetable consumption?

The *Australian Dietary Guidelines* recommends that adults consume at least 2 serves of fruit and 5–6 serves of vegetables per day. There are different guidelines for children and adolescents (see Box 2.6), as well as for pregnant and breastfeeding women (NHMRC 2013b).

A standard serve of fruit is about 150 grams, and a serve of vegetables is about 75 grams. Examples of serves include:

Fruit

1 medium apple, orange, banana or pear
2 small apricots, kiwi fruit or plums
1 cup diced or canned fruit (no sugar)
Occasionally: 125 mL (½ cup) fruit juice
Occasionally: 30g dried fruit

Vegetables

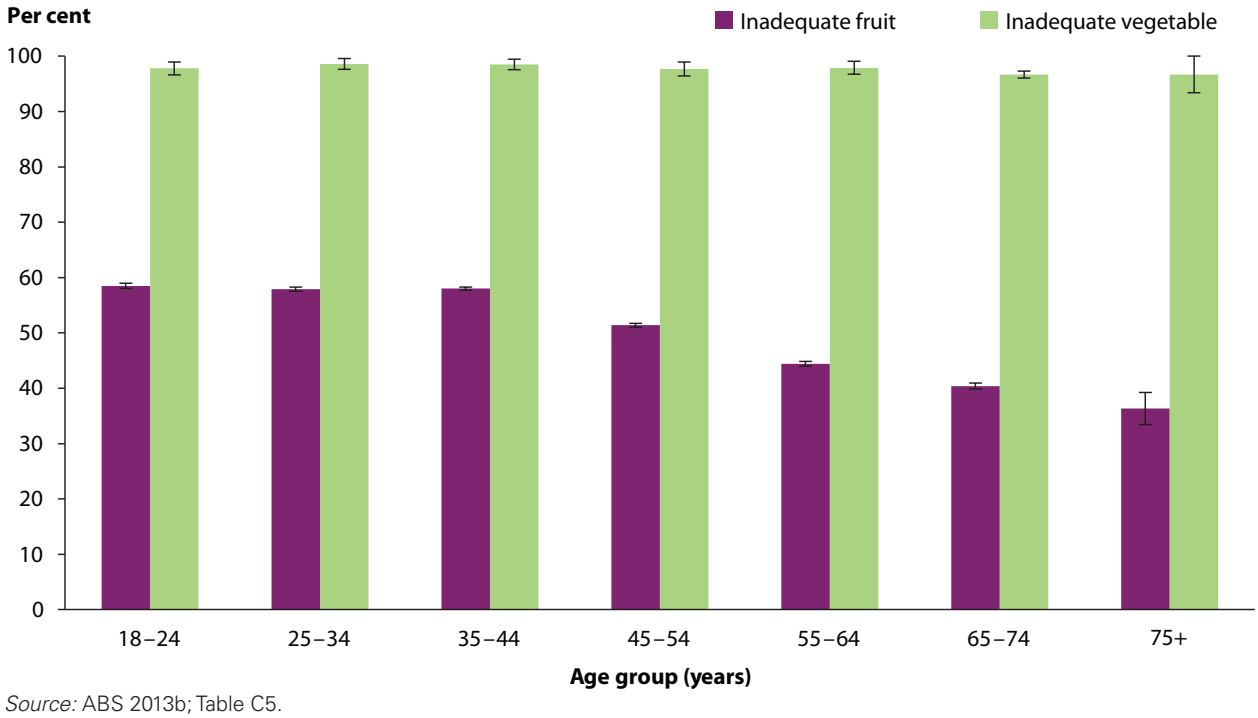
½ cup cooked vegetables or legumes
1 cup of green leafy or raw salad vegetables
½ medium potato
1 medium tomato

In the ABS 2011–12 Australian Health Survey, respondents were asked to report on the number of serves of fruit and vegetables usually consumed each day (ABS 2013e).

Sex and age

In 2011–12, more than 9 in 10 (95%) people aged 18 and over did not consume the recommended amount of fruit and vegetables in their diets (see Appendix Table C1). The majority had inadequate vegetable consumption (92%), and 52% had inadequate fruit consumption. Only 6% of adults indicated that they ate the recommended 2 serves of fruit and 5 serves of vegetables daily, with women (7%) more likely than men (5%) to meet the guidelines.

The proportion of people with inadequate vegetable consumption was similar across age groups (Figure 2.10). The proportion of adults with inadequate fruit consumption was approximately 59% for 18–44 year olds, declining to 36% of persons aged 75 and over.



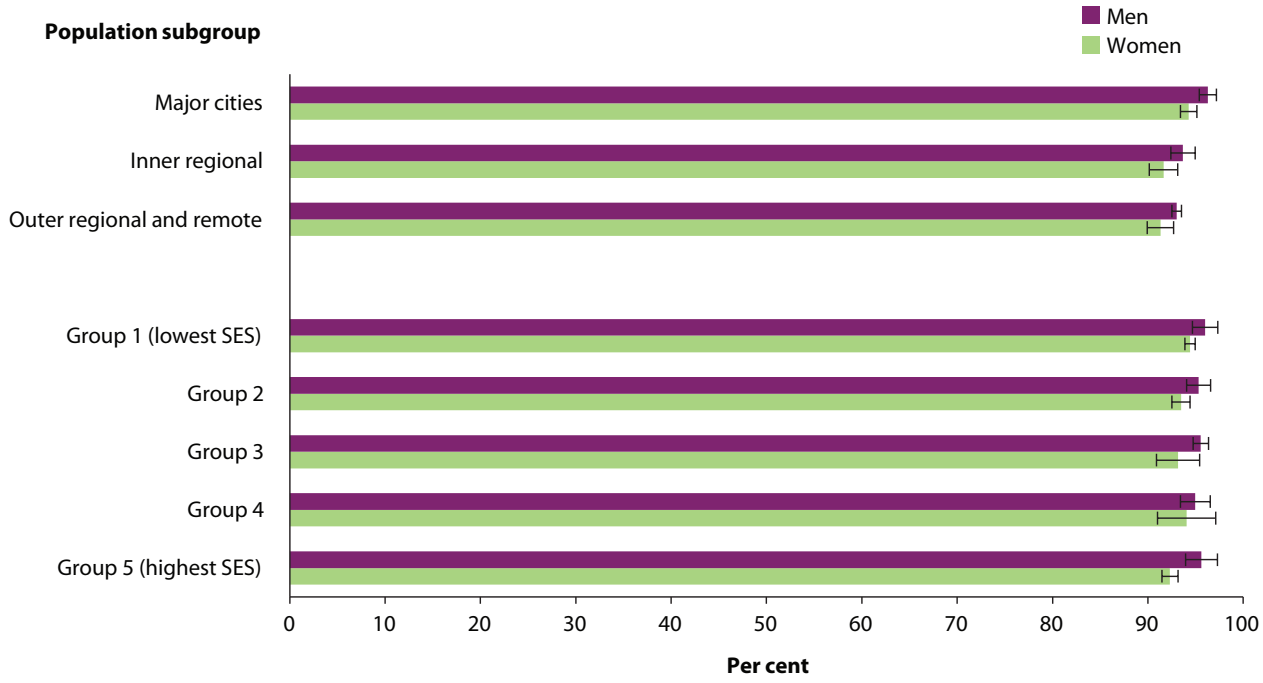
Source: ABS 2013b; Table C5.

Figure 2.10: Inadequate fruit and vegetable consumption, by age, 2011–12

Inequalities

In 2011–12, inadequate fruit and vegetable consumption did not vary greatly by geographic location or by socioeconomic group (Figure 2.11). The proportion of adults with inadequate fruit and vegetable consumption in *Major cities* (95%) was slightly higher than in *Outer regional and remote* areas (92%).

Inadequate fruit and vegetable consumption was similar across all levels of socioeconomic disadvantage (Figure 2.11).



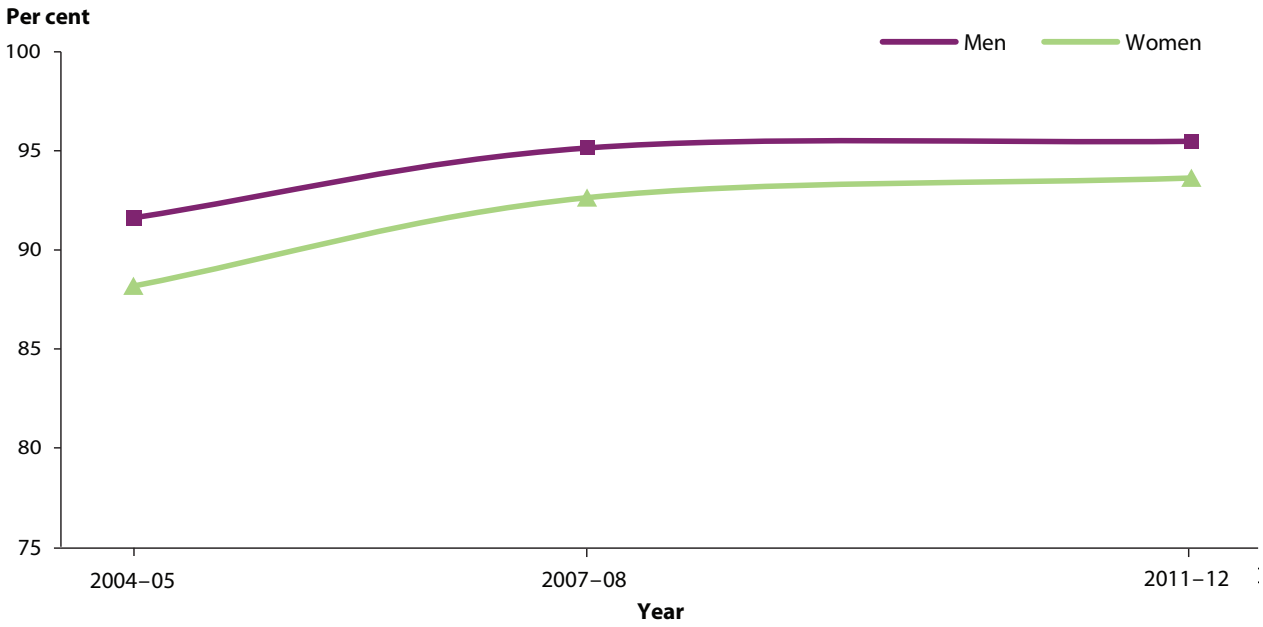
Note: See Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; Table C5.

Figure 2.11: Inadequate fruit and vegetable consumption, persons aged 18 and over, by sex and selected population characteristics, 2011–12

Trends

Between 2004–05 and 2011–12 inadequate fruit and vegetable consumption increased slightly in the adult population. The proportion of men aged 18 and over who did not consume sufficient fruit and vegetables increased slightly from 92% in 2004 to 96% in 2011. For women, the proportion increased from 88% to 94% (Figure 2.12).



Note: Age-standardised to the 2001 Australian population.

Sources: AIHW analysis of ABS 2004-05 and 2007-08 NHS CURFs and ABS 2013c; Table C5.

Figure 2.12: Inadequate fruit and vegetable consumption, persons aged 18 and over, by sex, 2004–05, 2007–08 and 2011–12

Box 2.6: Fruit and vegetable consumption among children and young people

The Australian Dietary Guidelines provide advice on the recommended daily serves of fruit and vegetables that children and young people aged 2–18 should consume for health and wellbeing (NHMRC 2013a):

	2–3 years	4–8 years	9–11 years	12–13 years	14–18 years
Daily serves of fruit	1	1.5	2	2	2
Daily serves of vegetables (including legumes/beans)	2.5	4.5	5	5.5 for boys 5 for girls	5.5 for boys 5 for girls

In 2011–12, almost 7 out of 10 (69%) children aged 5–11 ate 2 or more serves of fruit on a usual day, compared with 54% of 12–17 year olds. However, 36% of young people aged 12–17 consumed 3 or more serves of vegetables on a usual day, compared with 28% of children aged 5–11 (ABS 2013b).

Adequate consumption of fruit and vegetables among children and young people declines with increasing age. While 55% of children aged 5–7 consumed the recommended daily intake of fruit and vegetables, only 5% of those aged 16–17 did so.

A substantial portion of children's overall energy intake came from extra or 'treat' foods which are high in energy and low in nutrients, such as potato chips, soft drinks, cakes and biscuits. The proportion of overall energy intake from these foods was 31% among 2–3 year old children, increasing to 42% among 14–18 year olds (ABS 2014a).

Overweight and obesity

A healthy weight is important for overall health and can help prevent and control many diseases and conditions. Overweight and obesity are characterised by excessive weight presenting health risks because of the high proportion of body fat. They arise from a sustained energy imbalance due to dietary energy intake exceeding energy expended through physical activity. Obesity is a severe form of overweight and presents greater health risks than overweight. The effects of overweight and obesity are widely recognised as one of Australia's leading health concerns, involving all ages and socioeconomic groups (NHMRC 2013a).

Being overweight or obese is strongly associated with several chronic diseases, including cardiovascular disease—including CHD and stroke—type 2 diabetes and some cancers, along with mental health and eating disorders. It is also associated with high blood pressure, dyslipidaemia and atherosclerosis (NHMRC 2013a).

Weight loss can help reduce the incidence and severity of many chronic conditions.

Box 2.7: How is body weight classified?

Overweight and obesity are commonly measured using the *body mass index* (BMI). BMI is calculated by dividing a person's weight in kilograms by the square of their height in metres (kg/m^2). At the population level, international cut-off points (WHO 2000) based on BMI for the population aged 18 and over are used in the classification of overweight and obesity:

- underweight BMI < 18.5
- healthy weight BMI ≥ 18.5 and BMI < 25
- overweight but not obese BMI ≥ 25 and BMI < 30
- obese BMI ≥ 30.

The classification may not be suitable for all ethnic groups. Children and adolescents have separate classifications (see Box 2.8).

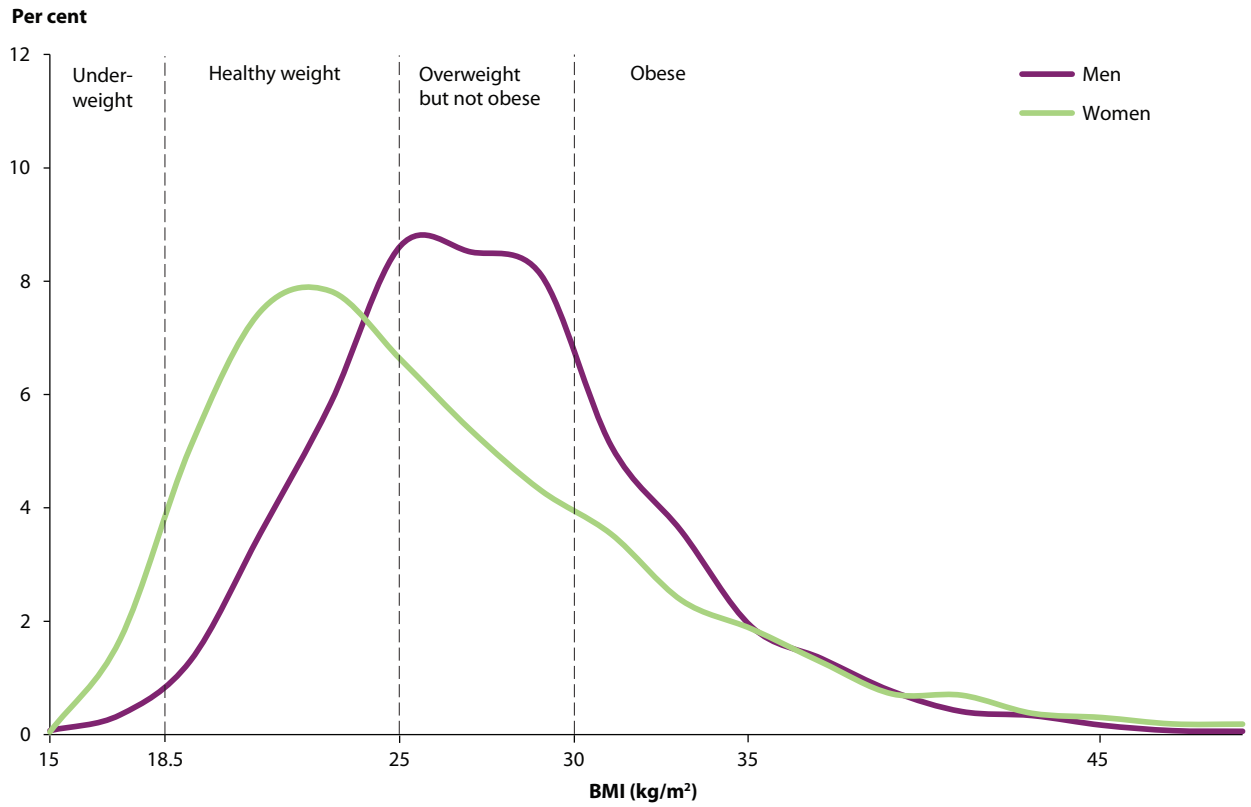
The classification of overweight and obesity in this report is based on measured height and weight of respondents in the ABS 2011–12 National Health Measures Survey component, excluding pregnant women (ABS 2013b).

Sex and age

In 2011–12 there were an estimated 9 million people (63%) aged 18 and over who were overweight or obese, of whom 4 million (28%) were obese (see Appendix Table C6). Only one-third of Australian adults (36%) had a healthy weight.

Overall, the proportion of overweight or obesity was greater among men (70%) than women (56%).

The body mass index (BMI) distribution varies between men and women. The distribution for men peaks at higher BMI values, indicating that overweight/obesity is more common in men than in women (Figure 2.13).



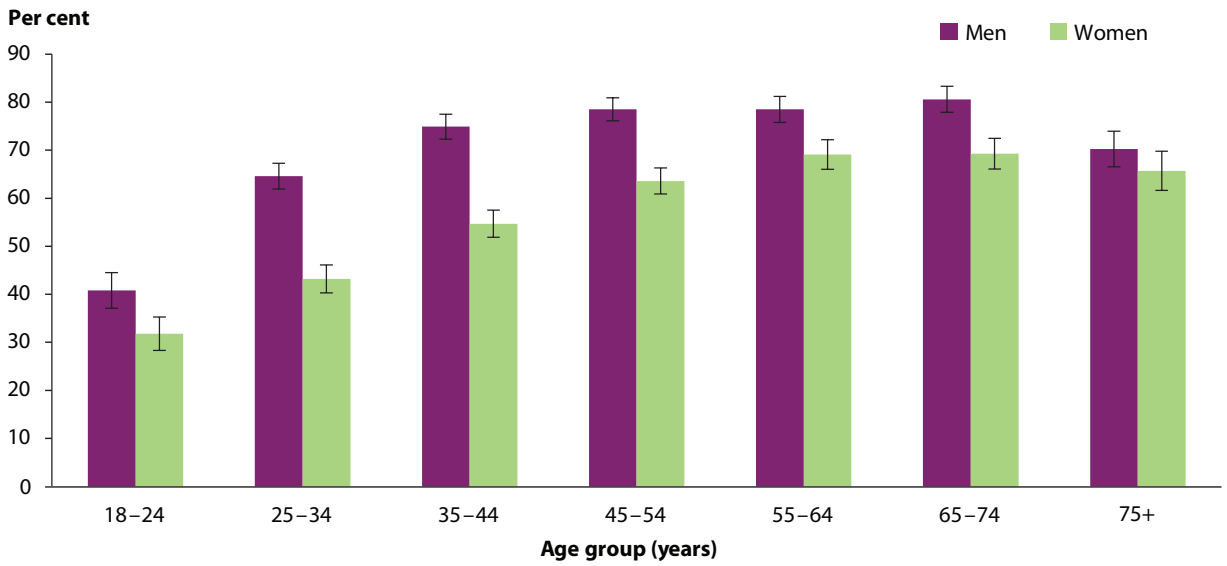
Note: The distributions have been smoothed, including the minimum and maximum values which are based on aggregates of 12 or less and 49 or more.

Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'.

Figure 2.13: Body mass index distribution, persons aged 18 and over by sex, 2011–12

The proportion of overweight or obese persons increased from age 18–24, reaching a maximum at age 65–74 for both men (81%) and women (69%), before declining to 70% of men and 66% of women aged 75 and over (Figure 2.14). Among men, overweight and obesity rates were similar from ages 35–44 to 65–74, while among women the increase with age was gradual.

The greatest difference between men and women in the proportion of overweight or obese was found in the 25–34 and 35–44 age groups.



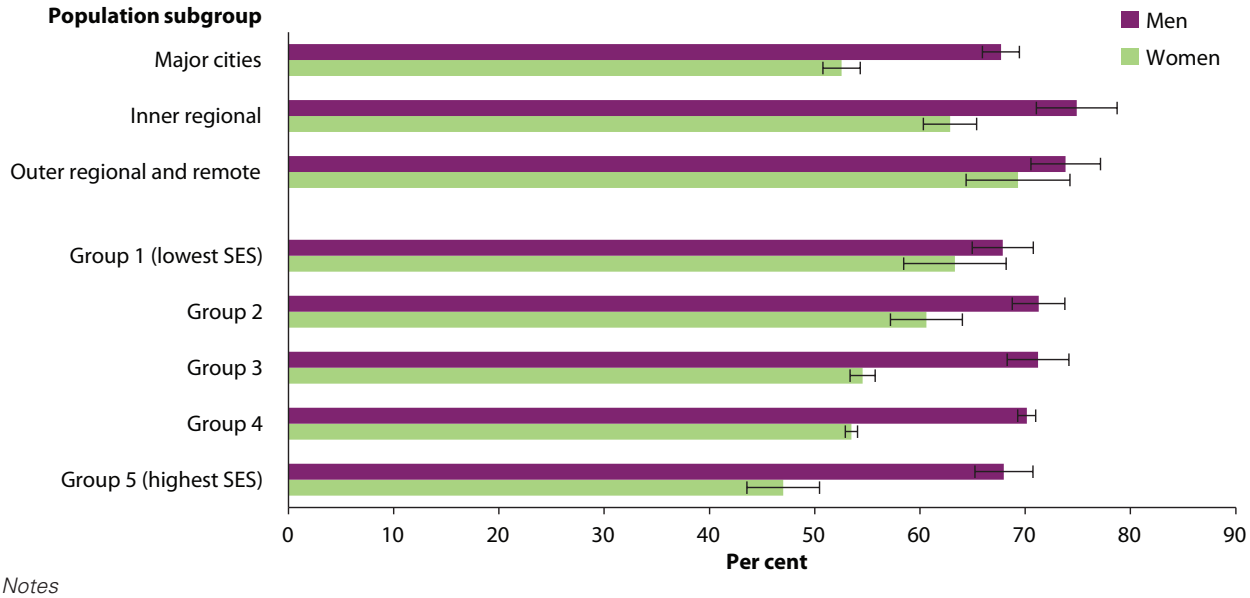
Note: Excludes persons for whom height and weight were not taken.

Source: ABS 2013c; Table C7.

Figure 2.14: Overweight or obese, by age and sex, 2011–12

Inequalities

The proportion of overweight or obese adults is lower in *Major cities*, compared with *Inner regional* and *Outer regional and remote* areas (Figure 2.15). In 2011–12, 68% of men living in *Major cities* were overweight or obese, increasing to 75% and 74% of men living in *Inner regional* and *Outer regional and remote* areas, respectively. For women, the proportion increased from 53% in *Major cities* to 63% in *Inner regional* and 69% in *Outer regional and remote* areas.



Notes

1. Excludes persons for whom height and weight were not taken.
2. Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; Table C7.

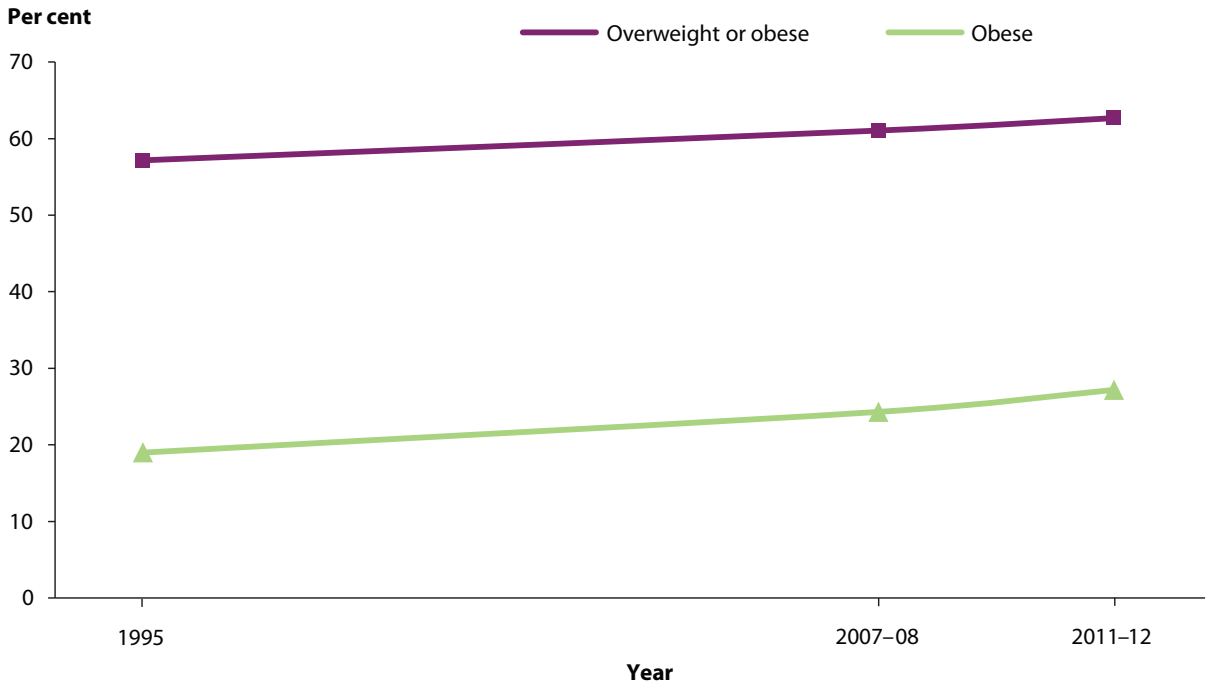
Figure 2.15: Overweight or obese, persons aged 18 and over, by selected population characteristics, 2011–12

Among women, being overweight or obese varied according to socioeconomic group (Figure 2.15). In 2011–12, 63% of women in the lowest socioeconomic group were overweight or obese, compared with 47% of those in the highest socioeconomic group. For men, however, the proportions of overweight or obesity were similar in each socioeconomic group, ranging from 68% to 71%.

Trends

The proportion of overweight or obese adults in the population (based on measured data) has increased in recent decades. The prevalence increased from 57% in 1995 to 61% in 2007–08 and 63% in 2011–12 (Figure 2.16). This was driven by an increase in the proportion of obese adults from 19% to 27% over the period, with the proportion of overweight but not obese adults remaining similar (36% to 38%).

Between 1995 and 2011–12, the relative increase in the proportion of overweight or obese adults was higher in women (12%) than men (8%), however the gap between men and women has remained similar.

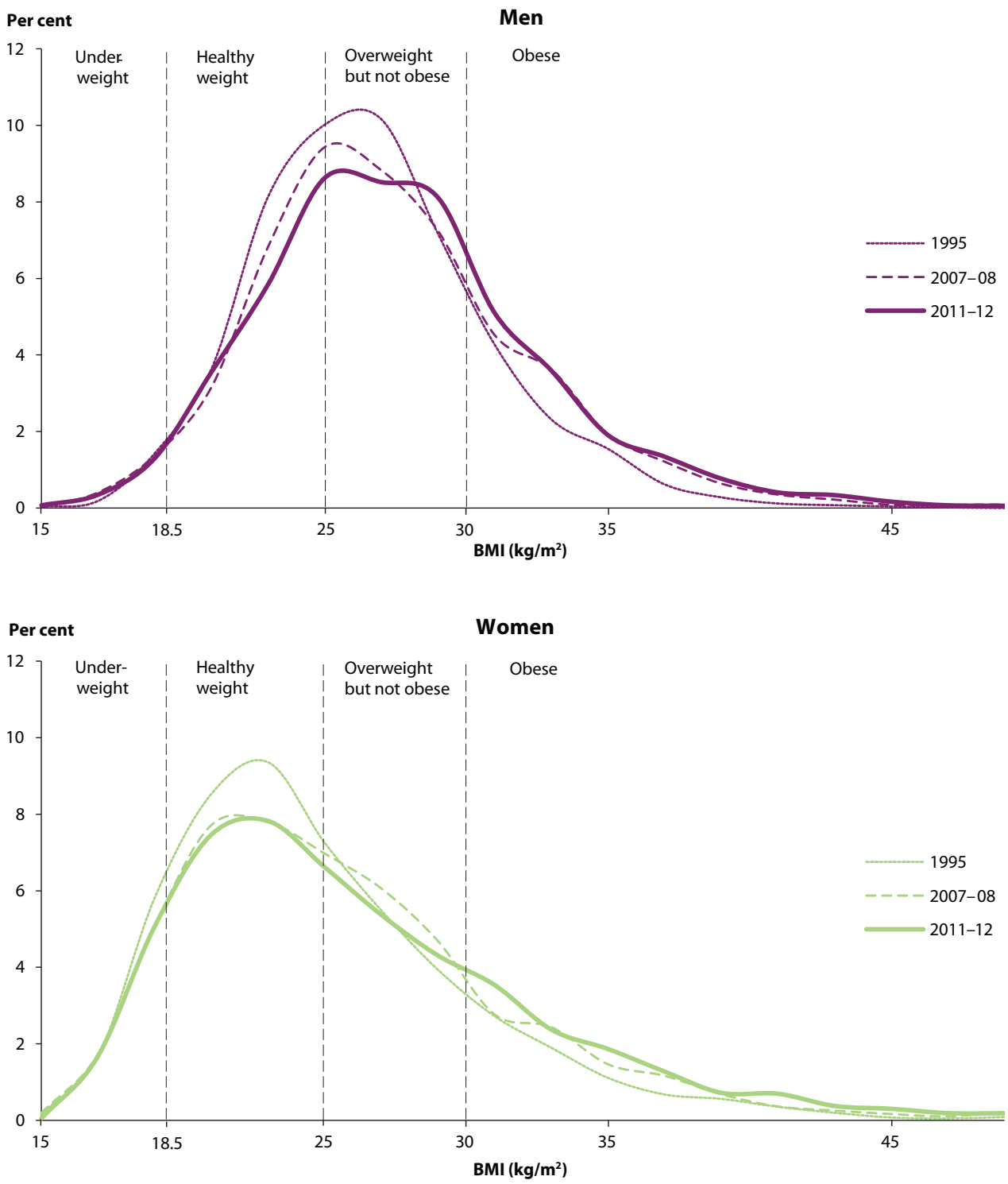


Note:
1. Age-standardised to the 2001 Australian population.
2. Overweight and obesity classification was based on measured height and weight in all 3 surveys.

Sources: AIHW 2012b; ABS 2013b; Table C7.

Figure 2.16: Overweight or obese, persons aged 18 and over, 1995, 2007–08 and 2011–12

The BMI distributions for men and women have shifted to the right towards higher BMI values over time, reflecting generalised weight gain for all Australian adults (Figure 2.17). Between 1995 and 2011–12, the average weight gain was 4 kg for men, and 3.4 kg for women.



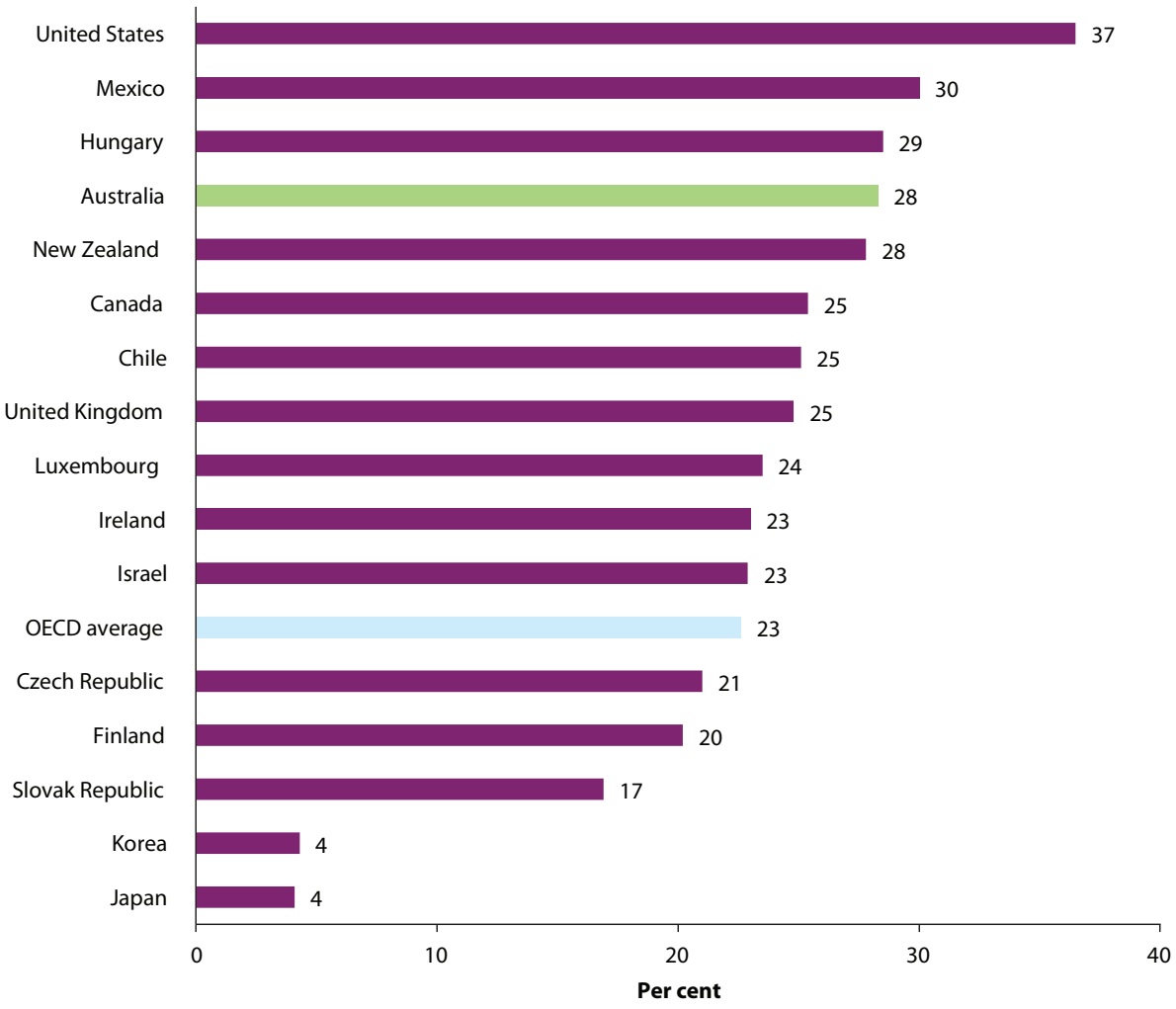
Note: The distributions have been smoothed, including the minimum and maximum values which are based on aggregates of 12 or less and 49 or more.

Sources: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; AIHW 2012b.

Figure 2.17: Distribution of body mass index, persons aged 18 and over, 1995, 2007–08 and 2011–12

International comparisons

Based on data for 2011 or the closest available year on measured height and weight for people aged over 15 years, more than half (53%) of adults in OECD countries were overweight or obese (OECD 2013). Australia's rate of obesity (28% of the population aged 15 and over) was fourth highest among 34 OECD countries, behind the United States (37%), Mexico (30%) and Hungary (29%). The average rate of obesity among OECD countries was 23%. Japan and Korea had the lowest rate of obesity at 4% (Figure 2.18).



Note: Countries with measured height and weight only.

Source: OECD 2013.

Figure 2.18: Obesity in selected OECD countries, persons aged 15 and over, 2011 or nearest year

Box 2.8: Overweight and obesity among children aged 2–17

Childhood overweight and obesity is a major concern that puts children at an increased risk of poor physical health and self-esteem issues in the short term and of being overweight or obese in adulthood, leading to chronic diseases along with psychological and social wellbeing issues. Children living in one-parent families or in low socioeconomic groups are more likely to be overweight or obese (AIHW 2014a).

For children and young people, overweight and obesity are defined using BMI. However, because BMI changes substantially with age and can differ for boys and girls, cut-off points are based on age and sex (Cole et al. 2000). Based on these, 25% of children aged 2–17 were overweight or obese in 2011–12, with 18% being overweight and 7% obese. The proportion of boys who were overweight or obese was not significantly different from girls (25% compared with 26%).

Rates of overweight and obesity were similar across age groups, ranging from 23% for children aged 2–4 to 27% for adolescents aged 12–15. Boys aged 5–7 had the highest obesity rate (9%), and obesity among girls was most common at ages 5–7 and 16–17 (8%) (ABS 2013b).

The proportion of children and adolescents aged 5–17 who were overweight or obese increased between 1995 and 2007–08 (21% and 25%, respectively) and then remained stable to 2011–12 (26%).

High blood pressure

High blood pressure—also known as hypertension—is responsible for more deaths and disease worldwide than any other single health risk factor (Lim et al. 2012).

High blood pressure is a major risk factor for chronic diseases including stroke, CHD, heart failure and CKD (National Heart Foundation of Australia 2010). High blood pressure is also a cardiovascular disease in its own right. The risk factors for high blood pressure are largely the same as those for other forms of CVD. They include age, family history, poor diet (particularly a high salt intake), obesity, excessive alcohol consumption and insufficient physical activity.

High blood pressure can be controlled with lifestyle measures and medication to reduce the risk of chronic disease, although not necessarily to the levels of unaffected people (Whitworth 2003).

Box 2.9: What is high blood pressure?

Blood pressure represents the forces exerted by blood on the walls of the arteries, depending on whether the heart muscle is contracting (systole) or relaxing between contractions (diastole). It is expressed as systolic/diastolic—for example, 120/80 mmHg is stated as '120 over 80'. The relationship between blood pressure levels and cardiovascular risk is continuous, with no threshold level where risk begins.

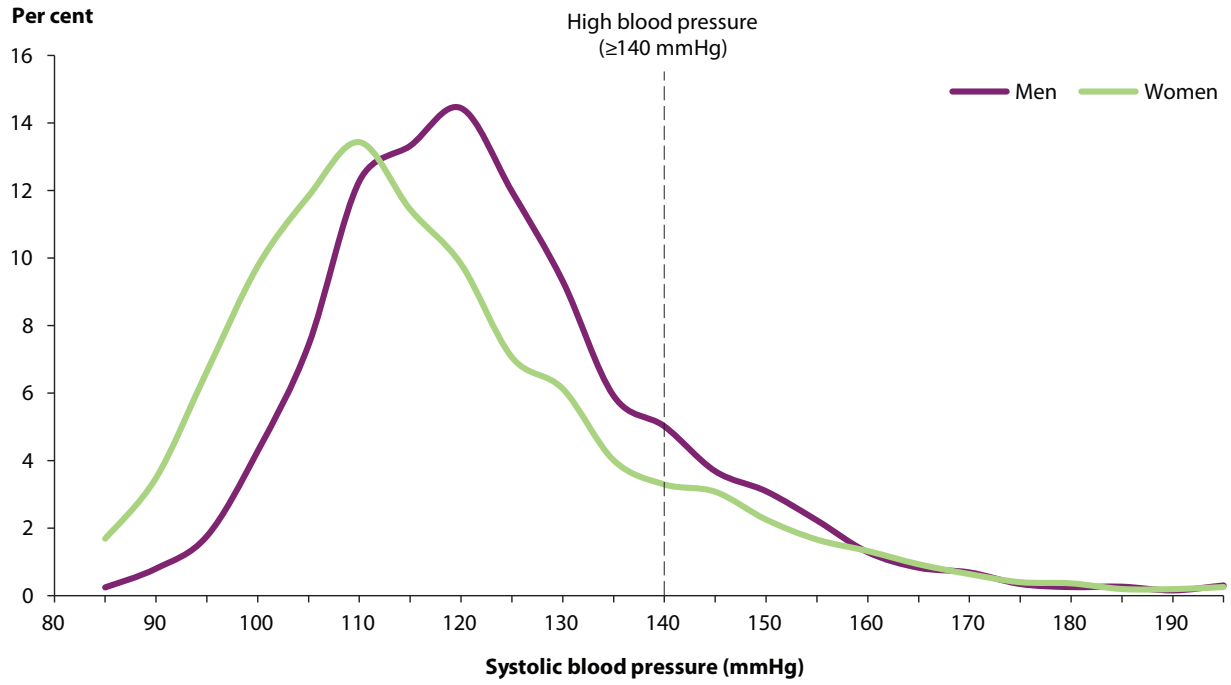
The World Health Organization (WHO) definition of high blood pressure includes any of the following (Whitworth 2003):

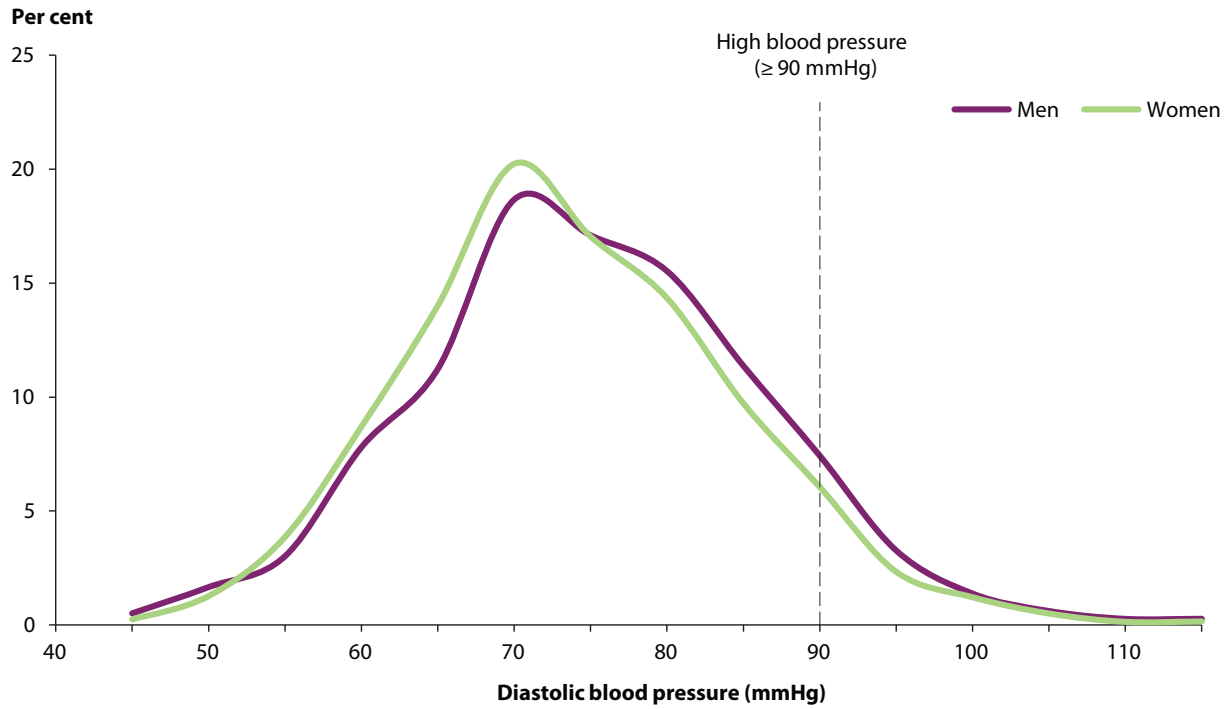
- systolic blood pressure of 140 mmHg or more
- diastolic blood pressure of 90 mmHg or more
- receiving medication for high blood pressure.

The ABS 2011–12 Australian Health Survey measured blood pressure at the time of the interview, and the definitions listed above were used in defining high blood pressure in this report.

In this report, 'uncontrolled high blood pressure' is defined as measured systolic blood pressure of 140 mmHg or more, or diastolic blood pressure of 90 mmHg or more, irrespective of the use of blood pressure medication.

The distributions of systolic and diastolic blood pressure for men and women are shown in Figure 2.19. In 2011–12, the average systolic blood pressure was higher for men (126 mmHg) than for women (120 mmHg). The average diastolic blood pressures were similar for men and women (77 and 76 mmHg, respectively).





Notes

1. Excludes persons for whom blood pressure was not measured or a valid reading was not obtained.
2. The distributions have been smoothed and rounded to the nearest multiple of 5, including the minimum and maximum values which are based on aggregates 89 or less and 195 or more for systolic blood pressure and the minimum and maximum values of 49 or less and 115 or more for diastolic blood pressure.

Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'.

Figure 2.19: Blood pressure, persons aged 18 and over by sex, 2011–12

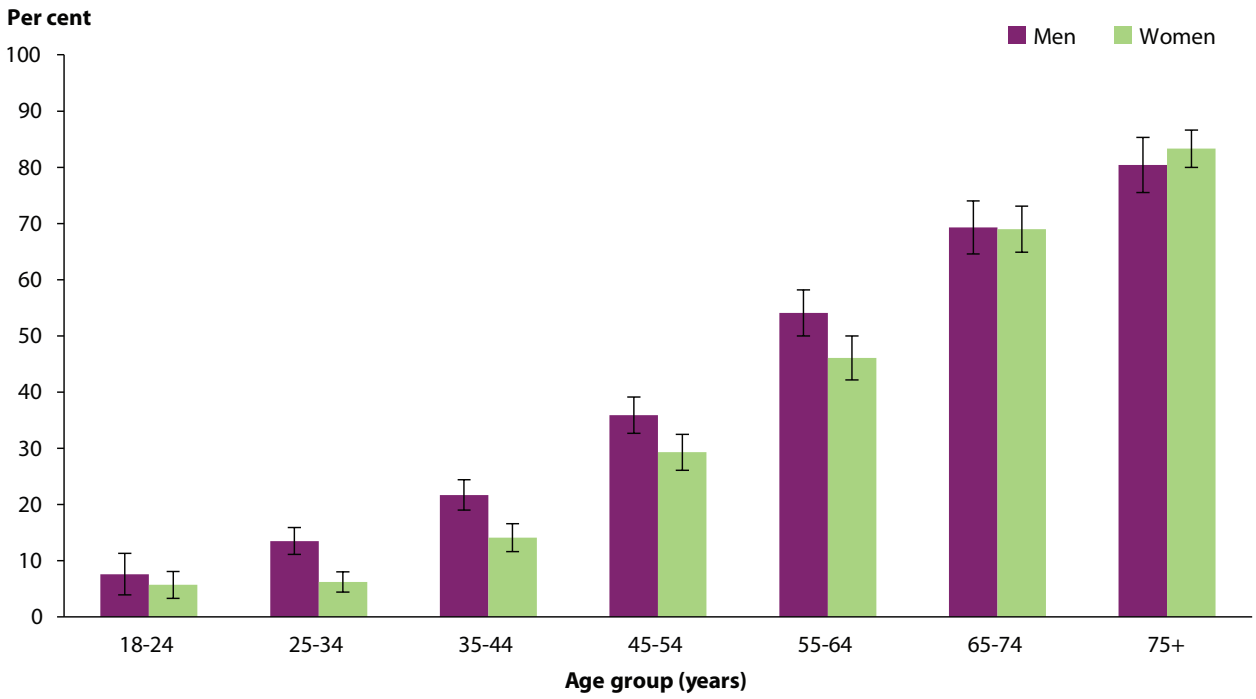
Sex and age

In 2011–12, an estimated 4.6 million Australians aged 18 and over (32%) had high blood pressure (see Appendix Table C8). This includes 3.1 million with uncontrolled high blood pressure and 1.5 million whose blood pressure was controlled by blood pressure medication.

Overall, a higher proportion of men (34%) than women (29%) had high blood pressure. This was also the case for uncontrolled high blood pressure (men 24% and women 20%) (see Appendix Table C6).

The proportion of adults with high blood pressure increased with age (Figure 2.20). The condition was relatively uncommon at the younger age of 18–24 (8% for men and 6% for women) and reached the highest level for both men (80%) and women (83%) at age 75 and over. Between ages 25 and 64, higher proportions of men than women had high blood pressure.

Uncontrolled high blood pressure followed a similar pattern, with the highest levels observed among men (44%) and women (52%) aged 75 and over.



Note: Excludes persons for whom blood pressure was not measured or a valid reading was not obtained.
Source: AIHW analysis of unpublished ABS 'Australian Health Survey 2011–12 (National Health Measures Survey Component)'; Table C8.

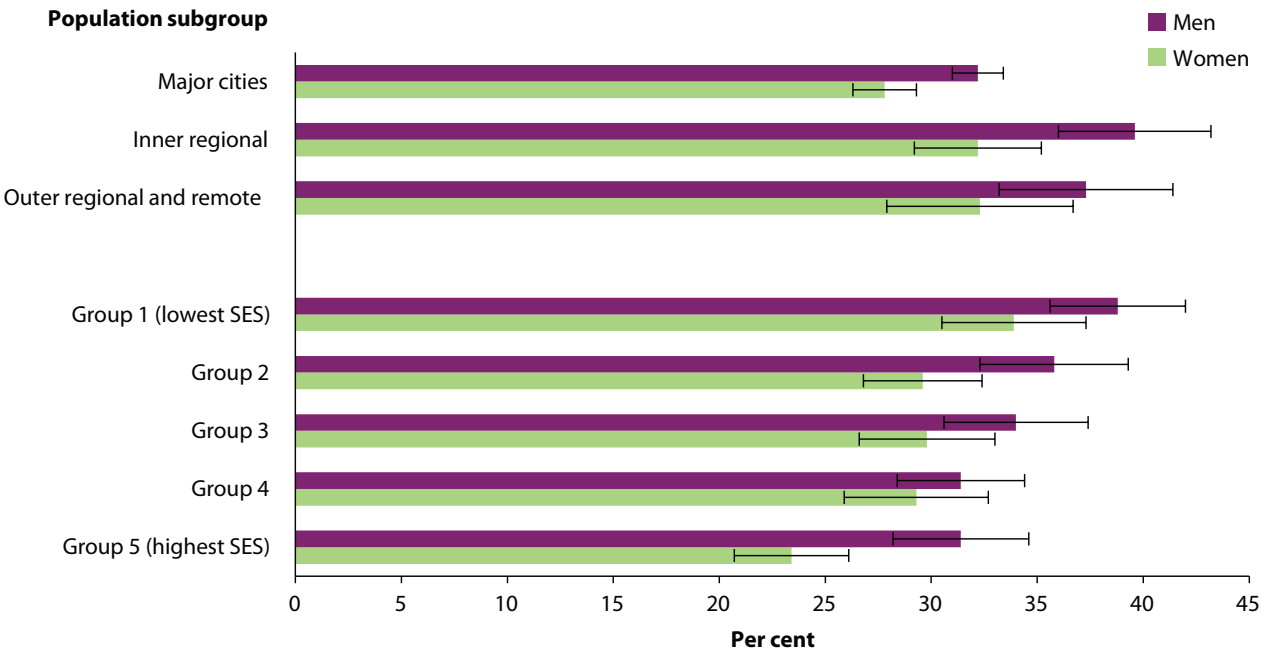
Figure 2.20: High blood pressure, by age and sex, 2011–12

Inequalities

In 2011–12, 32% of men and 28% of women living in *Major cities* had high blood pressure, increasing to 40% of men and 32% of women in *Inner regional* areas (Figure 2.21). The highest proportion of uncontrolled high blood pressure was among men (28%) and women (20%) in *Inner regional* areas, followed by *Outer regional and remote* areas (23% for men and 19% for women).

High blood pressure is more common in lower socioeconomic groups. In 2011–12, 39% of men and 34% of women in the lowest socioeconomic group had high blood pressure, compared with 31% of men and 23% of women in the highest (Figure 2.21).

Similar patterns emerged for women with uncontrolled high blood pressure, with 24% of women in the lowest socioeconomic group, compared with 15% of women in the highest socioeconomic group. For men, the proportion with uncontrolled high blood pressure was similar across SES groups.



Notes

1. Excludes persons for whom blood pressure was not measured or a valid reading was not obtained.
2. Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C8.

Figure 2.21: High blood pressure, persons aged 18 and over, by selected population characteristics, 2011–12

International comparisons

The WHO reported that 32% of the Australian population aged 25 and over had high blood pressure in 2008 (WHO 2014b). This was a lower proportion than most other OECD countries, and lower than the average across 34 OECD countries (38%).

Canada, Korea and the United States (all 30%) had the lowest proportions, and central and eastern European countries including Hungary, the Slovak Republic, Poland, Slovenia and Estonia the highest (all above 45%).

Dyslipidaemia

Blood lipids are fats in the blood, and include cholesterol and triglycerides. Cholesterol is a fatty substance produced by the liver and carried by the blood to supply material for cell walls and hormones. Triglycerides play an important role in metabolism as an energy source and in helping to transfer dietary fat throughout the body.

Dyslipidaemia—abnormal blood lipid levels—can contribute to the development of atherosclerosis, a build-up of fatty deposits in the blood vessels which may lead to the development of CVD. Dyslipidaemia is a risk factor for chronic diseases such as CHD, stroke and diabetes (AIHW 2009). There is also evidence that patients with CKD exhibit significant alterations in lipoprotein metabolism (Tsimihodimos et al. 2011), but it is less certain whether dyslipidaemia is a risk factor for the development or progression of CKD.

People with dyslipidaemia are encouraged to adopt a healthy lifestyle through a balanced diet and sufficient physical activity, and may also be treated using lipid-modifying medications such as statins (Taylor et al. 2011). Cholesterol-lowering medications also reduce the risk of vascular events in people with CKD (Baigent et al. 2011).

Box 2.10: What is dyslipidaemia?

Dyslipidaemia refers to a number of different conditions where there are abnormal levels of fats, such as cholesterol or triglycerides, in the blood.

Blood tests are used to determine levels of the most commonly measured lipids. The standard lipid blood tests include measurements of total cholesterol, low-density lipoprotein cholesterol (LDL, or 'bad' cholesterol), high-density lipoprotein cholesterol (HDL, or 'good' cholesterol), as well as triglycerides.

The National Heart Foundation (National Heart Foundation of Australia 2012) goals for healthy lipids levels are:

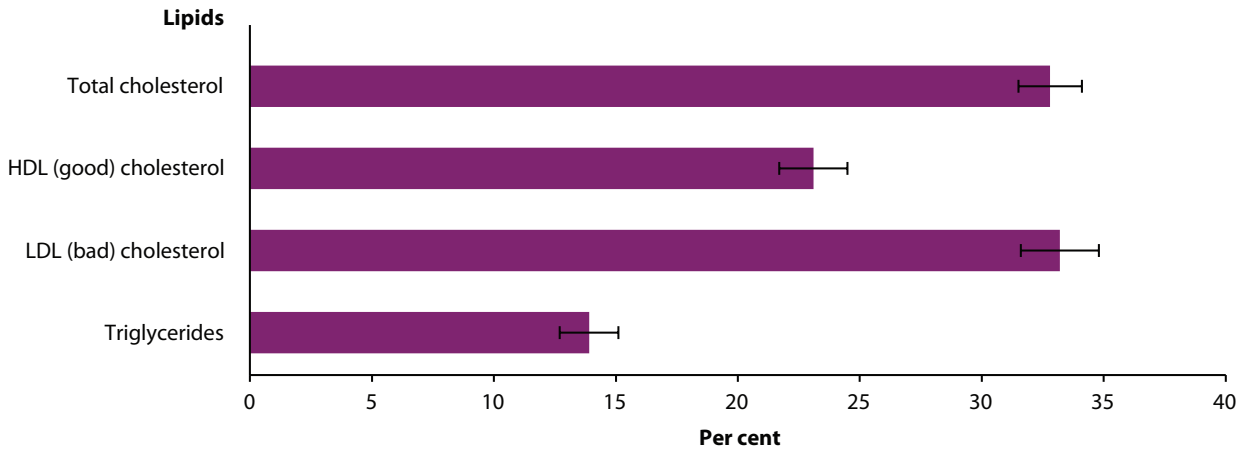
- LDL cholesterol < 1.8 mmol/L
- HDL cholesterol > 1.0 mmol/L
- triglycerides < 2.0 mmol/L.

In the ABS 2011–12 Australian Health Survey, a person was classified as having dyslipidaemia if they had one or more of the following (ABS 2013e):

- total cholesterol ≥ 5.5 mmol/L
- LDL cholesterol ≥ 3.5 mmol/L
- HDL cholesterol < 1.0 mmol/L for men, and < 1.3 mmol/L for women
- triglycerides ≥ 2.0 mmol/L
- taking lipid-modifying medication.

In this report, uncontrolled dyslipidaemia is defined as abnormal lipid levels in the blood, irrespective of whether the person takes lipid-modifying medications.

In 2011–12, 33% of Australian adults had high levels of LDL (bad) cholesterol, 23% had low levels of HDL (good) cholesterol and 14% had high levels of triglycerides (Figure 2.22). One in 3 Australians aged 18 and over had a total cholesterol level that was considered high.

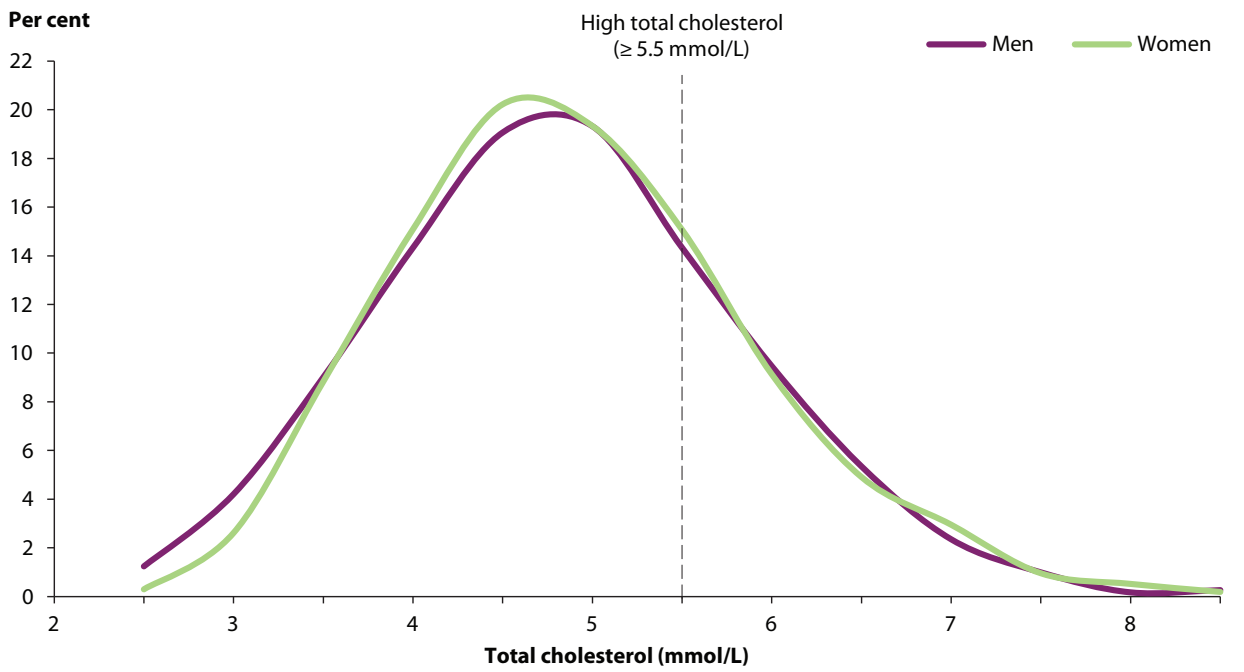


Note: The proportions have been derived from population participating in the National Health Measures Survey; for more information see Table A2.

Source: ABS 2013d.

Figure 2.22: Dyslipidaemia, persons aged 18 and over, 2011–12

Figure 2.23 shows the distribution of total cholesterol level for men and women aged 18 and over. In 2011–12, the average total cholesterol levels for men and women were 5.0 and 5.1 mmol/L respectively.



Notes

1. Excludes persons who did not participate in blood test.
2. The distributions have been smoothed, including the minimum and maximum values which are based on aggregates of 3 or less and 8.5 or more.

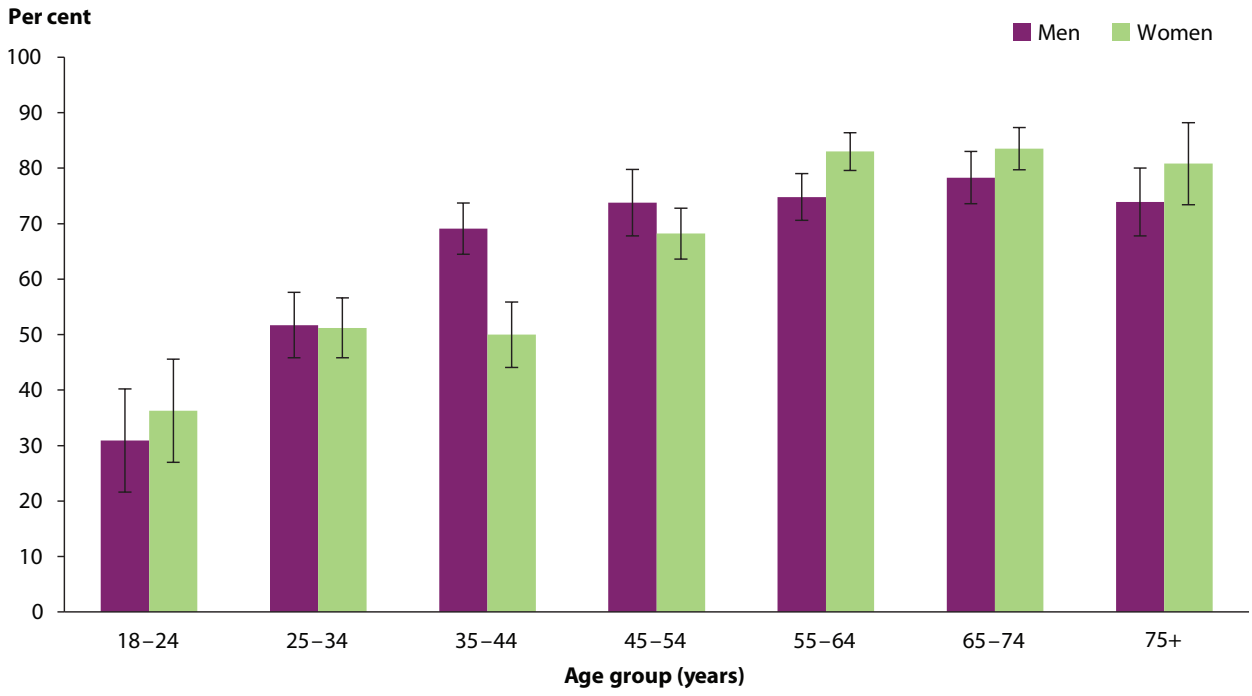
Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'.

Figure 2.23: Total blood cholesterol, persons aged 18 and over by sex, 2011–12

Sex and age

In 2011–12, two-thirds (63%) of Australians aged 18 and over (approximately 8.5 million people) had dyslipidaemia, including those with uncontrolled dyslipidaemia (7.6 million, 57%) and those taking some form of lipid-modifying medication but with normal lipid levels (0.9 million, 7%) (see Appendix Table C6).

Dyslipidaemia was common among both men and women, with rates over 50% for most age groups, except those aged 18–24 (Figure 2.24). Rates increased from age 18–24 to 65–74. Uncontrolled dyslipidaemia followed similar patterns.



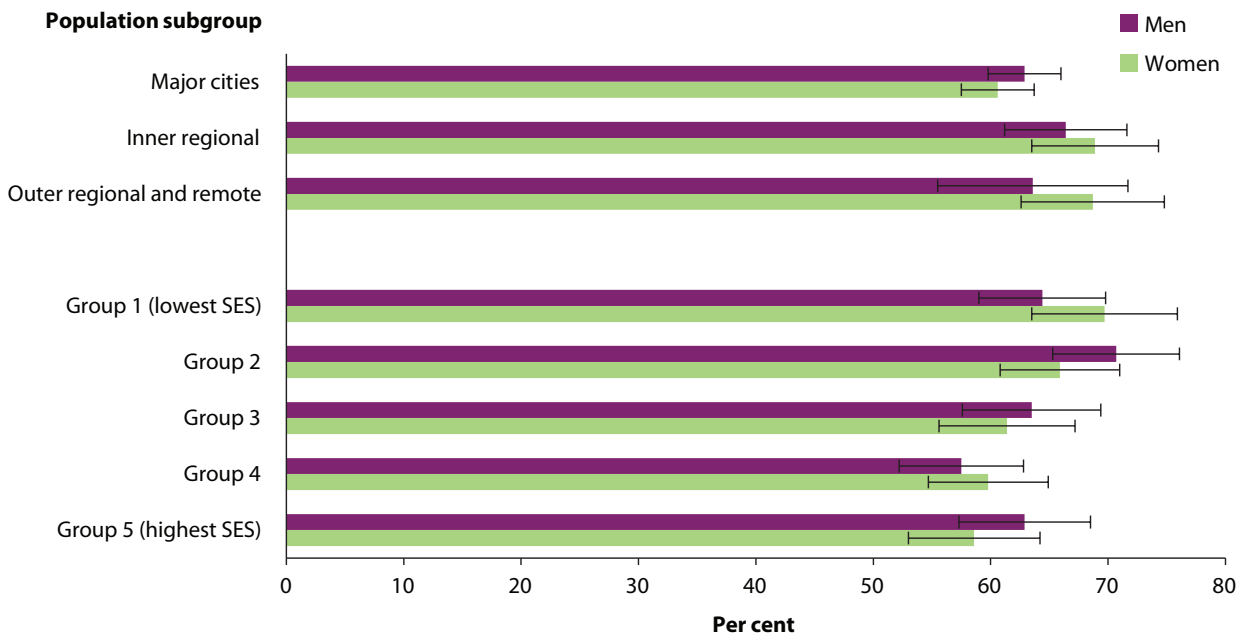
Note: Excludes persons who did not fast for 8 hours or more prior to their blood test.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C9.

Figure 2.24: Dyslipidaemia, by age and sex, 2011–12

Inequalities

In 2011–12, there were no distinguishable differences in the proportions of men and women with dyslipidaemia across geographic areas and socioeconomic groups (Figure 2.25).



Notes

1. Excludes persons who did not fast for 8 hours or more prior to their blood test.
2. Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C9.

Figure 2.25: Dyslipidaemia, persons aged 18 and over, by selected population characteristics, 2011–12

International comparisons

The WHO reported that Australian men and women aged 25 and over had average total cholesterol levels of 5.1 and 5.2 mmol/L in 2009 (WHO 2014a).

This was similar to New Zealand and Canada (5.1 mmol/L for both men and women) but lower than in United Kingdom (5.4 mmol/L for both sexes). Korea had the lowest average of 34 OECD countries, with total cholesterol of 4.9 mmol/L for both men and women. The highest average of 5.5 mmol/L was in Denmark and Germany.

Impaired fasting glucose

The initial stages of type 2 diabetes, also known as pre-diabetes, are characterised by impaired glucose regulation, including both impaired fasting glucose (IFG) and impaired glucose tolerance (IGT) (WHO & IDF 2006). IFG is characterised by higher than usual levels of glucose in the blood when fasting. People who have IFG or IGT are at risk for the future development of diabetes and cardiovascular disease (Twigg et al. 2007). Estimates indicate that most people with these pre-diabetic states eventually develop diabetes (Nathan et al. 2007).

Early treatment and improved management of impaired glucose regulation may help to reduce the occurrence of type 2 diabetes (Bennett 1999; Shaw & Chisholm 2003). Lifestyle changes incorporating increased physical activity and healthy eating can slow the progression of IFG and IGT to diabetes (Tuomilehto et al. 2001).

Box 2.11: Impaired fasting glucose

'Impaired fasting glucose' (IFG) is defined as the presence of higher than usual levels of glucose in the blood after fasting, in the range of 6.1 to 6.9 mmol/L but less than diabetes levels (at least 7.0 mmol/L).

In the ABS 2011–12 Australian Health Survey (AHS), a person who did not currently have diabetes but had an IFG result ranging from 6.1 to 6.9 mmol/L was considered to be at high risk of diabetes.

IFG is one of 2 measures that are used to define impaired glucose regulation, the other being impaired glucose tolerance (IGT). The ABS 2011–12 AHS collected measured data on IFG. IGT was not measured (ABS 2013e).

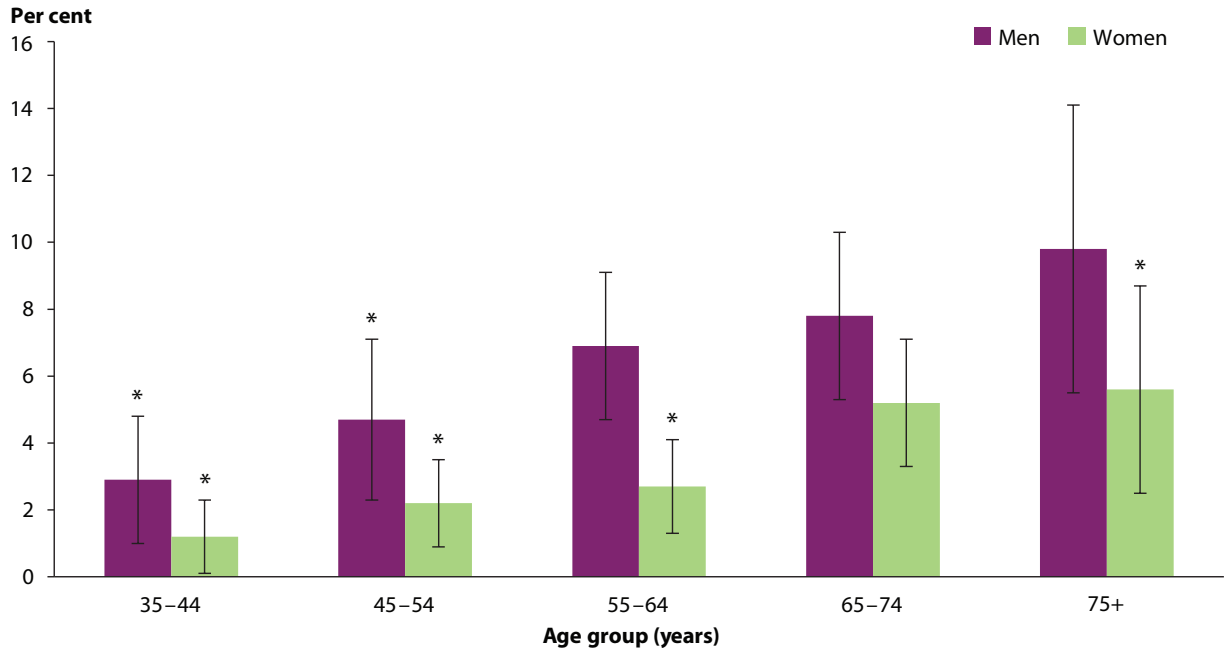
Since elevated blood glucose is a risk factor for CVD, type 2 diabetes and CKD, this report presents information on both IFG and diabetes. 'Elevated blood glucose' is here defined as blood glucose levels of 6.1 mmol/L and above.

Sex and age

In 2011–12, an estimated 1.1 million (8.2%) people aged 18 and over had elevated blood glucose levels, comprised of 5.1% who had diabetes, and 3.1% who had IFG. Men were more likely to have elevated blood glucose than women (10% and 6% respectively) (see Appendix Table C6).

The proportion of adults with IFG and thus at high risk of developing diabetes was 3.1% (420,000 persons). A higher proportion of men (4.1%) than women (2.1%) had IFG (see Appendix Table C10).

The proportion of adults with IFG increased with age—2.1% of those aged 35–44, compared with 7.5% among people aged 75 and over—however, most differences are not statistically significant (Figure 2.26).



* Estimate has a relative standard error (RSE) of 25% to 50% and should be used with caution.

Notes

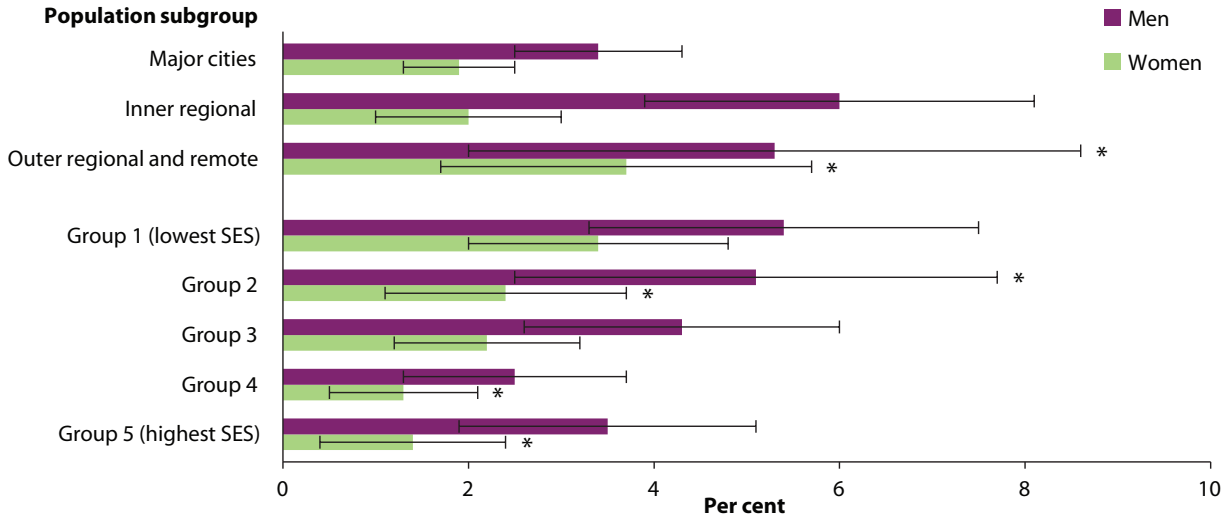
1. Excludes persons who did not fast for 8 hours or more prior to their blood test
2. Excludes age groups 18–24 and 25–34 due to small sample counts resulting in RSEs greater than 50%.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C10.

Figure 2.26: Impaired fasting glucose, by age and sex, 2011–12

Inequalities

In 2011–12, there were no statistically significant differences in the proportion of men and women with IFG across geographic areas and socioeconomic groups (Figure 2.27).



* Estimate has a relative standard error of 25% to 50% and should be used with caution.

Notes

1. Excludes persons who did not fast for 8 hours or more prior to their blood test.
2. Refer to Appendix B for definitions of classifications for remoteness and socioeconomic groups.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C10.

Figure 2.27: Impaired fasting glucose, persons aged 18 and over, by selected population characteristics, 2011–12

Multiple risk factors

Risk factors in populations are often considered in isolation, and individually each is important. However, while the presence of single risk factors can lead to illness, there is an increasing risk of developing chronic disease when more than one risk factor is present (Yusuf et al. 1998). Therefore, minimising the number of risk factors, as well as their levels, is important.

The combined effects of multiple risk factors can manifest in the earlier development of a condition, in an increased burden and need for management of a condition, in greater health-care costs and ultimately in reduced life expectancy.

Having multiple risk factors can also affect the speed at which a condition progresses. The combination of high blood pressure, dyslipidaemia and diabetes, for example, accelerates the build-up of plaque which leads to blockage of arteries. Controlling these risk factors can stabilise lesions and slow progression.

Understanding multiple risk factors can assist health professionals in developing better disease management regimes and in targeting their interventions. The measurement of the effect of multiple risk factors is difficult, however, since the effect of individual factors is often mediated through other factors.

In summary, the prevalence of individual risk factors among adults in 2011–12 was:

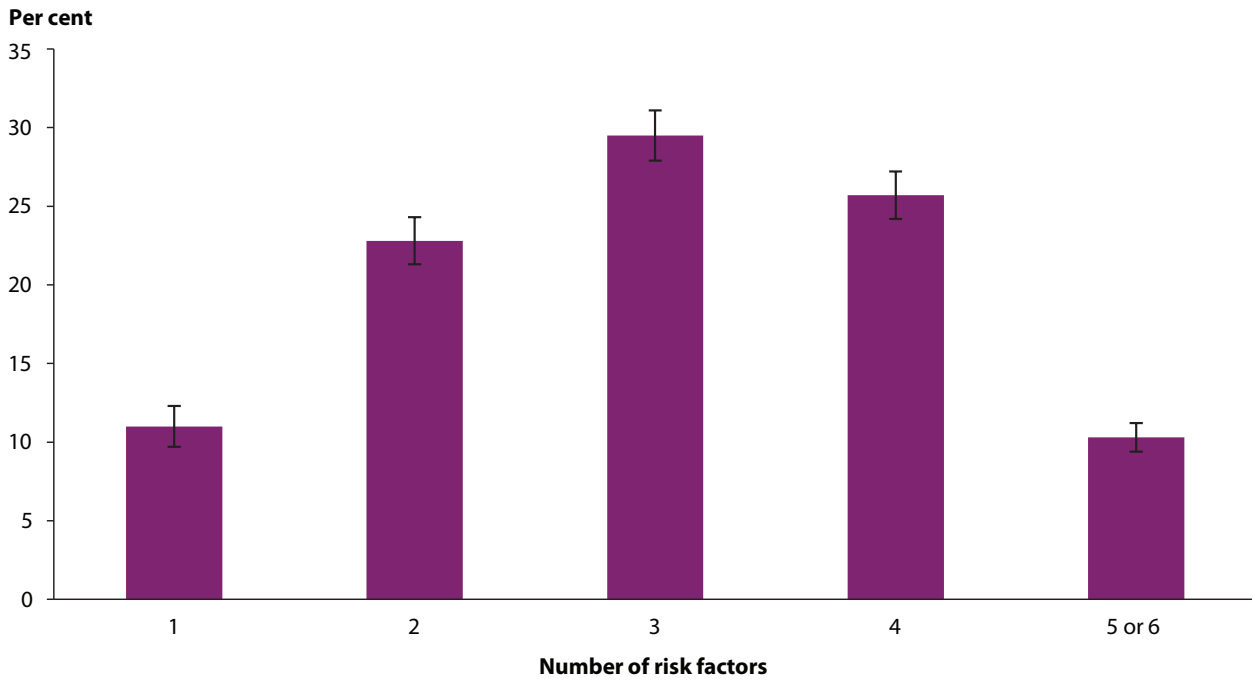
- 95% did not consume a sufficient amount of fruit and vegetables
- 63% were overweight or obese
- 63% had dyslipidaemia, including 57% who had uncontrolled dyslipidaemia
- 56% were inactive or insufficiently active
- 32% had high blood pressure, including 22% with uncontrolled high blood pressure
- 20% exceeded alcohol consumption guidelines for lifetime risk
- 16% smoked daily
- 8% had elevated blood glucose levels, including 3% with IFG.

The following sections examine selected combinations of risk factors, including daily smoking, inactive or insufficiently active, inadequate fruit and vegetable consumption, overweight or obese, high blood pressure and dyslipidaemia—with survey limitations excluding from this analysis lifetime risk of harm from excessive alcohol consumption, and IFG (see Appendix B).

Number of risk factors

Almost all adults (99%) had at least 1 of the 6 risk factors available for analysis.

Almost one in 4 (23%) Australian adults had 2 of these risk factors in combination (Figure 2.28). Two in 3 (66%) adults had 3 or more risk factors at the same time, with 10% of the population having 5 or 6 risk factors.



Note: Includes daily smoking, inactive or insufficiently active, inadequate fruit and vegetable consumption, overweight or obese, high blood pressure and dyslipidaemia.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'.

Figure 2.28: Number of selected risk factors, persons aged 18 and over, 2011–12

Risk factor combinations

Many combinations of risk factors are possible—a selection of some is presented in Table 2.1. Reflecting their high prevalence as single risk factors, inadequate fruit and vegetable consumption, overweight or obesity, dyslipidaemia, and inactive or insufficiently active feature prominently in these combinations.

Different risk factor combinations have different effects on health. For example, although daily smoking and excessive alcohol consumption do not feature as often as the risk factors associated with nutrition, their effect on health outcomes may be larger (AIHW 2012b).

A majority of the Australian adult population (55%) were overweight or obese and also had inadequate fruit and vegetable consumption. One-third (33%) were overweight or obese and were inactive or insufficiently active. Daily smoking and excessive drinking—a well-recognised risk factor combination—was reported by only 5% of the population.

For 3 risk factors in combination, almost one-third of the adult population (31%) had inadequate fruit and vegetable consumption, were overweight or obese and were inactive or insufficiently active. Overweight or obese, uncontrolled high blood pressure and dyslipidaemia are 3 important biomedical risk factors increasing the risk of CVD and type 2 diabetes, and 9% of the population had these in combination.

Approximately 3% of the population (549,000 people) had the following 4 behavioural risk factors: inadequate fruit and vegetable consumption, inactive or insufficiently active, excessive alcohol consumption and daily smoking. Two per cent (261,000 people) had 4 biomedical risk factors: overweight or obese, dyslipidaemia, uncontrolled high blood pressure and elevated blood glucose.

Table 2.1: Selected combinations of risk factors, persons aged 18 and over, 2011–12

2 risk factors	%	3 risk factors	%	4 risk factors	%
Inadequate fruit and vegetable consumption & overweight or obese	55	Inadequate fruit and vegetable consumption & overweight or obese & inactive or insufficiently active	31	Overweight or obese & inactive or insufficiently active & dyslipidaemia & uncontrolled high blood pressure	6
Overweight or obese & dyslipidaemia	34	Overweight or obese & inactive or insufficiently active & dyslipidaemia	19	Inadequate fruit and vegetable consumption & inactive or insufficiently active & excessive alcohol consumption[(a)] & daily smoking	3
Overweight or obese & inactive or insufficiently active	33	Inadequate fruit and vegetable consumption & inactive or insufficiently active & uncontrolled high blood pressure	11	Overweight or obese & dyslipidaemia & uncontrolled high blood pressure & elevated blood glucose	2
Inactive or insufficiently active & dyslipidaemia	28	Overweight or obese & uncontrolled high blood pressure & dyslipidaemia	9		
Inadequate fruit and vegetable consumption & excessive alcohol consumption[(a)]	19	Inadequate fruit and vegetable consumption & excessive alcohol consumption[(a)] & daily smoking	5		
Overweight or obese & uncontrolled high blood pressure	14	Overweight or obese & dyslipidaemia & elevated blood glucose	4		
Inactive or insufficiently active & uncontrolled high blood pressure	12	Inactive or insufficiently active & excessive alcohol consumption & daily smoking	3		
Uncontrolled high blood pressure & dyslipidaemia	12	Overweight or obese & uncontrolled high blood pressure & elevated blood glucose	2		
Inactive or insufficiently active & daily smoking	7				
Excessive alcohol consumption & daily smoking[(a)]	5				

(a) Combinations of excessive alcohol consumption with other risk factors are derived from the National Health Survey (NHS) and use person weights. All other combinations of risk factors are derived from the National Health Measure Survey (NHMS) and use biomedical weights.

Notes

1. Calculations include: daily smoking, inactive or insufficiently active, excessive alcohol consumption, inadequate fruit and vegetable consumption, overweight or obese, uncontrolled high blood pressure, dyslipidaemia and elevated blood glucose.
2. This table presents selected combinations of risk factors only.
3. Persons may have more than 2, 3 or 4 risk factors.

Sources: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12' and 'Microdata: Australian Health Survey, National Health Survey, 2011–12'.

3 Risk factor profile of people with CVD

Cardiovascular disease (CVD) encompasses many different conditions affecting the heart and blood vessels. The most common forms in Australia are CHD, stroke and heart failure. CVD is a leading cause of death and disability in Australia, in 2011 accounting for almost one-third (over 45,000) of deaths (see *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: mortality*).

The main underlying cause of CVD is atherosclerosis, leading to reduced or blocked blood supply to the heart (causing angina or heart attack) or to the brain (causing stroke). Known risk factors for atherosclerosis explain at least 75% of cases of CHD, offering great scope for prevention at both individual and whole population levels (Beaglehole & Magnus 2002).

The development of CVD is closely associated with behavioural risk factors such as smoking, physical inactivity, poor nutrition and the harmful use of alcohol. These behaviours contribute to the development of biomedical risk factors including overweight and obesity, high blood pressure and high blood cholesterol levels, which in turn can lead to chronic disease.

CVD is closely related with diabetes and CKD since the conditions share many risk factors and often coexist (NVDPA 2012). In 2011–12, 30% of persons with CVD also had diabetes and/or CKD (see *Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: prevalence and incidence*).

This chapter examines risk factors among people with CVD, and compares these with persons without CVD. The population with CVD in this report is obtained from self-reported data on long-term health conditions from the ABS 2011–12 AHS (see Appendix Table B1).

Data presented in this chapter may vary slightly and are not comparable with the data presented in Chapter 2. Sample sizes and population weights may differ, depending on which component of the survey was used (see Appendix B for further details). Analysis of risk factors for people with CVD was obtained from the NHMS only, to ensure its comparability with diabetes and CKD, and to maintain consistency across behavioural and biomedical risk factors (see Appendix A).

Since these data represent a snapshot at one point in time, caution should be used in attributing cause and effect to risk factors and chronic disease. Risk factors present at the time of the survey may or may not have contributed to the presence of a chronic condition. Chronic conditions can also affect risk factors; the presence of CVD could lead to reduced smoking, or disability caused by stroke may lead to reduced physical activity, for example. Similarly, the presence of CVD should not be attributed to the number of risk factors a person has.

Behavioural risk factors

Tobacco smoking

The absorption of the components of tobacco smoke into the bloodstream increases the risk of CVD through many mechanisms. It damages blood vessels, increases the risk of plaque and clots and reduces the blood's oxygen levels.

Giving up smoking is associated with substantially improved cardiovascular function and reduction in the risk of cardiovascular morbidity and mortality (Gratziou 2009). The risk of a coronary event among ex-smokers declines rapidly after quitting. Successfully quitting smoking can result in an increase in life expectancy of up to 10 years, if it occurs early enough (Zwar et al. 2011).

In 2011–12, 10% of adults with CVD smoked daily, similar to the 11% among adults without CVD (Figure 3.1).

The proportion of daily smokers among adults with CVD is higher in the age groups 18–39 (20%) and 40–54 (17%), compared with the age group 55 and over (6%) (Figure 3.2).

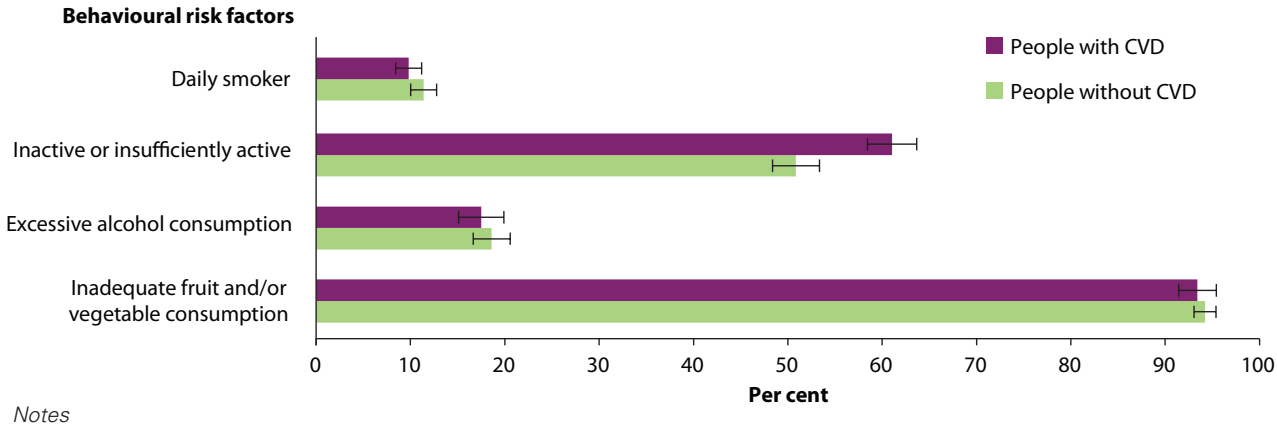
Insufficient physical activity

Physical inactivity is associated with an increased risk for a range of cardiovascular diseases including CHD, stroke, peripheral vascular disease and other conditions including high blood pressure and dyslipidaemia. Conversely, regular physical activity has a protective effect, lowering the risk of developing CVD and other CVD risk factors (Li & Siegrist 2012). For women, physical inactivity dominates all other risk factors in the risk of CVD after the age of 30 (Brown et al. 2014).

In addition to its direct effect on cardiovascular health, insufficient physical activity is associated with other CVD risk factors such as overweight or obesity, high blood pressure, dyslipidaemia and type 2 diabetes.

In 2011–12, 61% of persons aged 18 and over with CVD were inactive or insufficiently active, a higher proportion than the 51% of persons without CVD (Figure 3.1). This partially reflects the older age profile of the CVD population —around two-thirds of the CVD population were aged 55 and over, compared with one-third of the population without CVD.

The proportion of adults inactive or insufficiently active and with CVD increased with age, from 39% for those aged 18–39 to 65% for those aged 55 and over (Figure 3.2).

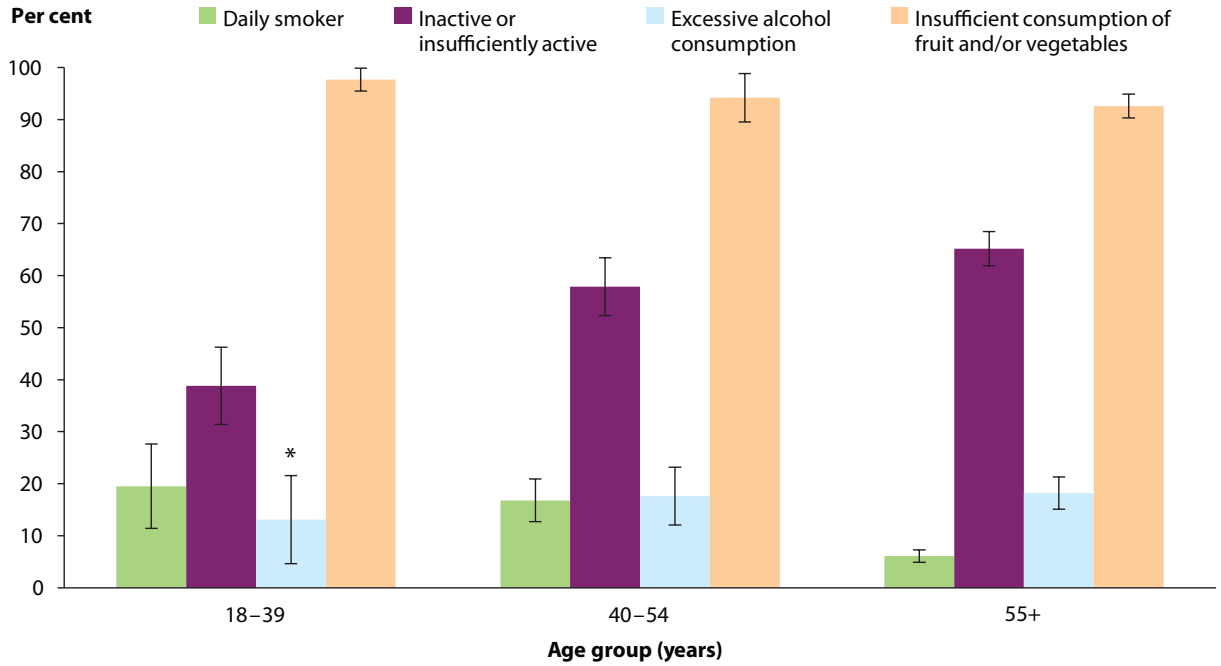


Notes

1. CVD population is based on the self-reported data of people who participated in the National Health Measures Survey.
2. Excessive alcohol consumption relates to lifetime risk of alcohol-related harm or injury.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C11.

Figure 3.1: Behavioural risk factors, persons aged 18 and over with and without CVD, 2011–12



* Estimate has a relative standard error of 25% to 50% and should be used with caution.

Notes

1. CVD population is based on the self-reported data of people who participated in the National Health Measures Survey.
2. Excessive alcohol consumption relates to lifetime risk of alcohol-related harm or injury.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C11.

Figure 3.2: Behavioural risk factors, persons with CVD, by age, 2011–12

Excessive alcohol consumption

Long-term excessive drinking is associated with cardiovascular diseases such as stroke, CHD, high blood pressure and heart failure. The lifetime risk of harm from drinking alcohol increases with the amount consumed (NHMRC 2009). Additionally, alcohol is a source of energy, and excessive consumption can lead to overweight and obesity. Light to moderate drinking without heavy drinking occasions, however, has been linked to beneficial effects on cardiovascular health (Rehm et al. 2010; Ronksley et al. 2011).

In 2011–12, 18% of adults with CVD consumed more than 2 standard drinks per day on average, exceeding the lifetime alcohol risk guidelines (Figure 3.1). This was similar to the proportion of adults without CVD exceeding lifetime risk guidelines (19%).

The proportion exceeding the lifetime alcohol risk guidelines is similar in the age groups 18–39 (13%), 40–54 (18%), and 55 and over (18%) (Figure 3.2).

Inadequate fruit and vegetable consumption

Consuming fruit and vegetables has a protective effect against cardiovascular disease (NHMRC 2013b), although the extent of the association remains uncertain (He et al. 2007; Martinez-Gonzalez et al. 2011). There is evidence that antioxidants and other vitamins, minerals and fibre found in fruit and vegetables may contribute to lower levels of blood cholesterol, blood pressure and atherosclerosis (De Moura 2008; Priebe et al. 2008; Erkkila et al. 2005).

In 2011–12, 93% of adults with CVD did not consume an adequate amount of fruit and vegetables, which was similar to the 94% of adults without CVD (Figure 3.1).

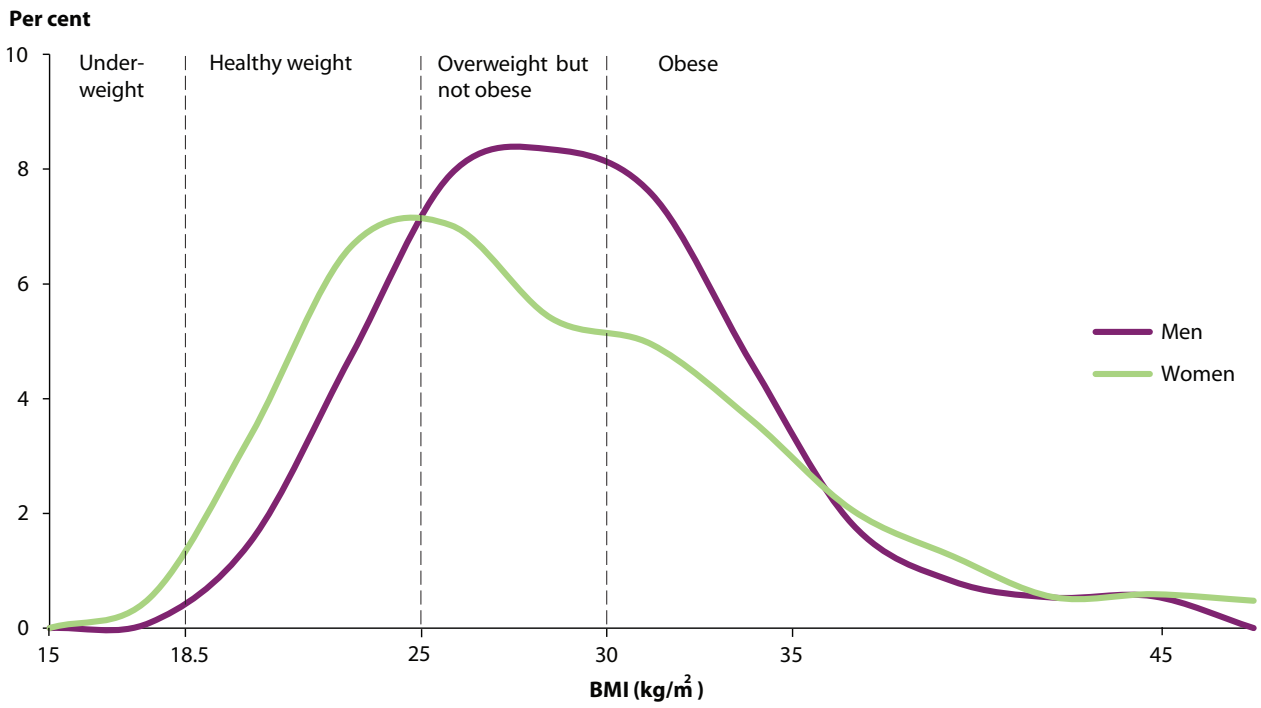
The proportion of adults with CVD who consumed an inadequate amount of fruit and vegetables was similar across age groups—98% of 18–39 year olds, 94% of 40–54 year olds and 93% of those aged 55 and over (Figure 3.2).

Biomedical risk factors

Overweight and obesity

Being overweight or obese is associated with increased risk of hypertension, CHD, stroke and other cardiovascular conditions. Intentional weight loss can assist in lowering the incidence of cardiovascular events and mortality. Weight loss can also favourably influence CVD risk factors such as high blood pressure and dyslipidaemia (NHMRC 2013a).

Figure 3.3 shows the distribution of BMI for men and women with CVD skewed towards high BMI values, more so than in the general population (see Figure 2.13).



Notes

1. CVD population is based on the self-reported data of people who participated in the National Health Measures Survey.
2. The distributions have been smoothed, including the minimum and maximum values which are based on aggregates of 12 or less and 49 or more.

Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'.

Figure 3.3: Distribution of body mass index, persons aged 18 and over with CVD, 2011–12

In 2011–12, 75% of people who had CVD were overweight or obese, of which 38% were obese. The rate of overweight or obesity in people with CVD was 1.3 times that of people without CVD (57%) (Figure 3.4).

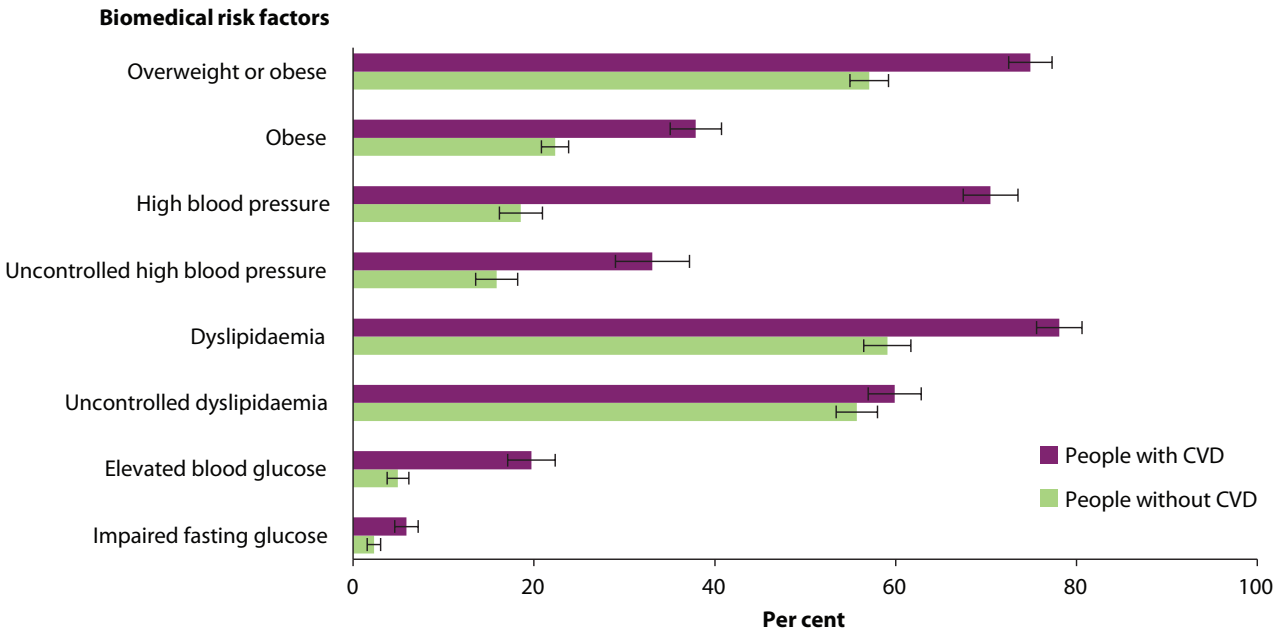
The proportion of overweight or obese people with CVD increases from 62% for 18–39 years olds to 76% for 55 or over (Figure 3.5).

High blood pressure

The risk of developing cardiovascular conditions—such as stroke, CHD, heart failure and peripheral vascular disease—increases as blood pressure increases, while controlling or reducing high blood pressure reduces the risk of CVD (National Heart Foundation of Australia 2010). High blood pressure is more likely to occur if other risk factors are already present, including tobacco smoking, physical inactivity, poor diet and obesity.

In 2011–12, 71% of people aged 18 and over with CVD had high blood pressure, compared with 19% of those without CVD. High blood pressure, also known as hypertension, is itself a cardiovascular condition and therefore rates of high blood pressure are high in the CVD population.

Among adults with CVD, 33% had uncontrolled high blood pressure, compared with 16% of those without CVD (Figure 3.4). The proportion of persons with high blood pressure increased with age, being highest among adults with CVD aged 55 and over (86%) (Figure 3.5). Some adults who had high blood pressure did not report having CVD, indicating that they were not aware of the condition. At the time of the survey, 86% of adults not reporting CVD who had high blood pressure had uncontrolled high blood pressure, compared with 47% of people with CVD.

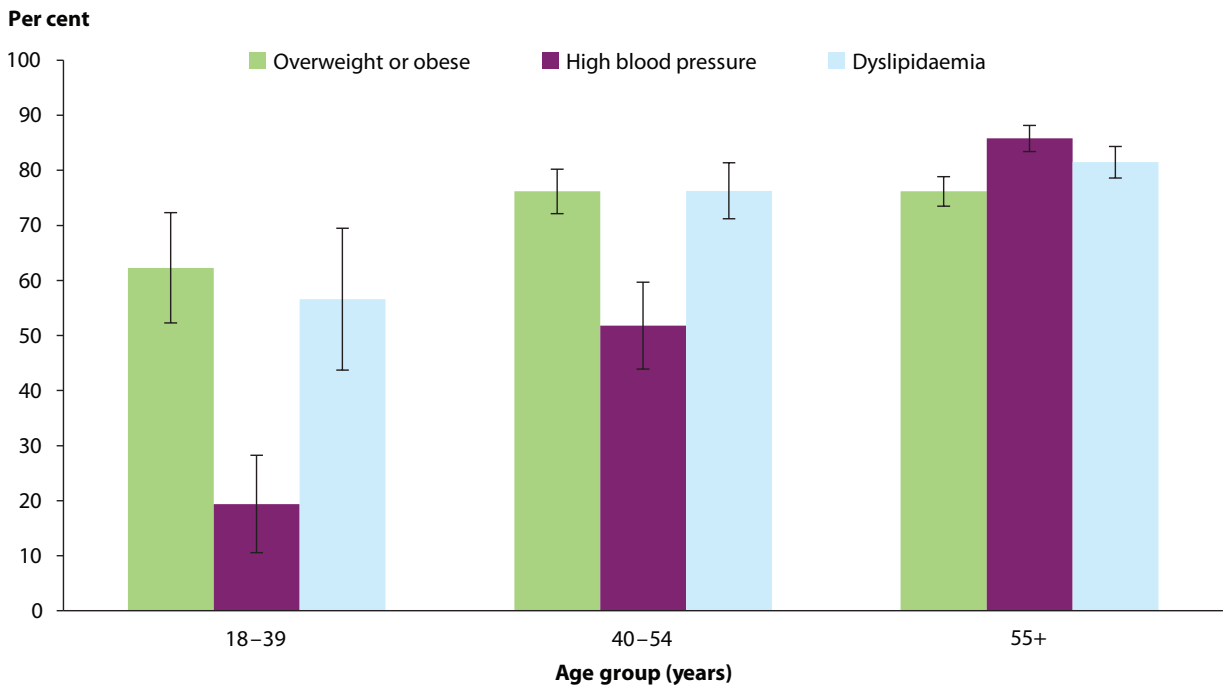


Notes

1. CVD population is based on the self-reported data of people who participated in the National Health Measures Survey.
2. Exclusions: overweight or obese and obese—persons for whom height and weight were not taken; high blood pressure and uncontrolled high blood pressure—blood pressure was not measured or a valid reading was not obtained; dyslipidaemia, uncontrolled dyslipidaemia, elevated blood glucose and impaired fasting glucose—persons who did not fast for 8 hours or more prior to their blood test.
3. Elevated blood glucose levels are above 6.0 mmol/L while IFG levels are from 6.1 to 6.9 mmol/L.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C12.

Figure 3.4: Biomedical risk factors, persons aged 18 and over, with and without CVD, 2011–12



Notes

1. CVD population is based on the self-reported data of people who participated in the National Health Measures Survey.
2. Exclusions: overweight or obese—persons for whom height and weight were not taken; high blood pressure—blood pressure was not measured or a valid reading was not obtained; dyslipidaemia—persons who did not fast for 8 hours or more prior to their blood test.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C12.

Figure 3.5: Biomedical risk factors, persons with CVD, by age, 2011–12

Dyslipidaemia

Lipid abnormalities, including high levels of LDL (bad) cholesterol, elevated triglycerides and low levels of HDL (good) cholesterol, are associated with an increased risk of developing cardiovascular conditions, such as CHD, angina and stroke. High levels of LDL cholesterol contribute to plaque build-up within arteries, referred to as atherosclerosis (AIHW 2011; Fakhrzadeh & Tabatabaei-Malazy 2012).

In 2011–12, 78% of people aged 18 and over with CVD had dyslipidaemia, compared with 59% among those without CVD. However, levels of uncontrolled dyslipidaemia were similar among those with CVD (60%) and those without CVD (56%) (Figure 3.4).

More than half (57%) of people with CVD aged 18–39 had dyslipidaemia, increasing to 82% for those aged 55 and over (Figure 3.5).

Impaired fasting glucose

IFG increases the long-term risk of type 2 diabetes, which in turn is associated with CVD (Yeboah et al. 2011). Although improving blood glucose control in patients with type 2 diabetes may not directly affect short-term CVD risk, good glycaemic control will reduce complications such as retinopathy (damage to blood vessels in the retina of the eye) and nephropathy (damage to the kidneys) (NHF 2012).

In 2011–12, 20% of adults with CVD had elevated blood glucose, substantially higher than the 5% among adults without CVD. The prevalence of IFG among adults with CVD was 5.9%, compared with 2.3% among adults without CVD (Figure 3.4).

IFG levels are higher for older people with CVD. In 2011–12, 6.6% of those aged 55 and over had IFG, while the IFG estimates in the younger age groups were too unreliable to be reported.

Multiple risk factors

Multiple risk factors among people who already have CVD can increase the severity of their condition, reduce the effectiveness of treatment and place people at risk for developing complications or other diseases, including type 2 diabetes and chronic kidney disease. Treatment of persons with CVD will commonly include medication or advice which aims to reduce levels of multiple risk factors.

The prevalence of common individual risk factors among adults who had CVD in 2011–12 include:

- 93% did not consume a sufficient amount of fruit and vegetables
- 78% had dyslipidaemia, including 60% who had uncontrolled dyslipidaemia
- 75% were overweight or obese
- 71% had high blood pressure, including 33% who had uncontrolled high blood pressure
- 61% were inactive or insufficiently active
- 18% exceeded alcohol consumption guidelines for lifetime risk
- 10% smoked daily
- 6% had IFG.

The following sections examine selected combinations of risk factors among people with CVD, including daily smoking, inactive or insufficiently active, inadequate fruit and vegetable consumption, overweight or obese, high blood pressure and dyslipidaemia (survey limitations exclude alcohol and elevated blood glucose from this analysis; see Appendix B) (Figure 3.6).

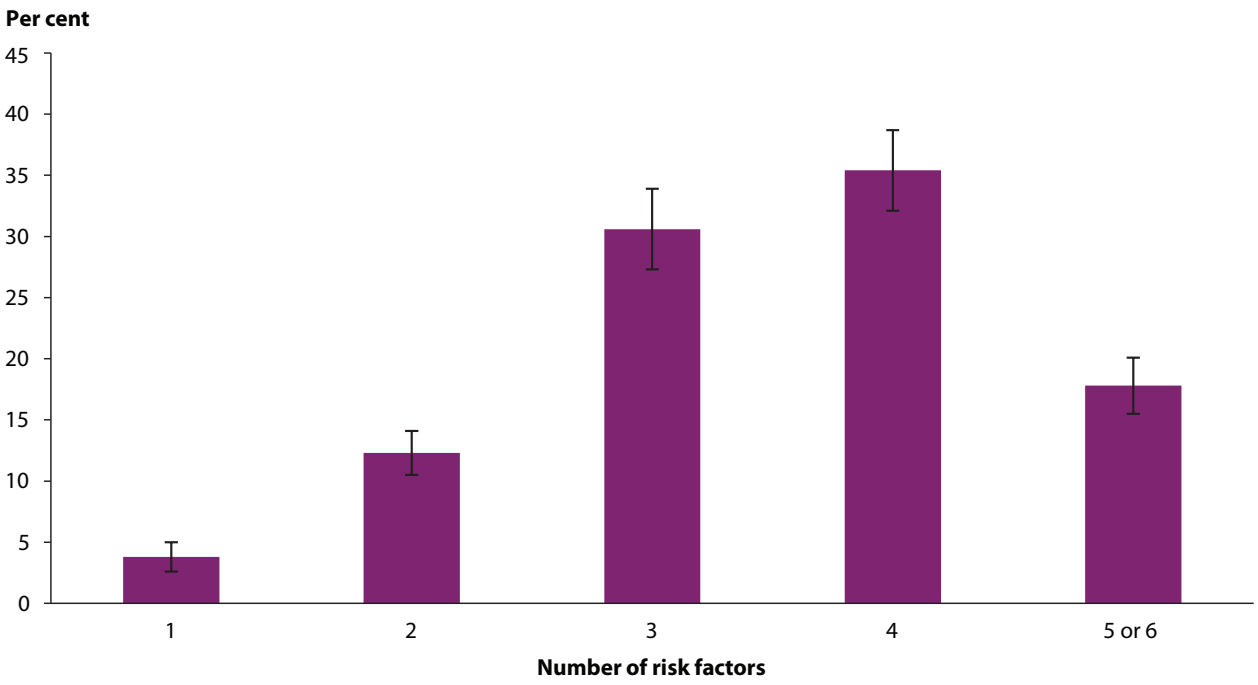
Number of risk factors

In 2011–12, nearly all persons (99.9%) aged 18 and over who had CVD were living with at least 1 of the 6 risk factors.

Two in 3 people with CVD (66%) had 3 or 4 risk factors in combination, a higher proportion than in the general population (55%; see Chapter 2).

Among adults with CVD, 31% had 3 risk factors, 35% had 4 risk factors, and 18% had 5 or 6 risk factors. Having 4 risk factors was most common among people with CVD, in contrast to the general population who most commonly had 3 risk factors.

The high proportion of the population with CVD who have multiple risk factors underlies the need for ongoing disease management and monitoring.



Notes

1. Includes daily smoking, inactive or insufficiently active, inadequate fruit and vegetable consumption, overweight or obese, high blood pressure and dyslipidaemia.
2. The CVD population is based on the self-reported data of people who participated in the National Health Measures Survey.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'.

Figure 3.6: Number of selected risk factors, persons aged 18 and over with CVD, 2011–12

Risk factor combinations

Many combinations of risk factors are possible—a selection of risk factor combinations among adults with CVD is presented in Table 3.1.

People with CVD were commonly overweight or obese and had inadequate fruit and vegetable consumption (66%). Nearly half (45%) were overweight or obese and inactive or insufficiently active. Almost a quarter (24%) were overweight or obese and had uncontrolled high blood pressure.

Almost half of the population with CVD (42%) had inadequate fruit and vegetable consumption, were overweight or obese, and were inactive or insufficiently active, compared with 28% of the population without CVD. Three risk factors which feature prominently in CVD management are overweight or obese, uncontrolled high blood pressure and dyslipidaemia—16% of the population with CVD had these.

Approximately 11% of the population with CVD were overweight or obese, were inactive or insufficiently active, had dyslipidaemia and had uncontrolled high blood pressure, compared with 4% of the population without CVD.

Table 3.1: Selected combinations of risk factors among persons with CVD aged 18 and over, 2011–12

2 risk factors	%	3 risk factors	%	4 risk factors	%
Inadequate fruit and vegetable consumption & overweight or obese	66	Inadequate fruit and vegetable consumption & overweight or obese & inactive or insufficiently active	42	Overweight or obese & inactive or insufficiently active & dyslipidaemia & uncontrolled high blood pressure	11
Inadequate fruit and vegetable consumption & inactive or insufficiently active	58	Overweight or obese & inactive or insufficiently active & dyslipidaemia	25	Overweight or obese & dyslipidaemia & uncontrolled high blood pressure & elevated blood glucose	4
Overweight or obese & inactive or insufficiently active	45	Inadequate fruit and vegetable consumption & inactive or insufficiently active & uncontrolled high blood pressure	22		
Overweight or obese & dyslipidaemia	45	Overweight or obese & uncontrolled high blood pressure & dyslipidaemia	16		
Inadequate fruit and vegetable consumption & uncontrolled high blood pressure	31	Overweight or obese & dyslipidaemia & elevated blood glucose	10		
Overweight or obese & uncontrolled high blood pressure	24				

Notes

1. Calculations include: daily smoking, inactive or insufficiently active, inadequate fruit and vegetable consumption, overweight or obese, uncontrolled high blood pressure, dyslipidaemia and elevated blood glucose.
2. This table presents selected combinations of risk factors only.
3. Persons may have more than 2, 3 or 4 risk factors.

Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'.

4 Risk factor profile of people with diabetes

Diabetes is a chronic condition marked by high levels of glucose in the blood. It is caused either by the inability to produce insulin (a hormone produced by the pancreas to control blood glucose levels), by the body not being able to use insulin effectively, or both. The main types of diabetes are:

- *type 1 diabetes*—an autoimmune disease that usually has an onset in childhood or early adulthood but can be diagnosed at any age
- *type 2 diabetes*—largely preventable, usually associated with lifestyle factors and with a later onset
- *gestational diabetes*—when higher than normal blood glucose is diagnosed in pregnancy.

Diabetes may increase the risk of complications, including CHD, stroke, kidney disease, retinopathy (loss of vision), heart failure and limb amputation.

A number of factors are known to increase the risk of developing diabetes, particularly type 2 diabetes, including physical inactivity, poor diet, overweight and obesity, tobacco smoking, high blood pressure and high blood lipids.

This chapter examines risk factors among people with diabetes and compares these with persons without diabetes. In this report, the population with diabetes was obtained from both self-reported data (presence of diabetes and medication use) and measured results (measured HbA1c) from the National Health Measures Survey component of the ABS 2011–12 AHS. Biomedical estimates from the AHS can detect signs of diabetes, but not diabetes type (see Appendix B). While the measured data in the AHS make no distinction between type 1 and type 2 diabetes and exclude gestational diabetes, type 2 diabetes is more prevalent (AIHW 2014b), and the risk factors presented in this chapter relate largely to the development of type 2 diabetes.

Data presented in this chapter may vary slightly and are not comparable with the data presented in Chapter 2. Sample sizes and population weights may differ, depending on which component of the survey was used (see Appendix B for further details). Analysis of risk factors for people with diabetes was obtained from the National Health Measures Survey only, to ensure its comparability with CVD and CKD, and to maintain consistency across behavioural and biomedical risk factors (see Appendix A).

Since these data represent a snapshot at one point in time, caution should be used in attributing cause and effect to risk factors and chronic disease. Risk factors present at the time of the survey may or may not have contributed to the presence of a chronic condition. Similarly, the presence of diabetes should not be attributed to the number of risk factors a person has.

Behavioural risk factors

Tobacco smoking

People with type 1 and type 2 diabetes who smoke are at an increased risk of developing complications such as CHD, stroke, peripheral vascular disease and CKD. Cigarette smoking can impair glycaemic control, and produce insulin resistance and chronic inflammation which can accelerate the development of kidney disease (USDHHS 2014).

In 2011–12, 12% of adults with diabetes were daily smokers, a similar proportion to that among adults without diabetes (11%) (Figure 4.1). Note that these rates are derived using a biomedical weighting, and differ from the person weighting used in Chapter 2 (see Appendix B).

The proportion of daily smokers among adults with diabetes was 4 times as high for those aged 40–54 (25%), compared with those aged 55 and over (6.4%) (Figure 4.2).

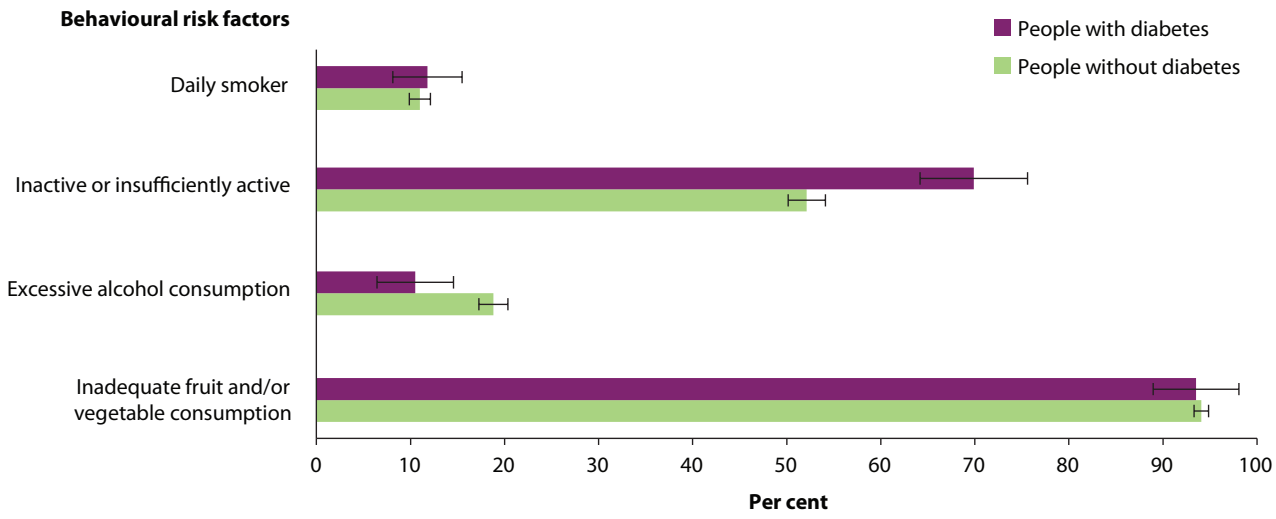
Insufficient physical activity

Participation in physical activity can reduce the risk of developing type 2 diabetes, slow the progression from impaired glucose regulation to type 2 diabetes, and reduce diabetes-related mortality (Colagiuri et al. 2009).

Participation in sufficient physical activity can modify, or reduce the impact of, other risk factors for diabetes and its complications, such as obesity and high blood cholesterol. Some of the benefits of physical activity in reducing diabetes risk occur irrespective of weight loss, most likely because of the direct metabolic effects of physical activity (Kirwan et al. 2009).

In 2011–12, 70% of persons with diabetes were inactive or insufficiently active, compared with 52% of persons without diabetes (Figure 4.1).

Physical inactivity in people with diabetes did not differ significantly with age; the proportion was 64% among 40–54 year olds, and 71% among persons aged 55 and over (Figure 4.2).

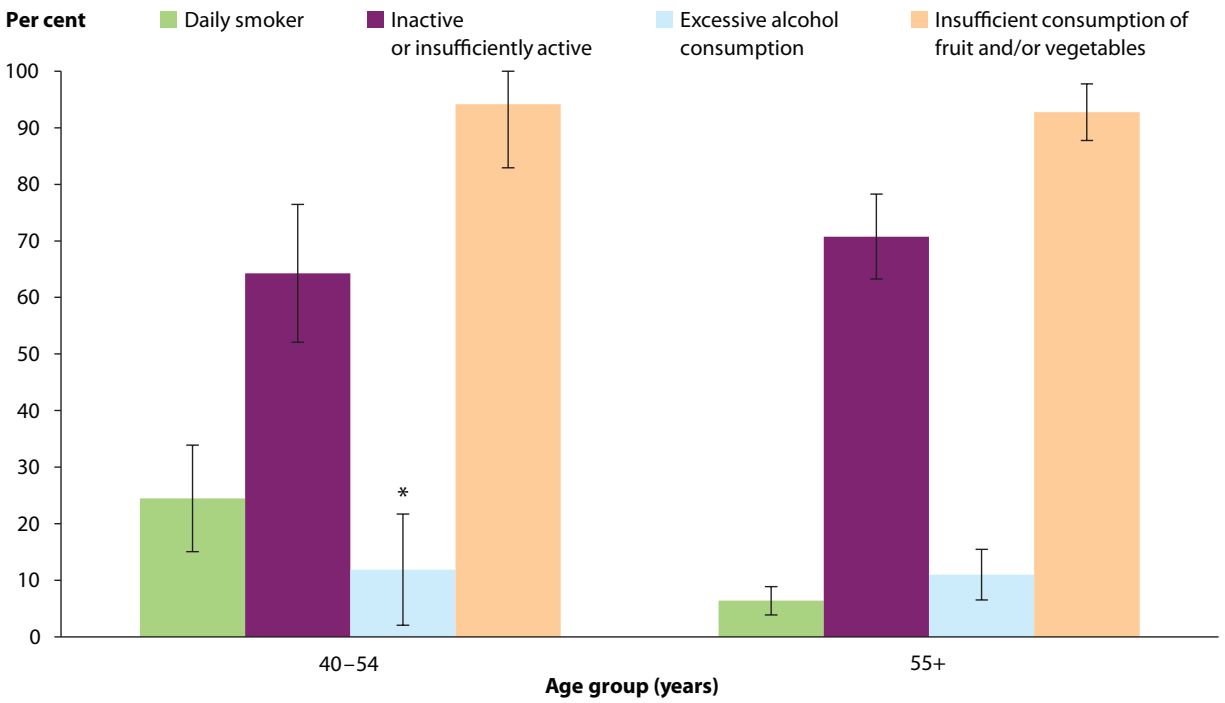


Notes

1. Diabetes population is based on HbA1c and self-reported data of people who participated in the National Health Measures Survey.
2. Excessive alcohol consumption relates to lifetime risk of alcohol-related harm or injury.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C11.

Figure 4.1: Behavioural risk factors, persons aged 18 and over, with and without diabetes, 2011–12



* Estimate has a relative standard error (RSE) of 25% to 50% and should be used with caution.

Notes

1. Diabetes population is based on HbA1c and self-reported data of people who participated in the National Health Measures Survey.
2. Excludes age groups 18–24 and 25–34 due to small sample counts resulting in RSEs greater than 50%.
3. Excessive alcohol consumption relates to lifetime risk of alcohol-related harm or injury.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C11.

Figure 4.2: Behavioural risk factors, persons with diabetes, by age, 2011–12

Excessive alcohol consumption

Moderate alcohol consumption is associated with a lower risk of developing type 2 diabetes in men and women (Baliunas et al. 2009). However, alcohol may increase the risk of hypoglycaemia among people with diabetes who are treated with insulin or certain tablets through blocking glucose production by the liver, which can lead to difficulties in managing diabetes. Excessive consumption of alcohol can also contribute to overweight and obesity, increasing the risk of developing complications.

In 2011–12, 11% of adults with diabetes consumed more than 2 standard drinks per day on average, exceeding lifetime alcohol risk guidelines. Among the population without diabetes, 19% exceeded alcohol guidelines (Figure 4.1).

The proportions exceeding alcohol guidelines were similar in the age groups 40–54 (12%) and 55 and over (11%) (Figure 4.2).

Inadequate fruit and vegetable consumption

Diet plays an important role in the management of diabetes (WHO 2003). Poor diet is a risk factor for type 2 and gestational diabetes largely through its influence on body weight, and particularly obesity (NHMRC 2013b; WHO 2003). Although studies have shown that increasing dietary fibre and reducing total fat intake can reduce the risk of diabetes, evidence that sufficient fruit and vegetable intake

reduces risk remains inconclusive (Cooper et al. 2012; Lindstrom et al. 2006; NHMRC 2013b). Increased consumption of fruit, however, is associated with a reduced risk of overweight or obesity, a key risk factor for diabetes (NHMRC 2013b).

In 2011–12, 94% of adults with diabetes did not consume the recommended amounts of fruit and vegetables in their diets, the same proportion as adults without diabetes (94%) (Figure 4.1).

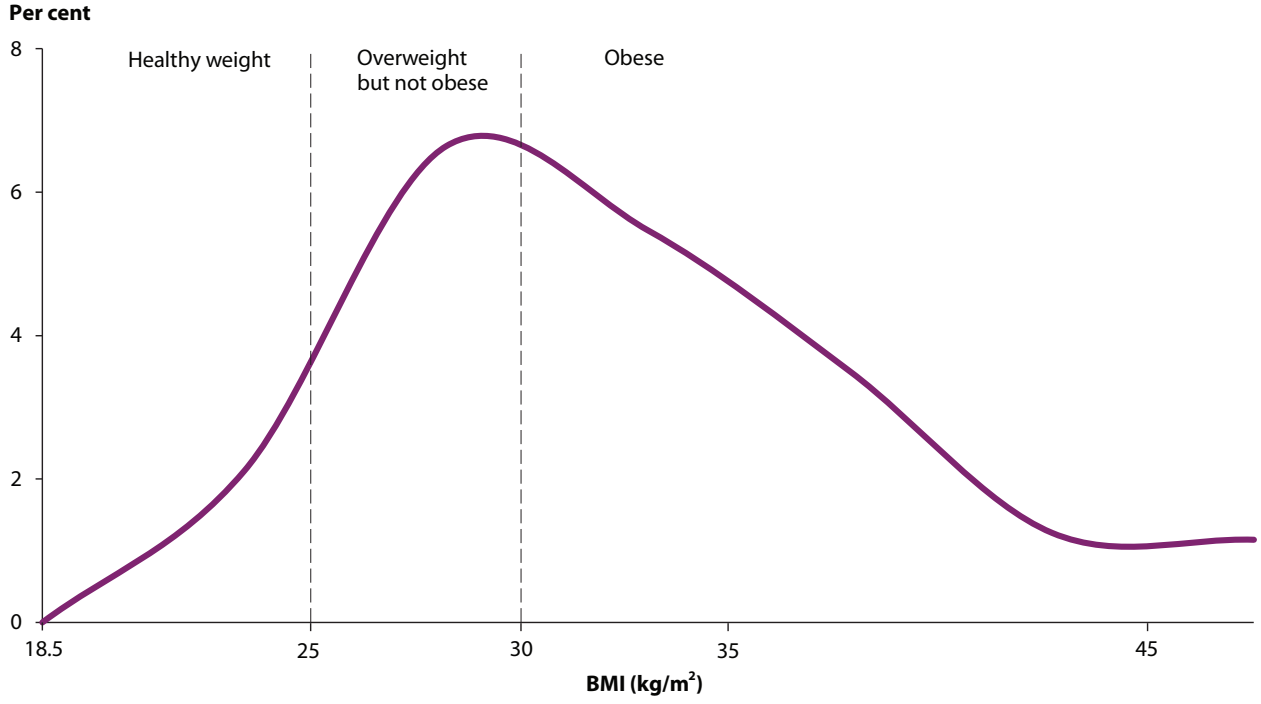
The proportion of adults with diabetes who did not consume adequate fruit and vegetables was similar for those aged 40–54 (94%) and 55 and over (93%) (Figure 4.2).

Biomedical risk factors

Overweight and obesity

Overweight and obesity is a significant predictor of type 2 diabetes (Thomas et al. 2006; Wilson et al. 2007). With excess body fat increasing insulin resistance, overweight and obesity is an important modifiable risk factor for type 2 diabetes (Lippincot Williams & Wikins 2007). Effective weight management can help prevent type 2 diabetes in people with IGT (Colagiuri et al. 2009).

Figure 4.3 shows the BMI distribution in people with diabetes, with the peak in BMI value of 29 close to the obesity cut-off. The distribution is skewed towards higher BMI values compared with the total population (see Figure 2.13).



Notes

1. Diabetes population is based on HbA1c and self-reported data of people who participated in the National Health Measures Survey and includes both type 1 and type 2 diabetes.
2. The distribution has been smoothed, including the minimum and maximum values which are based on aggregates of 12 or less and 49 or more.

Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'.

Figure 4.3: Distribution of body mass index, persons aged 18 and over with diabetes, 2011–12

In 2011–12, 88% of people with diabetes were overweight or obese, including 56% who were obese. The proportion of persons with diabetes who were overweight or obese was 1.5 times that of persons without diabetes (59%). The gap was larger for obesity alone; the proportion of persons with diabetes who were obese was 2.4 times that of persons without diabetes (Figure 4.4).

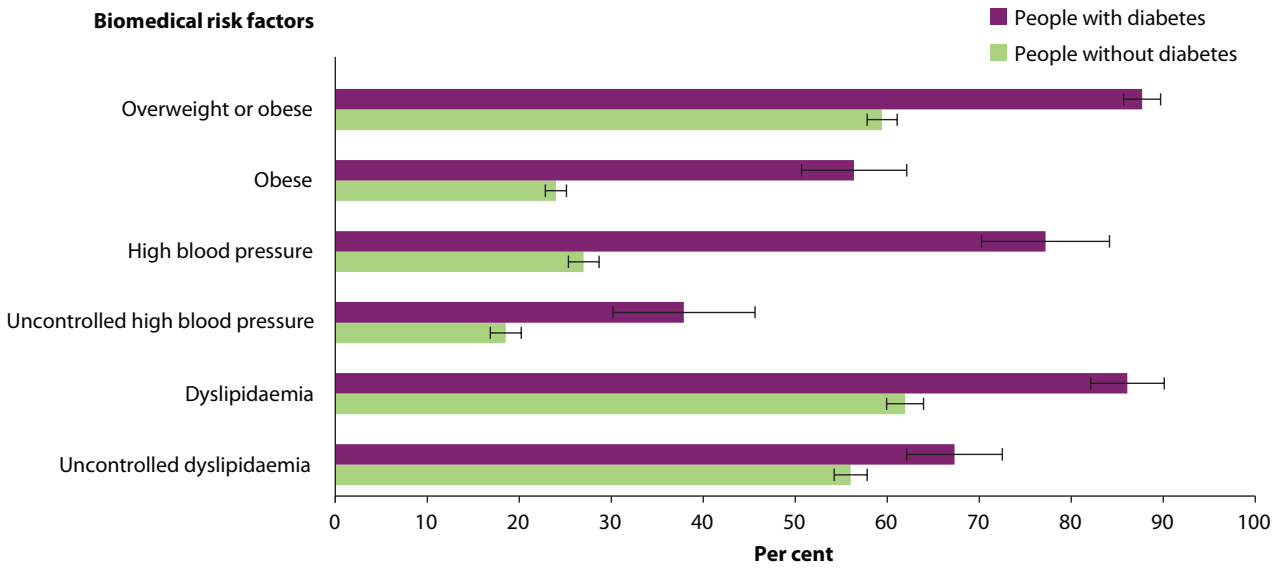
The proportion of overweight or obesity in people with diabetes increased from 69% of persons aged 18–39 to 93% of persons aged 40–54 and 88% of persons aged 55 and over, although there were no statistically significant differences (Figure 4.5).

High blood pressure

High blood pressure contributes to the development of diabetes complications, including CVD, CKD and diabetic eye disease. The goal for optimum management of type 2 diabetes involves careful blood pressure control to a level of 130/80 mmHg, this being associated with a reduction in stroke and adverse event risk (RACGP & Diabetes Australia 2014).

In 2011–12, 77% of people aged 18 and over with diabetes had high blood pressure. This proportion is substantially higher than for those without diabetes (27%). Similarly, the proportion of persons with diabetes who had uncontrolled high blood pressure (38%) was double that of persons without diabetes (19%) (Figure 4.4).

High blood pressure among persons with diabetes is more common among older age groups, with the highest proportion (86%) among those aged 55 and over (Figure 4.5).

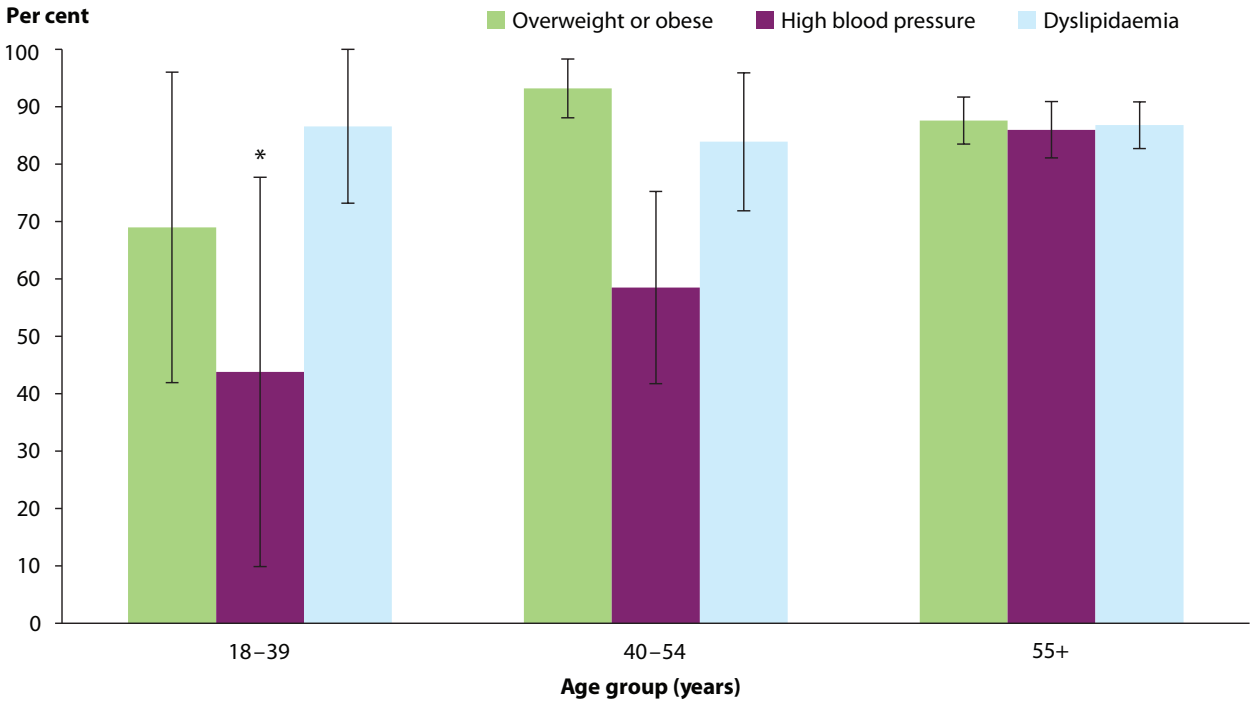


Notes

1. Diabetes population is based on HbA1c and self-reported data of people who participated in the National Health Measures Survey.
2. Exclusions: overweight or obese and obese—persons for whom height and weight were not taken; high blood pressure and uncontrolled high blood pressure—blood pressure was not measured or a valid reading was not obtained; dyslipidaemia and uncontrolled dyslipidaemia—persons who did not fast for 8 hours or more prior to their blood test.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C12.

Figure 4.4: Biomedical risk factors, persons aged 18 and over, with and without diabetes, 2011–12



* Estimate has a relative standard error of 25% to 50% and should be used with caution.

Notes

1. Diabetes population is based on HbA1c and self-reported data of people who participated in the National Health Measures Survey.
2. Exclusions: overweight or obese—persons for whom height and weight were not taken; high blood pressure—blood pressure was not measured or a valid reading was not obtained; dyslipidaemia—persons who did not fast for 8 hours or more prior to their blood test.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C12.

Figure 4.5: Biomedical risk factors, persons with diabetes, by age, 2011–12

Dyslipidaemia

The characteristic features of diabetic dyslipidaemia are high levels of triglycerides, low HDL cholesterol and increases in small, dense LDL cholesterol particles, resulting from insulin resistance and deficiency (Mooradian 2009). Lowering of cholesterol with statins can help reduce diabetic patients' relative cardiovascular risk.

In 2011–12, 86% of adults with diabetes had dyslipidaemia, of whom 67% had uncontrolled dyslipidaemia, compared with 62% and 56% respectively for those without diabetes (Figure 4.4). Dyslipidaemia is more common among adults with diabetes than in those with CVD. The proportion of dyslipidaemia among people with diabetes in each age group exceeds 80%, however there were no statistically significant differences (Figure 4.5).

Multiple risk factors

As for CVD, combinations of major risk factors increase the risk of developing type 2 diabetes. The metabolic syndrome, for example (a disorder of energy use and storage diagnosed by a co-occurrence of 3 risk factors from among obesity, high blood pressure, IFG and dyslipidaemia in the form of high triglycerides or reduced HDL cholesterol) identifies persons at an increased risk of diabetes and its complications (Harris 2013).

The prevalence of common individual risk factors among adults with diabetes in 2011–12 includes:

- 94% did not consume a sufficient amount of fruit and vegetables
- 88% were overweight or obese
- 86% had dyslipidaemia, including 67% who had uncontrolled dyslipidaemia
- 77% had high blood pressure, including 38% who had uncontrolled high blood pressure
- 70% were inactive or insufficiently active
- 12% smoked daily
- 11% exceeded alcohol consumption guidelines for lifetime risk.

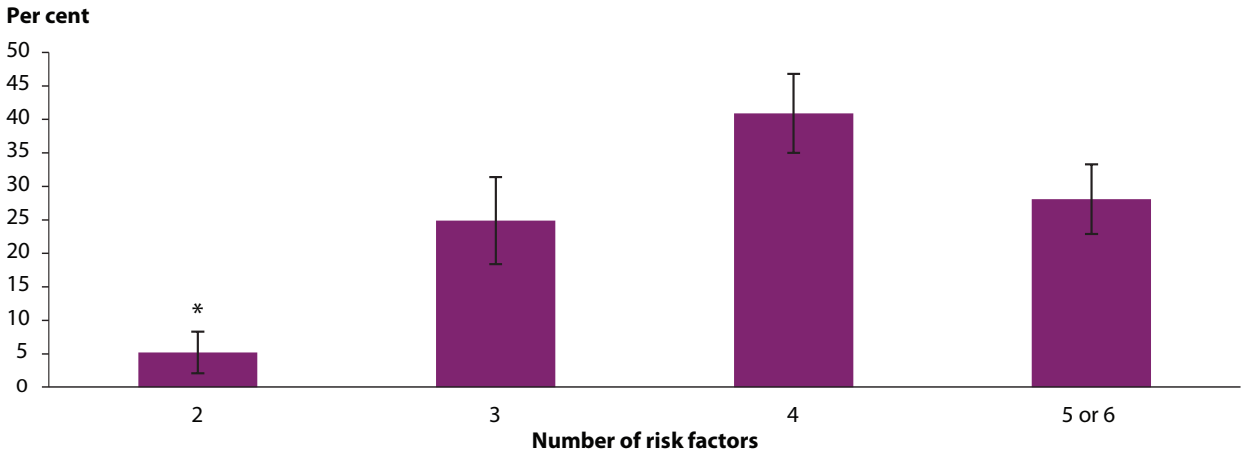
The following sections examine selected combinations of risk factors among people with diabetes.

Number of risk factors

In the population with diabetes, the 6 risk factors available for analysis—including daily smoking, being inactive or insufficiently active, inadequate fruit and vegetable consumption, overweight or obese, high blood pressure and dyslipidaemia—are commonly found in combination with each other. Survey limitations exclude excessive alcohol consumption from this analysis (see Appendix B).

In 2011–12, almost all adults with diabetes (94%) had 3 or more of these risk factors concurrently (Figure 4.6)—a proportion greater than for people with CVD (84%) or CKD (77%).

Among adults with diabetes, 25% had 3 risk factors in combination, 41% had 4 risk factors, and 28% had 5 or 6 risk factors. Compared with populations with CVD or CKD, the population with diabetes more commonly lives with multiple risk factors.



* Estimate has a relative standard error of 25% to 50% and should be used with caution.

Notes

1. Includes daily smoking, inactive or insufficiently active, inadequate fruit and vegetable consumption, overweight or obese, high blood pressure and dyslipidaemia.
2. The population with diabetes is based on HbA1c testing and self-reported data.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'.

Figure 4.6: Number of risk factors, persons aged 18 and over with diabetes, 2011–12

Risk factor combinations

A selection of common risk factor combinations among adults with diabetes is presented in Table 4.1. The risk factors which comprise the metabolic syndrome feature prominently—45% of the population with diabetes were overweight or obese and had dyslipidaemia, 32% were overweight or obese and had uncontrolled high blood pressure, and 26% had uncontrolled high blood pressure and dyslipidaemia.

For combinations of 3 risk factors, 22% of the population with diabetes were overweight or obese, had uncontrolled high blood pressure and had dyslipidaemia, whereas 8% of the population without diabetes had this combination.

For combinations of 4 risk factors, 15% of the population with diabetes were overweight or obese, were inactive or insufficiently active, had dyslipidaemia and had uncontrolled high blood pressure, this being 3 times the proportion (5%) among the population without diabetes.

These combinations of risk factors among people who are living with diabetes reinforce the need for making healthy lifestyle choices, adhering to care plans and attaining goals in disease management.

Table 4.1: Selected combinations of risk factors among persons with diabetes aged 18 and over, 2011–12

2 risk factors	%	3 risk factors	%	4 risk factors	%
Inadequate fruit and vegetable consumption & overweight or obese	76	Inadequate fruit and vegetable consumption & overweight or obese & inactive or insufficiently active	54	Overweight or obese & inactive or insufficiently active & dyslipidaemia & uncontrolled high blood pressure	15
Inadequate fruit and vegetable consumption & inactive or insufficiently active	67	Overweight or obese & uncontrolled high blood pressure & dyslipidaemia	22	Inadequate fruit and vegetable consumption & overweight or obese & inactive or insufficiently active & daily smoking	8
Overweight or obese & dyslipidaemia	45	Inadequate fruit and vegetable consumption & inactive or insufficiently active & daily smoking	10		
Overweight or obese & uncontrolled high blood pressure	32				
Uncontrolled high blood pressure & dyslipidaemia	26				

Notes

1. Calculations include: daily smoking, inactive or insufficiently active, inadequate fruit and vegetable consumption, overweight or obese, uncontrolled high blood pressure and dyslipidaemia.
2. This table presents selected combinations of risk factors only.
3. Persons may have more than 2, 3 or 4 risk factors.

Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'.

5 Risk factor profile of people with CKD

Chronic kidney disease (CKD) refers to all kidney conditions where a person has evidence of kidney damage and/or reduced kidney function, lasting at least 3 months. Although around 1.7 million Australians aged 18 and over have clinical evidence of CKD, less than 10% of people with the condition are aware that they have it, since CKD typically has no symptoms (Kidney Health Australia 2014).

People who have end-stage kidney disease (ESKD)—the most severe form of CKD—often require kidney replacement therapy, in the form of dialysis or kidney transplantation, in order to survive. The most common causes of ESKD in Australia are diabetic nephropathy and hypertension.

CKD is common and largely preventable, because risk factors such as high blood pressure, tobacco smoking and being overweight or obese are modifiable. Many of the risk factors for CKD are also risk factors for CVD and diabetes, which in turn are risk factors for CKD.

This chapter examines risk factors among people with CKD and compares these with persons without CKD. The population with CKD in this report is based on measured data from tests to determine kidney function (estimated glomerular filtration rate, or eGFR) and kidney damage (albumin creatinine ratio, or ACR) from the NHMS component of the ABS 2011–12 AHS. These two measures are combined to identify biomedical signs of CKD staging or indicate impaired kidney function, but they are not a diagnosis of CKD (see Appendix B).

Dyslipidaemia is not included in this chapter because it is uncertain whether it is a risk factor for the development or progression of CKD. Data presented in this chapter may vary slightly and are not comparable with the data presented in Chapter 2. Sample sizes and population weights may differ, depending on which component of the survey was used (see Appendix B for further details). Analysis of risk factors for people with CKD was obtained from the NHMS only, to ensure its comparability with CVD and diabetes, and to maintain consistency across behavioural and biomedical risk factors (see Appendix A).

Since these data represent a snapshot at one point in time, caution should be used in attributing cause and effect to risk factors and chronic disease. Risk factors present at the time of the survey may or may not have contributed to the presence of a chronic condition. Similarly, the presence of CKD should not be attributed to the number of risk factors a person has.

Behavioural risk factors

Tobacco smoking

People who smoke are at increased risk of developing CKD (Orth & Hallan 2008). Tobacco smoking can damage kidney function and accelerate the progression to kidney failure, and men are particularly at risk (Hallan & Orth 2011). Evidence suggests that Australian men who smoked are more than 3 times as likely as non-smokers to have reduced kidney function (Briganti et al. 2002). Smoking also contributes to negative outcomes for persons with kidney transplants (Mercado & Jaimes 2007).

In 2011–12, the proportion of daily smokers among adults with CKD was 8.2% (Figure 5.1), lower than in the population without CKD (11%).

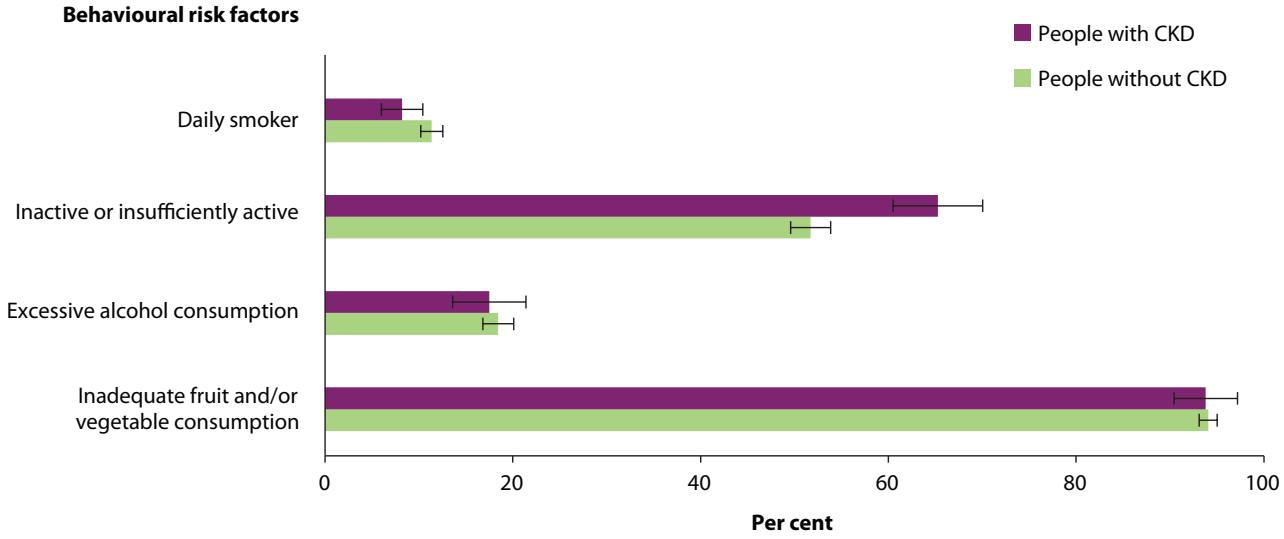
Daily smoking among adults with CKD was similar in all age groups (Figure 5.2).

Insufficient physical activity

Sufficient physical activity reduces the risk of developing CKD by reducing blood pressure and contributing to weight loss, both of which are major risk factors for chronic kidney disease. The risk of CKD in inactive people has been shown to be twice as high as in active people (Stengel et al. 2003; White et al. 2011). Regular physical activity may also reduce systemic inflammation and slow the progression of chronic kidney disease (Robinson-Cohen et al. 2014).

In 2011–12, 65% of people with CKD were inactive or insufficiently active, compared with 52% of people without CKD (Figure 5.1).

The proportion of people with CKD who were inactive or insufficiently active was similar across all age groups (Figure 5.2).

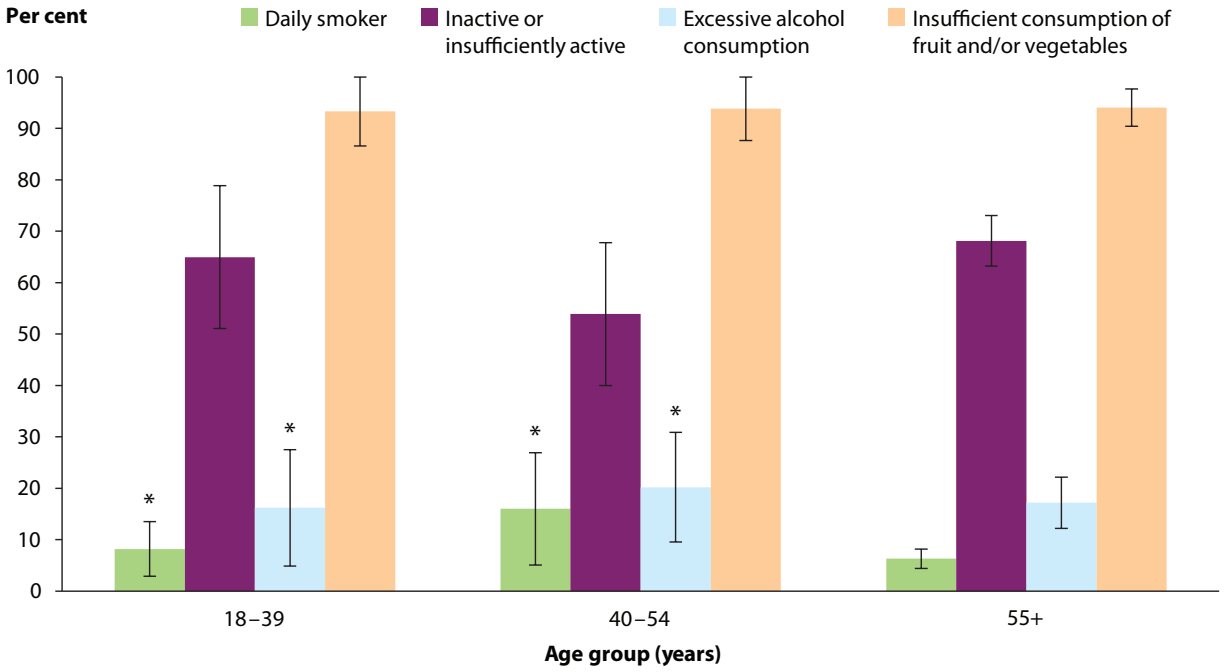


Notes

1. CKD population is based on eGFR and ACR test results of people who participated in the National Health Measures Survey.
2. Excessive alcohol consumption relates to lifetime risk of alcohol-related harm or injury.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C11.

Figure 5.1: Behavioural risk factors, persons aged 18 and over, with and without CKD, 2011–12



* Estimate has a relative standard error of 25% to 50% and should be used with caution.

Notes

1. CKD population is based on eGFR and ACR test results of people who participated in the National Health Measures Survey.
2. Excessive alcohol consumption relates to lifetime risk of alcohol-related harm or injury.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C11.

Figure 5.2: Behavioural risk factors, persons with CKD, by age, 2011–12

Excessive alcohol consumption

Although the association between alcohol consumption and CKD is complex and less obvious than for other conditions, it is known that excessive alcohol consumption can lead to obesity and high blood pressure, both of which increase the risk of CKD. Moderate to heavy alcohol consumption may also be an important modifiable risk factor for albuminuria—the presence of protein in urine—indicating possible kidney damage (White et al. 2009).

In 2011–12, 18% of adults with CKD consumed more than 2 standard drinks per day on average, exceeding lifetime alcohol risk guidelines, a similar proportion to people without CKD (Figure 5.1).

The proportion exceeding alcohol guidelines was similar in each age group—18–39 (16%), 40–54 (20%) and 55 and over (17%) (Figure 5.2).

Inadequate fruit and vegetable consumption

Although there is limited research regarding the association between sufficient fruit and vegetable consumption and CKD, there is evidence that sufficient intake of fruit and vegetables reduces the risk of developing cardiovascular conditions and obesity—risk factors for CKD (NHMRC 2013b; WHO 2003). Diets high in sugar, salt, and fat and protein from red meat can also lead to impaired kidney function and CKD (Odermatt 2011).

In 2011–12, 94% of adults with CKD did not consume the recommended amounts of fruit and vegetables in their diets, the same proportion as the 94% of adults without CKD (Figure 5.1).

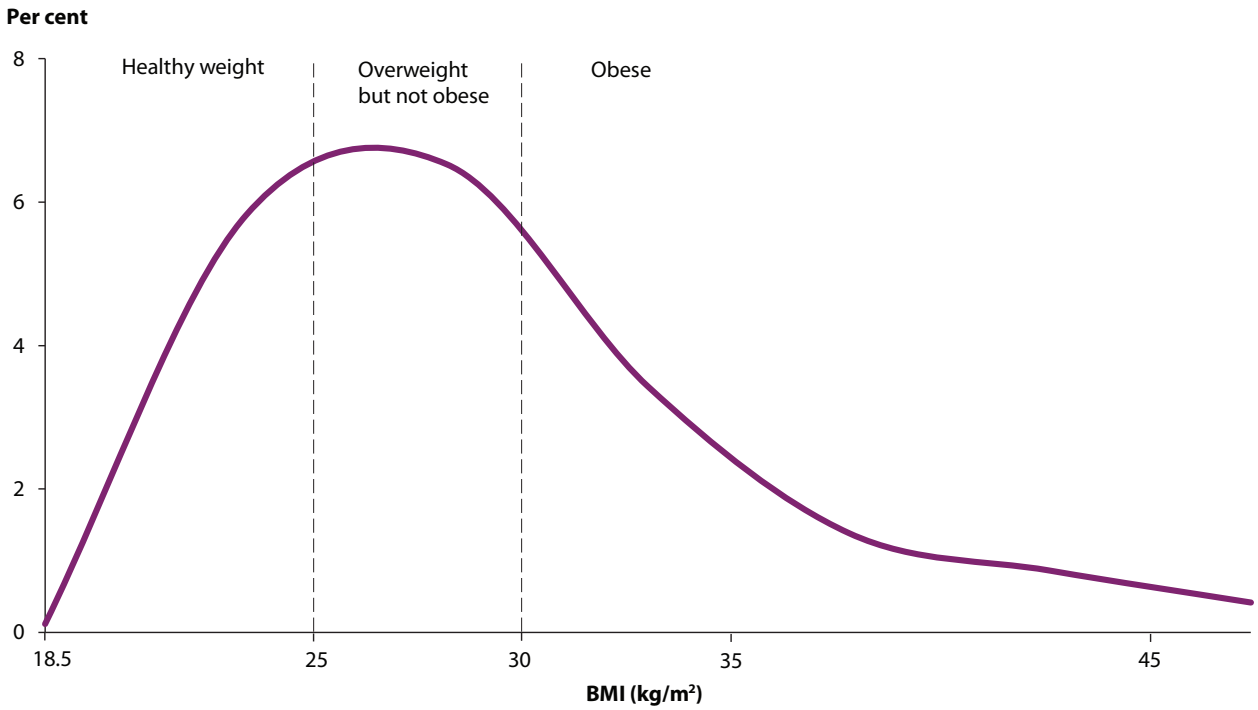
The proportion of adults with CKD who consumed an inadequate amount of fruit and vegetables was similar across age groups, between 93% and 94% (Figure 5.2).

Biomedical risk factors

Overweight and obesity

Excess weight can increase a person's risk of developing CKD. Evidence has shown that the risk of CKD was almost 1.5 times as high for an overweight but not obese person and was almost double for an obese person. Obese women had a higher risk of developing CKD than obese men (Wang et al. 2008).

Compared with people with CVD or diabetes, a higher proportion of people with CKD had healthy weight, as shown by the left skew of the BMI distribution (Figure 5.3).



Notes

1. CKD population is based on eGFR and ACR test results of people who participated in the National Health Measures Survey.
2. The distribution has been smoothed, including the minimum and maximum values which are based on aggregates of 12 or less and 49 or more.

Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'.

Figure 5.3: Distribution of body mass index, persons aged 18 and over with CKD, 2011–12

In 2011–12, 63% of people with CKD were overweight or obese, compared with 61% of those without CKD. Obesity in people with CKD was more prevalent than for people without CKD (30% compared with 25%) (Figure 5.4). The prevalence of overweight or obesity in the CKD population (63%) is lower than for people with diabetes (88%) or CVD (75%).

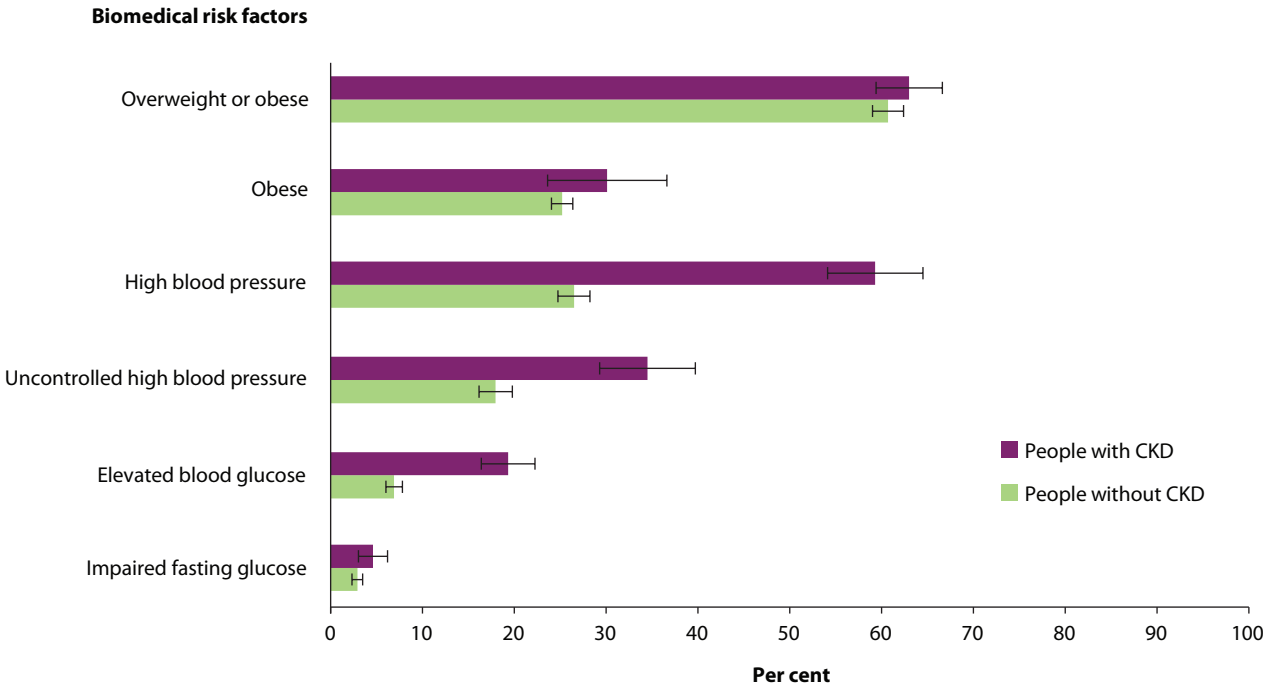
Among persons with CKD, overweight or obesity increases rapidly with age, with the prevalence in the age groups 40–54 and 55 and over double that for ages 18–39 (Figure 5.5).

High blood pressure

High blood pressure is the most significant risk factor for the development and progression of CKD (Barri 2008). Elevated blood pressure can cause damage to the blood vessels in the kidney, leading to reduced blood supply and making waste removal difficult. Prevention and treatment are closely related, since CKD can itself cause high blood pressure. High blood pressure is a risk factor for cardiovascular events in persons with CKD or ESKD. Optimal management of CKD remains a challenge, since a large proportion of patients with CKD receiving blood pressure medication do not have their blood pressure controlled to target levels (Kidney Health Australia 2014).

In 2011–12, 59% of people aged 18 and over with CKD had high blood pressure, with 35% having uncontrolled high blood pressure. This was much higher than for adults without CKD, of whom 27% had high blood pressure and 18% had uncontrolled high blood pressure. Overall, high blood pressure among persons with CKD (59%) was lower than among persons with CVD (71%) or diabetes (77%).

High blood pressure among persons aged 18–39 with CKD was uncommon (16%). The proportion rose among persons aged 40–54 (47%) and 55 and over (80%). (Figure 5.5).

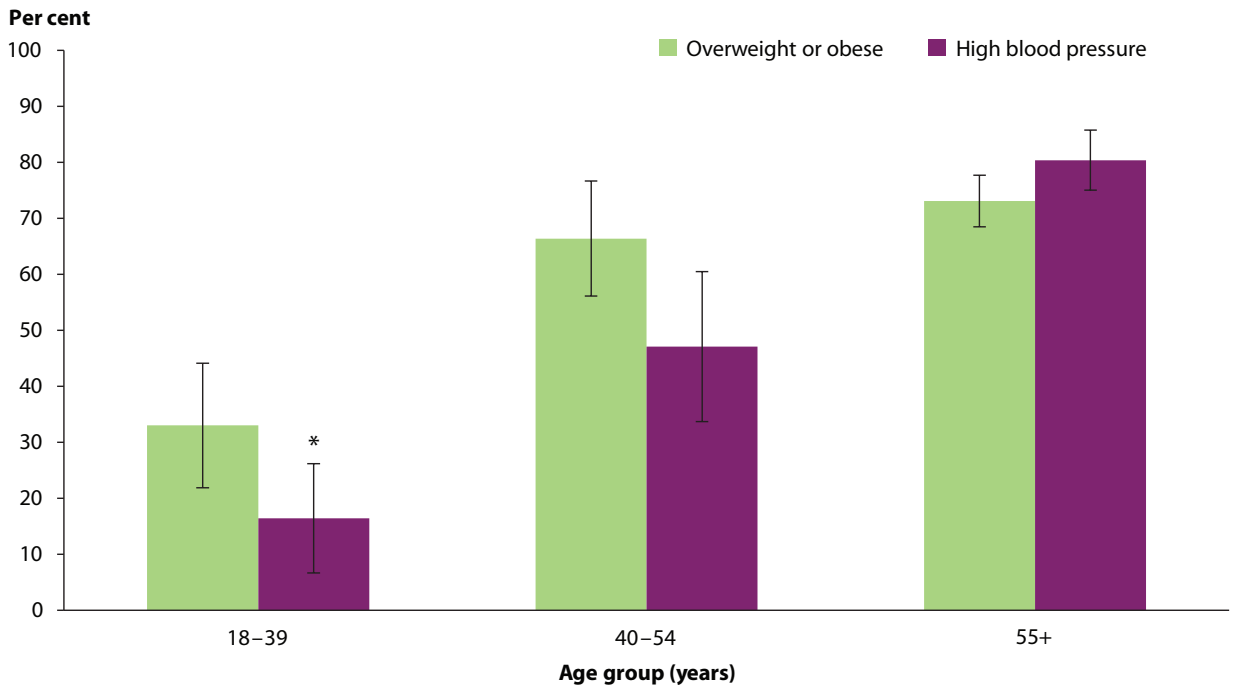


Notes

1. CKD population is based on eGFR and ACR test results of people who participated in the National Health Measures Survey.
2. Exclusions: overweight or obese—persons for whom height and weight were not taken; high blood pressure and uncontrolled high blood pressure—blood pressure was not measured or a valid reading was not obtained; elevated blood glucose and impaired fasting glucose—persons who did not fast for 8 hours or more prior to their blood test.
3. Elevated blood glucose levels are above 6.0 mmol/L while IFG levels are from 6.1 to 6.9 mmol/L.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C12.

Figure 5.4: Biomedical risk factors, persons aged 18 and over, with and without CKD, 2011–12



* Estimate has a relative standard error of 25% to 50% and should be used with caution.

Notes

1. CKD population is based on eGFR and ACR test results of people who participated in the National Health Measures Survey.
2. Exclusions: overweight or obese—persons for whom height and weight were not taken; high blood pressure—blood pressure was not measured or a valid reading was not obtained.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; Table C12.

Figure 5.5: Biomedical risk factors, persons with CKD, by age, 2011–12

Impaired fasting glucose

People with IFG are at increased risk of developing diabetes, which is the leading cause of ESKD (AIHW 2014a). Excessive amount of glucose in the blood is one of the factors contributing to kidney damage.

In 2011–12, 19% of adults with CKD had elevated blood glucose, almost 3 times the proportion in the population without CKD (7%). Elevated blood glucose results for adults with CKD were similar to those with CVD.

The proportion of IFG among adults with CKD was 4.6%, compared with 2.9% of persons without CKD. In 2011–12, 6.2% of adults with CKD aged 55 and over had IFG.

Multiple risk factors

The risk of CKD, as for other chronic diseases such as CVD and diabetes, is increased through the effects of multiple risk factors.

Early detection and effective management of multiple risk factors to levels that are as close to normal as possible can assist in the prevention and control of the CKD health burden.

In 2011–12, the prevalence of common individual risk factors among adults with chronic kidney disease included:

- 94% did not consume the recommended amounts of fruit and vegetables
- 65% were inactive or insufficiently active
- 63% were overweight or obese
- 59% had high blood pressure, including 35% who had uncontrolled high blood pressure
- 19% had elevated blood glucose
- 8% smoked daily.

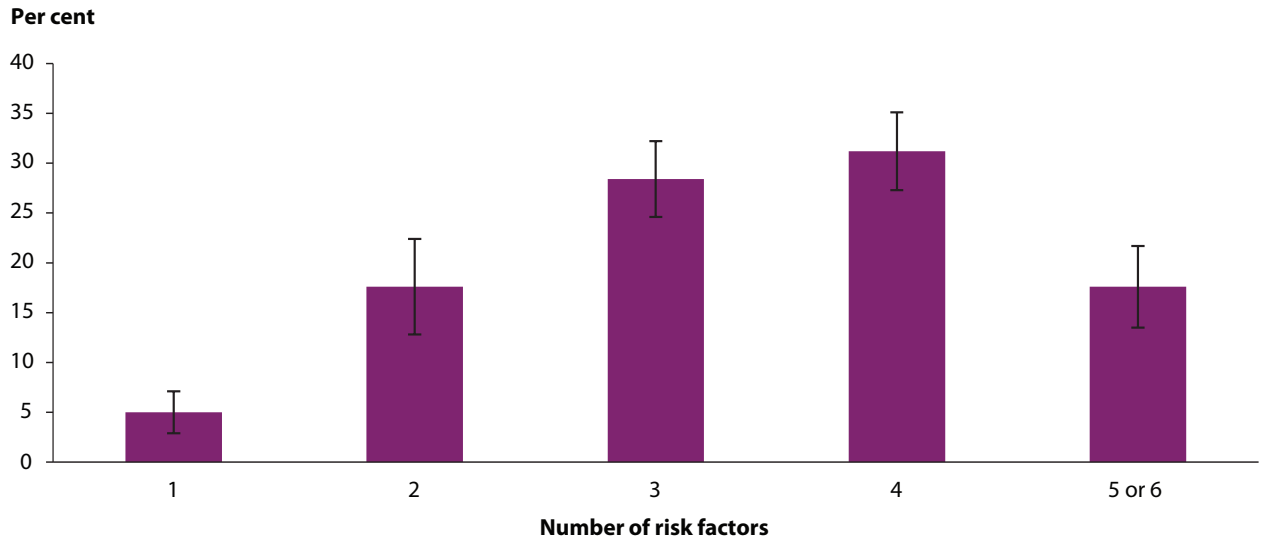
The following sections examine selected combinations of risk factors among people with CKD.

Number of risk factors

In 2011–12, nearly all persons (99.8%) aged 18 and over who had CKD were living with at least 1 of the 6 risk factors available for analysis, which included daily smoking, being inactive or insufficiently active, inadequate fruit and vegetable consumption, overweight or obese, high blood pressure and dyslipidaemia (survey limitations exclude alcohol and elevated blood glucose from this analysis; see Appendix B).

Around three-quarters of adults with CKD (77%) had 3 or more risk factors in combination, with 4 risk factors being most common (Figure 5.6).

Among adults with CKD, 28% had 3 risk factors, 31% had 4, and 18% had 5 or 6.



Notes

1. Includes daily smoking, inactive or insufficiently active, inadequate fruit and vegetable consumption, overweight or obese, high blood pressure and dyslipidaemia. Dyslipidaemia was included, although it has a greater role in the progression of CKD, and as a risk factor for CVD and diabetes.
2. The CKD population is based on eGFR and ACR test results.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'.

Figure 5.6: Number of selected risk factors, persons aged 18 and over with CKD, 2011–12

Risk factor combinations

A selection of combinations of risk factors among adults with CKD is presented in Table 5.1.

A high proportion (62%), of the population with CKD were inactive or insufficiently active, and did not consume recommended amounts of fruit and vegetables. One-quarter (25%) were overweight or obese and had uncontrolled high blood pressure, twice the proportion in the population without CKD (13%). A similar proportion were overweight or obese and had elevated blood glucose levels (24%).

Around 5% of the population with CKD were overweight or obese, had uncontrolled high blood pressure and had elevated blood glucose levels.

The presence of multiple risk factors at these levels indicates that many people with CKD may need to take additional steps to ensure optimal management of their condition.

Table 5.1: Selected combinations of risk factors among persons with CKD aged 18 and over, 2011–12

2 risk factors	%	3 risk factors	%	4 risk factors	%
Inadequate fruit and vegetable consumption & inactive or insufficiently active	62	Inadequate fruit and vegetable consumption & overweight or obese & inactive or insufficiently active	37	Inadequate fruit and vegetable consumption & overweight or obese & inactive or insufficiently active & daily smoking	3
Overweight or obese & inactive or insufficiently active	39	Overweight or obese & uncontrolled high blood pressure & elevated blood glucose	5		
Overweight or obese & uncontrolled high blood pressure	25				
Overweight or obese & elevated blood glucose	24				
Uncontrolled high blood pressure & elevated blood glucose	9				
Inactive or insufficiently active & daily smoking	7				

Notes

1. Calculations include: daily smoking, inactive or insufficiently active, inadequate fruit and vegetable consumption, overweight or obese, uncontrolled high blood pressure, dyslipidaemia and elevated blood glucose.
2. This table presents selected combinations of risk factors only.
3. Persons may have more than 2, 3 or 4 risk factors.

Source: AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'.

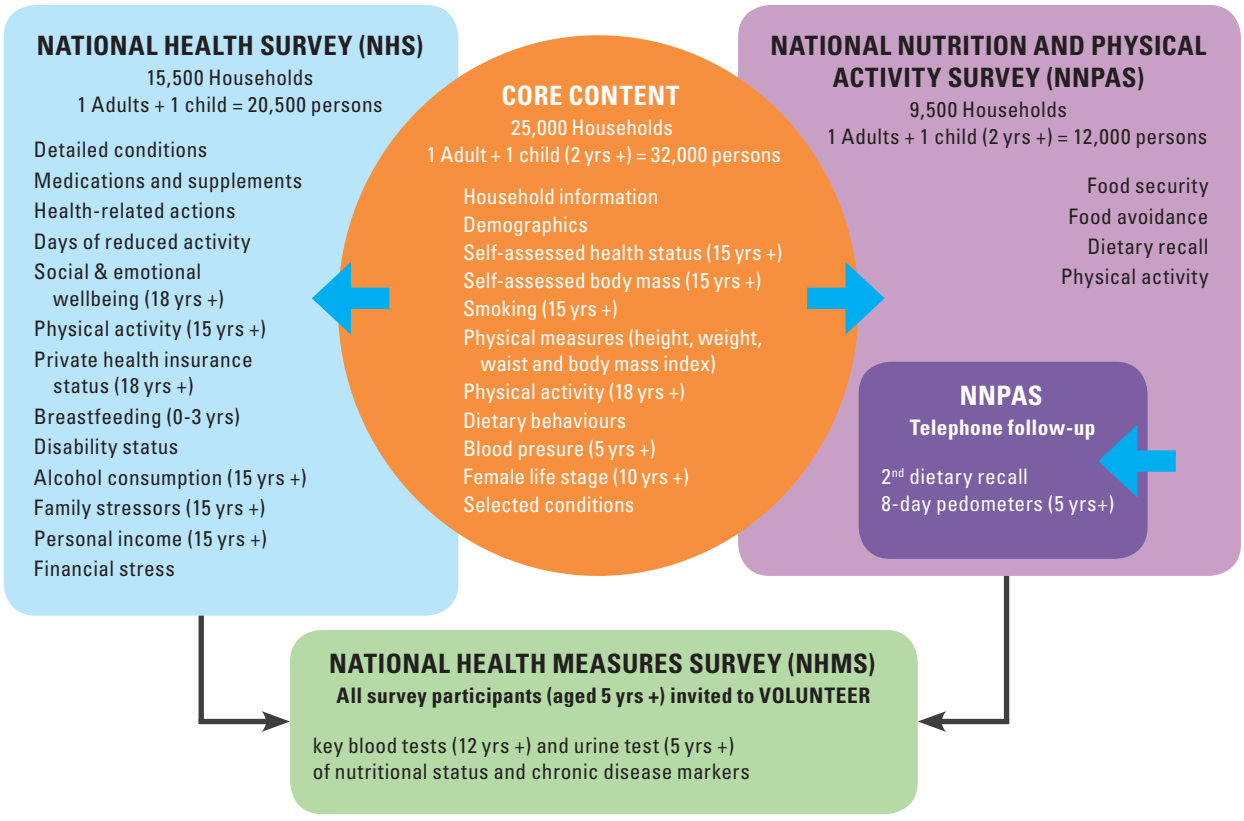
Appendix A: Data sources

ABS 2011–12 Australian Health Survey (AHS)

The ABS 2011–12 Australian Health Survey (AHS) combines the previous National Health Survey (NHS) with two new components: a National Nutrition and Physical Activity Survey (NNPAS) and National Health Measures Survey (NHMS).

People who took part in the AHS participated in either the NHS or the NNPAS. A core set of data items was common to both surveys, and information from these data items is available for all persons in the AHS (approximately 32,000). This core set of data items included household and demographic information, self-assessed health status and self-assessed body mass.

All people aged 5 and over were then invited to volunteer to participate in the NHMS. Figure A.1 shows the structure of the various components of the AHS.



Source: ABS 2013e.

Figure A.1: Structure of the 2011–12 Australian Health Survey

Scope of the AHS

The ABS 2011–12 AHS covered approximately 25,000 private dwellings across Australia. Sample sizes of each AHS components are listed in Table A1. Urban and rural areas in all states and territories were included. *Very remote* areas of Australia, discrete Aboriginal and Torres Strait Islander communities and the districts in which these communities were located were excluded. The aggregation of *Remote areas* with *Outer regional* and the exclusion of *Very remote* areas means that the impact of risk factors by remoteness could not be fully assessed in this report.

Non-private dwellings such as institutional care facilities (including hospitals and aged care facilities accommodating people with health conditions), hotels, motels and short-stay caravan parks were excluded from the survey. The following groups were also excluded from the survey: certain diplomatic personnel of overseas governments, customarily excluded from the Census and estimated resident population; persons whose usual place of residence was outside Australia; members of non-Australian defence forces (and their dependants) stationed in Australia; and visitors to private dwellings.

In this report, analyses were only conducted for respondents aged 18 and over.

Table A.1: ABS 2011–12 Australian Health Survey components and sample sizes

Survey components	Size
NHS + NHMS	7,000 persons
NHMS + Core content	11,000 persons
Core content	32,000 persons
NHS	20,500 persons

Source: ABS 2013e.

National Health Survey (NHS)

National Health Surveys conducted by the ABS are designed to obtain national benchmarks on a wide range of health issues, and to enable changes in health to be monitored over time. One adult (aged 18 and over) and one child (where applicable) for each sampled dwelling were included in the surveys. In 2011–12, the NHS formed part of the AHS.

This report presents findings from the 1989–90, 1995, 2001, 2004–05, 2007–08 and 2011–2012 National Health Surveys, where applicable.

National Health Measures Survey (NHMS)

The 2011–12 NHMS survey collected voluntary samples from around 11,200 Australian adults and children. Voluntary urine samples were collected from respondents aged 5 and over, and voluntary blood samples from respondents aged 12 and over. The NHMS focuses on test results from these samples for chronic diseases including diabetes, cardiovascular disease, chronic kidney disease and liver function (Table A2). Results also include measures of exposure to tobacco smoke and risk of anaemia.

Table A.2: Summary of chronic disease biomarkers included in this report

NHMS	Age	Test type	Fasting
Cardiovascular disease biomarkers			
Total cholesterol	18+	Blood	No
High-density lipoprotein (HDL) cholesterol	18+	Blood	No
Low-density lipoprotein (LDL) cholesterol	18+	Blood	Yes
Triglycerides	18+	Blood	Yes
Diabetes biomarkers			
Fasting plasma glucose	18+	Blood	Yes
Glycated haemoglobin (HbA1c)	18+	Blood	No
Kidney disease biomarkers			
Albumin creatinine ratio (ACR)	18+	Blood	No
Estimated glomerular filtration rate (eGFR)	18+	Blood	No

Source: ABS 2013e.

For fasting plasma glucose, LDL cholesterol and triglyceride tests, participants providing blood samples were asked to fast for 8 hours before their test. Results for these biomarkers in this publication refer only to those people who did fast (approximately 79% of adults who participated in the NHMS). ABS analysis showed no difference in the characteristics of people who fasted compared with those who did not fast.

Data quality

The sample size and weightings applied to the various components of the AHS may result in slight differences in the estimates derived from those components. Caution should be used in comparing estimates from these different components.

The ABS undertook investigations to determine whether the accuracy of NHMS estimates could be improved by weighting with other variables collected in the NHS and NNPAS, including smoking status, body mass index, self-assessed health, physical activity, employment status, marital status, country of birth and blood pressure (ABS 2013a). The use of some of these variables may have improved the accuracy of some NHMS estimates, for example the use of smoker status in the weighting process would have ensured that totals relating to current daily smokers were identical in the NHMS to those in the combined NHS and NNPAS. However, this weighting was found to make little difference to the main variables of interest in the NHMS (i.e. estimates of diabetes and cholesterol) and in some cases increased the measure of sampling error or relative standard error.

The ABS decision to maximise the accuracy of these variables of interest in the NHMS by not including other variables in the calculation of weights for the NHMS means that, while variables collected in the NHMS can be analysed with variables collected in either the NHS or NNPAS, the NHS and NNPAS should be used when reporting on the prevalence of these variables. However, for this report this approach would then prevent the comparability of risk factors in populations with health conditions determined using biomedical tests.

Information about the data quality of the AHS can be found in *Australian Health Survey: users' guide, 2011–13* (ABS cat. No. 4363.0.55.001) <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4363.0.55.001Main+Features12011-13?OpenDocument>.

Appendix B: Methods and limitations

Age-specific rates

An age-specific rate is defined as the number of events for a specified age group over a specified period (for example, a year) divided by the total population at risk of the event in that age group.

Age-standardised rates

Age-standardisation is a technique used to eliminate the effect of differences in population age structures when comparing rates for different periods of time, or for different population groups. In this report, direct age-standardisation has been used in all trends comparisons.

Direct age-standardisation

Direct age-standardisation applies the age-specific rates to a standard population in order to determine the rate that would have occurred in the standard population. This allows direct comparison of different rates applied to the same standard population. The 2001 Australian population was used as the standard population in calculating age-standardised rates, as described below:

The method used for the calculation of age-standardised rates consists of three steps:

Step 1: Calculate the age-specific rate for each age group.

Step 2: Calculate the expected number of cases in each age group by multiplying the age-specific rates by the corresponding standard population for each group.

Step 3: Sum the expected number of cases in each age group and divide this sum by the total of the standard population to give the age-standardised rate.

Significance testing for survey data

The observed value of a rate may vary because of the influence of chance and natural variation. To provide an indication of whether 2 rates are statistically different, 95% confidence intervals have been calculated. Rates are reported as different if statistically significant, otherwise results are reported as similar.

A 95% confidence interval describes a span of numbers around the estimate which has a 95% chance of including the true value. When comparing 2 groups, if the 2 confidence intervals do not overlap, the reader can be confident that the difference between the groups is real, and not due to chance.

For published AHS data, standard errors and confidence intervals are provided. Confidence intervals have been calculated for data derived from ABS estimates, for example for populations without specific conditions.

The standard error of difference between 2 survey estimates (e.g. total population and population with specific condition) is subject to sampling variability and was calculated by the following formula:

$$SE(x - y) = \sqrt{[\,([SE\,(x)]^2 + [SE\,(y)]^2)\,]}$$

The lower 95% confidence limit = $(x - y) - (1.96 \times SE)$

The upper 95% confidence limit = $(x - y) + (1.96 \times SE)$.

As with all statistical comparisons, care should be exercised in interpreting results. A non-significant difference between 2 rates may indicate no true difference, or could indicate that numbers of observations are too small to detect a true statistically significant difference. Judgment should be exercised in deciding whether the size of the difference observed is of practical importance.

Geographical structures used in this report

The Australian Statistical Geography Standard (ASGS) is a hierarchical classification system of geographical areas and consists of a number of interrelated structures. These provide a common framework of statistical geography and enable production of statistics which are comparable.

Comparisons of regions in this report use 4 of the ASGS remoteness areas:

- *Major cities*
- *Inner regional*
- *Outer regional*
- *Remote.*

In this report, data from *Outer regional* and *Remote* areas were combined because of small sample sizes. No data for the general population were collected from *Very remote* areas.

The remoteness areas used in this report are based on the 2011 Census.

Socioeconomic groups

The ABS has constructed a number of socioeconomic indexes to classify areas on the basis of social and economic information collected in the 2011 Census of Population and Housing.

In this report, the SEIFA Index of Relative Socioeconomic Disadvantage is used. This is derived from social and economic characteristics of the local area such as low income, low educational attainment, high levels of public sector housing, high unemployment and jobs in relatively unskilled occupations. SEIFA is constructed so that relatively disadvantaged areas have low index values (referred to as 'low socioeconomic group' in this report), and relatively advantaged areas have high index values (referred to as 'high socioeconomic group' in this report).

It should be noted that the Index of Relative Socioeconomic Disadvantage relates to the average disadvantage of all people living in a statistical area, not to the level of disadvantage of a specific individual. As the population of many areas covers a broad range of socioeconomic disadvantage, these measures will generally underestimate the true effect of disadvantage on health.

Health conditions and risk factors

This section provides information on the classification of conditions and risk factors described in this report, based on the ABS 2011–12 Australian Health Survey (AHS). The International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) was used in the AHS to classify conditions. For more detailed information, visit the Australian Health Survey: Users' Guide, 2011-13 at <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4363.0.55.001Main+Features12011-13?OpenDocument>.

Cardiovascular disease

The population with CVD was based on self-reported responses from people who participated in the ABS 2011–12 AHS. Respondents were asked whether they had ever been told by a doctor or nurse that they had a heart or circulatory condition, and were then provided with prompt cards showing examples of conditions. Respondents were also asked whether the condition was current or long-term:

- 1: Ever told has condition, still current and long-term
- 2: Ever told has condition, still current but not long-term
- 3: Ever told has condition, not current
- Survey responses were classified using the cardiovascular disease classification found in Table B1.

Table B.1: 2011–12 Australian Health Survey cardiovascular disease classification

Condition	Condition status
Hypertensive diseases	1
Ischaemic heart diseases: angina, other ischaemic heart diseases	1, 2 and 3
Other heart diseases	1, 2 and 3
Tachycardia	1
Cerebrovascular diseases	1, 2 and 3
Oedema	1
Diseases of arteries, arterioles and capillaries	1
Diseases of veins, lymphatic vessels etc.	1
Other diseases of circulatory system	1
Symptoms and signs involving the circulatory system	1

Source: ABS 2013e.

Diabetes

As part of the biomedical component of the ABS 2011–12 AHS, two blood tests for diabetes were performed: fasting plasma glucose (FPG) and glycated haemoglobin (commonly referred to as HbA1c). The population with diabetes was derived using a combination of blood test results and self-reported information (also from the AHS) on diabetes diagnosis and medication use (Table B2). (See AIHW 2014b for further details).

Table B.2: 2011-12 National Health Measures Survey diabetes classification

Diabetes status	Criteria for survey participant
Known diabetes*	Ever been told by a doctor or nurse that they have diabetes and they were taking diabetes medication (either insulin or tablets); OR Ever been told by a doctor or nurse that they have diabetes and their blood test result for FPG was greater than or equal to the cut-off point for diabetes (that is, ≥7.0 mmol/L); OR Ever been told by a doctor or nurse that they have diabetes and their blood test result for HbA1c was greater than or equal to the cut-off point for diabetes (that is, 6.5%).
Newly diagnosed diabetes	Reported no prior diagnosis of diabetes but had an FPG value ≥7.0 mmol/L.
Total persons with diabetes	*Known diabetes + newly diagnosed diabetes.*

* People with known diabetes were further classified as having type 1, type 2 or type unknown, based on the type of diabetes they were told they had by a doctor or nurse. Women with gestational diabetes were excluded.

Source: ABS 2014b.

In determining the population with diabetes, this report uses HbA1c results, to include the greatest number of respondents with biomedical markers for diabetes. Approximately 21% of people aged 18 and over who participated in the AHS did not fast, meaning that their FPG results could not be used. In 2011–12, the prevalence of diabetes among people aged 18 and over based on FPG (5.1%) and HbA1c (5.4%) were similar.

Chronic kidney disease

Biomedical data in the ABS 2011–12 AHS are used to estimate the CKD population in this report. These data are based on measures of estimated glomerular filtration rate (eGFR) and albumin creatinine ratio (ACR), which together identify signs of CKD. Although abnormal eGFR and ACR measurements may indicate impaired kidney function, kidney disease can only be confirmed if albuminuria or eGFR less than 60 mL/min/1.73 m^2 has persisted for at least 3 months (ABS 2013a, 2013e; Kidney Health Australia 2012).

CKD is usually categorised into 5 stages (1 to 5) according to the level of kidney function and evidence of kidney damage, indicated by biological markers such as blood or protein in the urine—see AIHW (2014b) for further details. In the AHS, stages for signs of CKD were defined using both the eGFR (kidney function) and ACR (kidney damage) results (ABS 2013b).

Tobacco smoking

The measure of tobacco smoking used in this report was based on self-reported information collected from the AHS. Although the focus is on current daily smokers aged 18 or over, information for younger age groups has also been included.

The sex- and age-specific rates of daily smoking were based on the online June 2013 publication *Australian Health Survey: updated results, 2011–2012* (ABS cat. no. 4364.0.55.003) <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4364.0.55.003main+features12011-2012>, which report on the AHS core content survey. Rates for other population groups were extracted from the ABS Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, using the TableBuilder microdata tool.

Rates of smoking for populations with and without conditions were based on unpublished data from the ABS. Rates from the AHS core content survey and the National Health Measures Survey (NHMS) differed substantially, due to variability in sampling and weighting (ABS 2013e). For example, the unweighted daily smoking rates for AHS core content survey were 17.5% out of 25,000 adults compared with 12% out of 9,500 adults in the NHMS. The weighted estimates were 16% and 11%, respectively, out of an estimated 17 million adults.

Insufficient physical activity

The measure of physical activity in this report was based on self-reported information collected from the AHS. The information includes the intensity, frequency and duration of physical activity during the week preceding the survey. The focus of this report is on adults aged 18 and over, however information for younger age groups is also included.

The sex- and age-specific rates for inactive and insufficiently active adults were based on unpublished results from the Australian Health Survey: Core Content—Risk Factors and Selected Health Conditions, 2011–12, while the rates for other selected population groups were extracted from the ABS Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12, using the TableBuilder microdata tool. The rates for inactive and insufficiently active adults by disease-specific and disease-free population were supplied as unpublished ABS data. Small discrepancies can be found between the AHS core content results and the biomedical results, because of sampling variability between the two data sources (ABS 2013e).

Trend data on physical inactivity was based on a derived weekly average of physical activity time and sessions collected from previous National Health Surveys (NHS). Unlike the ABS 2011–12 AHS, these surveys were based on a 2-week recall period and did not include incidental physical activity, such as walking for transport. In the ABS 2011–12 AHS the proportion of people with insufficient physical activity was based on the duration and sessions undertaken during the week prior to the survey including walking for transport and one-week recall (ABS 2013b).

Excessive alcohol consumption

Excessive alcohol consumption was measured against the lifetime risk benchmark of exceeding 2 standard drinks a day in the week preceding the survey. It was based on self-reported information on frequency, quantity and type of alcohol consumed over the past week. Results presented for exceeding alcohol risk guidelines relate to lifetime risk for adults aged 18 and over.

The sex- and age-specific rates for excessive alcohol consumption for adults at lifetime risk were based on results published in *Australian Health Survey: first results, 2011–2012* (ABS cat. no. 4364.0.55.001), while the rates for other selected population groups were extracted from the ABS AHS NHS component using the TableBuilder microdata tool.

The rates of excessive alcohol consumption for adults as lifetime risk by disease-specific and disease-free population were supplied as unpublished ABS data. Small discrepancies can be found between the AHS core content results and the biomedical results, because of sampling variability between the two data sources (ABS 2013e).

Inadequate fruit and vegetable consumption

The inadequate fruit and vegetable consumption measure is based on self-reported information on daily serves of vegetable and fruit consumed in the week preceding the survey (see Box 2.5). The focus of this report is on adults aged 18 and over, however information for younger age groups was also included.

The sex- and age-specific rates for inadequate fruit or vegetable consumption in adults were based on results published in *Australian Health Survey: updated results, 2011–2012* (ABS cat. no. 4364.0.55.003), while the rates for other selected population groups were extracted from the Australian Health Survey: Core Content—Risk Factors and Selected Health Conditions, 2011–12 using the TableBuilder microdata tool.

The rates for inadequate fruit or vegetable consumption in adults by disease-specific and disease-free population were based on unpublished data from the ABS. Small discrepancies can be found between the AHS core content results and the biomedical results, due to the variability in sampling and weighting (ABS 2013e).

Body mass

Measurements of height and weight were obtained for all persons (excluding pregnant women) aged 2 and over in the AHS who agreed to measurements being taken. Adults aged 18 and over, as well as younger age groups, have been included in this report.

Body mass index (BMI) scores were derived using Quetelet's metric BMI, which is calculated as weight (kg) divided by height squared (m^2). BMI was calculated for 96% of persons aged 18 and over. The results in this report are based on the measured population only. Estimates presented in this report were obtained through published ABS results and unpublished data requests, and by AIHW analysis using the ABS TableBuilder microdata tool. The graphic representation of BMI distribution in the report is based on smoothing of BMI data points, including the minimum and maximum values which are based on aggregates for 12 or less and 49 or more.

Blood pressure

Information on blood pressure was obtained for all AHS participants who agreed to have their measurements taken. Eighty-six per cent of persons aged 18 and over did so, and provided a valid blood pressure reading. The results in this report are based on the measured population only.

Estimates presented in this report were derived from published ABS results and unpublished data requests, and by AIHW analysis using the ABS TableBuilder microdata tool. The graphic representation of blood pressure distributions in the report are based on smoothing of data points, including the minimum and maximum values which are based on aggregates for systolic blood pressure 89mmHg or less and 195mmHg or more and diastolic blood pressure 49mmHg or less and 115mmHg or more.

Dyslipidaemia and impaired fasting glucose

Cardiovascular disease biomarkers (including total, HDL and LDL cholesterol and triglycerides) and impaired fasting glucose were measured only for NHMS participants who fasted for 8 hours or more before their blood test. Blood samples after fasting were obtained for 79% of participants aged 18 and over.

Estimates presented in this report were obtained through published ABS results and unpublished data requests, and by AIHW analysis using the ABS TableBuilder microdata tool. The graphic representation of total cholesterol distribution in the report is based on smoothing of data points, including the minimum and maximum values which are based on aggregates of 3 mmol/L or less and 8.5 mmol/L or more.

Multiple risk factors

The data presented in sections describing multiple risk factors were compiled from components of the AHS. Results are subject to survey limitations which preclude the inclusion of some risk factors, as described below.

The introduction to each section includes a summary of findings for individual risk factors. These are subject to the population restrictions applicable to the relevant components of the AHS.

Number of risk factors

Six risk factors were available for analysis of the collective number of risk factors. These were reported by people participating in the NHMS component of the ABS AHS.

Risk factors included in the analysis were:

- daily smoking
- inactive or insufficiently active
- inadequate fruit and vegetable consumption
- overweight or obese—excludes persons for whom height and weight were not measured
- high blood pressure—excludes persons for whom blood pressure was not measured
- dyslipidaemia—excludes persons who did not fast for at least 8 hours prior to their blood test and 'Not reported'.

Excessive alcohol consumption was not included, since this risk factor was only available from the ABS NHS.

Impaired fasting glucose was excluded, because of small sample sizes leading to large relative standard errors.

Although dyslipidaemia has a greater role in the progression of CKD rather than as a risk factor, it was included in the count of risk factors for the CKD population.

Risk factor combinations

Many combinations of risk factors are possible—each chapter provides a sample of risk factor combinations obtained through the ABS Survey TableBuilder microdata tool.

All proportions presented for combinations of risk factors have been calculated using the population aged 18 and over, irrespective of their participation in biomedical tests. This approach differs from other sections of the report where proportions of individual risk factors are calculated using the population aged 18 and over who participated in biomedical tests. Therefore it is likely that the proportions derived for combinations of risk factors in this report underestimate the occurrence of these combinations in the population.

Combinations of risk factors with relative standard errors of 25% or more have been excluded from this report.

Combinations of risk factors were sourced from two components of the AHS. All combinations of risk factors including excessive alcohol consumption have been derived from the NHS component, whereas combinations excluding excessive alcohol consumption have been derived from the NHMS. Caution should be exercised when comparing results from different components of the AHS.

Risk factors included in the analysis were:

- daily smoking
- inactive or insufficiently active
- excessive alcohol consumption
- inadequate fruit and vegetable consumption
- overweight or obese
- uncontrolled high blood pressure
- dyslipidaemia
- elevated blood glucose.

Analysis of risk factor combinations using the ABS Survey TableBuilder microdata tool are restricted to no more than 4 risk factors. Data randomisation results in small variations in estimates of risk factors analysed in combinations with other risk factors.

Appendix C: Statistical tables

Behavioural risk factors

Table C.1: Behavioural risk factors, persons aged 18 and over by sex, 2011–12

Risk factor	Men	Women	Persons
	%		
Tobacco smoking			
Current smoker	20.3	15.7	18.0
Daily smoker	18.3	14.1	16.1
Ex-smoker	35.2	26.8	31.0
Never smoked	44.5	57.5	51.2
Physical activity			
Inactive	18.8	19.4	19.1
Insufficiently active	34.6	38.3	36.5
Sufficiently active for health	46.1	42.0	44.0
Alcohol consumption			
Exceeded guidelines in last week	29.1	10.1	19.5
Did not exceed guidelines in last week	39.8	40.6	40.3
Did not consume alcohol in previous week, but did less than 12 months ago	18.6	26.4	22.6
Consumed alcohol 12 months or more ago	6.0	8.9	7.5
Never consumed alcohol	5.8	12.1	9.0
Fruit and vegetable consumption			
Inadequate fruit and vegetable consumption	95.5	93.5	94.5
Inadequate fruit consumption	56.4	46.7	51.6
Inadequate vegetable consumption	92.9	90.6	91.9
Adequate fruit and vegetable consumption	4.5	6.5	5.5

Sources: ABS 2013b; AIHW analysis of unpublished ABS Australian Health Survey, 2011–12 (National Health Survey Component); ABS 2012.

Table C.2: Daily smoking, persons aged 18 and over, by selected population characteristics, 2011–12 and time series

	Men		Women		Persons	
Population characteristics	**%**	**95% CI**	**%**	**95% CI**	**%**	**95% CI**
Age group (years)						
18–24	18.3	14.7–21.9	14.8	12.4–17.2	16.6	14.5–18.7
25–34	21.9	19.5–24.3	17.1	15.3–18.9	19.5	17.9–21.1
35–44	21.2	19.2–23.2	16.5	14.8–18.2	18.9	17.5–20.3
45–54	22.9	20.6–25.2	17.4	15.4–19.4	20.2	18.8–21.6
55–64	15.5	13.5–17.5	12.9	11.2–14.6	14.2	13.0–15.4
65–74	10.8	8.6–13.0	7.2	5.7–8.7	8.9	7.5–10.3
75+	4.3	2.8–5.8	3.6	2.4–4.8	3.9	3.0–4.8
All persons	18.3	17.3–19.3	14.1	13.3–14.9	16.1	15.5–16.7
All persons ('000)	*1,535.7*	. .	*1,215.7*	. .	*2,751.4*	. .
Remoteness						
Major cities	16.6	15.2–17.9	13.0	11.8–14.1	14.8	13.9–15.6
Inner regional	19.5	16.5–22.6	17.4	15.1–19.8	18.6	16.6–20.5
Outer regional and remote	27.6	24.3–30.9	18.3	15.6–21.1	22.7	21.2–24.3
Socioeconomic group						
Group 1 (lowest SES)	26.7	23.1–30.2	21.2	19.2–23.1	23.8	21.9–25.7
Group 2	22.7	19.7–25.6	17.2	15.0–19.3	19.7	17.9–21.6
Group 3	17.7	14.7–20.6	15.7	13.9–17.6	16.6	15.0–18.2
Group 4	15.3	12.5–18.0	10.9	9.2–12.7	13.2	11.7–14.6
Group 5 (highest SES)	10.7	8.2–13.1	7.1	5.6–8.6	9.0	7.5–10.6
Time series[(a)]						
1989–90	27.4	26.9–28.0	23.8	23.2–24.3	25.6	25.2–26.0
1995	26.5	26.0–27.0	20.1	19.7–20.6	23.3	23.0–23.6
2001	25.0	24.0–26.1	19.6	18.6–20.6	22.3	21.5–23.0
2004–05	24.1	22.9–25.3	18.6	17.7–19.6	21.3	20.6–22.1
2007–08	21.0	19.7–22.2	17.2	16.2–18.2	19.1	18.3–19.9
2011–12	18.3	17.3–19.3	14.3	13.5–15.1	16.3	15.7–16.9

(a) Rates are age-standardised to the 2001 Australian standard population.

Sources: ABS 2013b; AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; AIHW 2012b.

Table C.3: Inactive or insufficiently active, persons aged 18 and over, by selected population characteristics, 2011–12 and time series

	Men		Women		Persons	
Population characteristics	**%**	**95% CI**	**%**	**95% CI**	**%**	**95% CI**
Age group (years)						
18–24	41.8	37.5–46.1	50.6	45.6–55.6	46.1	43.1–49.1
25–34	47.3	44.0–50.6	53.8	50.5–57.1	50.5	47.9–53.1
35–44	54.8	51.5–58.1	55.0	52.3–57.7	55.0	53.0–57.0
45–54	54.5	51.1–57.9	55.9	52.2–59.6	55.2	52.7–57.7
55–64	57.1	53.6–60.6	59.1	55.3–62.9	58.1	55.5–60.7
65–74	61.1	56.6–65.6	61.3	57.7–64.9	61.1	58.1–64.1
75+	66.8	61.9–71.7	81.2	76.5–85.9	74.8	71.5–78.1
All persons	53.4	51.9–54.9	57.7	56.1–59.3	55.6	54.5–56.7
All persons ('000)	*4,483.1*	. .	*4,983.9*	. .	*9,466.9*	. .
Remoteness						
Major cities	50.6	49.0–52.2	55.8	54.0–57.6	53.2	51.9–54.5
Inner regional	60.7	57.1–64.3	62.4	59.2–65.6	61.5	59.0–64.0
Outer regional and remote	59.1	54.0–64.2	62.7	58.1–67.3	60.9	57.0–64.8
Socioeconomic group						
Group 1 (lowest SES)	60.3	56.2–64.4	66.9	63.5–70.3	63.7	61.2–66.7
Group 2	58.8	55.6–62.0	61.7	58.7–64.7	60.3	58.1–62.9
Group 3	54.0	50.4–57.6	58.2	55.3–61.1	56.2	53.7–58.2
Group 4	50.7	47.4–54.0	53.1	50.1–56.1	51.9	49.7–54.4
Group 5 (highest SES)	43.9	41.0–46.8	49.5	46.2–52.8	46.8	44.4–49.4
Time series[(a)(b)]						
1989–90	50.5	49.4–51.9	53.6	52.5–54.8	52.1	51.3–52.9
1995	50.9	50.4–51.4	54.1	53.1–55.0	52.4	51.7–53.1
2001	59.3	58.1–60.5	58.8	57.4–60.1	59.0	58.1–59.9
2004–05	56.5	55.2–57.8	56.4	55.2–57.6	56.4	55.5–57.3
2007–08	55.8	54.3–57.3	54.7	53.2–56.2	55.2	54.2–56.2
2011–12	53.4	52.5–54.3	57.5	56.5–58.4	55.5	54.7–56.2

(a) Rates are age-standardised to the 2001 Australian standard population.

(b) Trends are based on duration, session and intensity over a 2-week recall period, and are averaged over a week. They exclude incidental physical activity such as walking for transport.

Sources: ABS 2013b; AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12' and unpublished 'Australian Health Survey, 2011–12 (Core component)'; AIHW 2012b.

Table C.4: Excessive alcohol consumption[a], persons aged 18 and over at lifetime risk of harm, by selected population characteristics, 2011–12 and time series

	Men		Women		Persons	
Population characteristics	**%**	**95% CI**	**%**	**95% CI**	**%**	**95% CI**
Age group (years)						
18–24	28.6	23.4–33.8	8.6	6.2–11.0	18.8	16.1–21.5
25–34	30.6	27.5–33.7	9.1	7.3–10.9	19.9	17.9–21.9
35–44	30.7	28.4–33.0	10.6	8.8–12.4	20.5	18.9–22.1
45–54	27.9	24.8–31.0	11.5	9.0–14.0	19.6	17.7–21.5
55–64	33.5	29.4–37.6	12.7	10.2–15.2	23.0	20.8–25.2
65–74	26.6	23.0–30.2	8.9	6.3–11.5	17.6	15.4–19.8
75+	17.8	14.1–21.5	7.0	4.7–9.3	11.8	9.9–13.7
All persons	29.1	27.7–30.5	10.1	9.1–11.1	19.5	18.6–20.4
All persons ('000)	*2,445.0*	. .	*873.2*	. .	*3,318.2*	. .
Remoteness						
Major cities	28.0	26.2–29.9	9.4	8.3–10.6	18.6	17.5–19.7
Inner regional	29.7	26.4–33.0	11.1	8.3–14.0	20.7	18.3–23.2
Outer regional and remote	35.9	33.2–38.6	12.9	10.0–15.8	23.7	21.3–26.2
Socioeconomic group						
Group 1 (lowest SES)	25.7	23.0–28.4	6.3	4.7–7.9	15.5	14.1–16.9
Group 2	28.9	25.7–32.0	10.6	8.4–12.7	19.1	16.9–21.4
Group 3	29.6	25.7–33.5	10.4	8.0–12.8	19.7	17.1–22.3
Group 4	30.2	27.2–33.1	9.9	8.4–11.5	20.5	18.9–22.2
Group 5 (highest SES)	30.7	27.7–33.6	13.1	10.5–15.6	22.1	20.0–24.1
Time series[b]						
2001	29.0	27.8–30.2	8.5	7.8–9.2	n.a.	n.a.
2004–05	32.2	31.0–33.4	11.7	11.0–12.4	n.a.	n.a.
2007–08	30.2	28.8–31.6	11.7	10.8–12.6	n.a.	n.a.
2011–12	28.9	27.5–30.3	10.1	9.1–11.1	n.a.	n.a.

(a) Excessive alcohol consumption relates to lifetime risk of alcohol-related harm or injury.
(b) Rates are age-standardised to the 2001 Australian standard population.

Sources: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Survey Component)' and ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; ABS 1989–90, 1995, 2001,2004–05, 2007–08 NHS CURFs.

Table C.5: Inadequate fruit and vegetable consumption, persons aged 18 and over, by selected population characteristics, 2011–12 and time series

	Men		Women		Persons	
Population characteristics	**%**	**95% CI**	**%**	**95% CI**	**%**	**95% CI**
Age group (years)						
18–24	97.0	95.5–98.5	96.1	94.4–97.8	96.5	95.4–97.6
25–34	96.7	95.8–97.6	96.5	95.6–97.4	96.6	95.8–97.4
35–44	96.1	95.2–97.0	94.9	93.8–96.0	95.5	94.8–96.2
45–54	95.5	94.4–96.6	92.2	90.6–93.8	93.9	92.8–95.0
55–64	94.7	93.6–95.8	90.5	88.9–92.1	92.5	91.4–93.6
65–74	93.4	91.8–95.0	89.9	88.1–91.7	91.7	90.5–93.0
75+	91.7	89.2–94.2	91.7	89.7–93.6	91.7	90.3–93.0
All persons	95.5	94.9–96.1	93.5	93.0–94.0	94.5	94.1–94.9
All persons ('000)	*8,026.3*	. .	*8,070.7*	. .	*16,096.9*	. .
Remoteness						
Major cities	96.3	95.4–97.2	94.3	93.4–95.1	95.2	94.5–96.0
Inner regional	93.7	92.4–95.0	91.6	90.2–93.1	92.7	92.5–92.8
Outer regional and remote	93.0	92.5–93.5	91.3	89.9–92.7	92.2	91.8–92.5
Socioeconomic group						
Group 1 (lowest SES)	96.0	94.7–97.3	94.4	93.9–94.9	95.3	94.6–96.0
Group 2	95.3	94.1–96.6	93.5	92.5–94.4	94.4	94.1–94.6
Group 3	95.6	94.7–96.4	93.2	90.9–95.4	94.3	92.8–95.7
Group 4	95.0	93.4–96.5	94.1	91.0–97.1	94.6	92.4–96.7
Group 5 (highest SES)	95.6	94.0–97.3	92.3	91.5–93.2	94.0	92.9–95.1
Time series[(a)]						
2004–05	91.6	90.9–92.3	88.2	87.4–88.9	89.9	89.4–90.4
2007–08	95.1	94.5–95.8	92.6	91.9–93.4	93.9	93.4–94.4
2011–12	95.5	95.0–96.0	93.6	93.2–94.1	94.5	94.2–94.9

(a) Rates are age-standardised to the 2001 Australian standard population.

Sources: ABS 2013b; AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; ABS 2004-05 and 2007-08 NHS CURFs; ABS 2013c.

Biomedical risk factors

Table C.6: Biomedical risk factors, persons aged 18 and over by sex, 2011–12

Biomedical risk factor	Men	Women	Persons
		%	
Overweight and obesity			
Underweight	1.2	2.1	1.7
Healthy weight	29.1	42.2	35.5
Overweight or obese	69.7	55.7	62.8
Overweight but not obese	42.2	28.2	35.3
Blood pressure			
Does not have high blood pressure	65.9	70.9	68.4
Has high blood pressure	34.1	29.1	31.6
Uncontrolled high blood pressure	23.6	19.5	21.5
Dyslipidaemia			
Does not have dyslipidaemia	34.8	35.5	35.1
Has dyslipidaemia	63.7	62.8	63.2
Uncontrolled dyslipidaemia	56.8	56.5	56.6
Taking lipid medication, and has normal lipid levels	6.9	6.3	6.6
Impaired fasting glucose			
Has elevated blood glucose levels	10.4	6.0	8.2
Impaired fasting plasma glucose	4.1	2.1	3.1
Has diabetes	6.3	3.9	5.1

Note: Exclusions: body mass index categories—persons for whom height and weight were not measured; blood pressure—blood pressure was not measured or a valid reading was not obtained; dyslipidaemia and impaired fasting glucose—persons who did not fast for 8 hours or more prior to their blood test.

Sources: ABS 2013a; AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'; ABS 2013b.

Table C.7: Overweight and obesity, persons aged 18 and over, by selected population characteristics, 2011–12 and time series

	Men		Women		Persons	
Population characteristics	**%**	**95% CI**	**%**	**95% CI**	**%**	**95% CI**
Age group (years)						
18–24	40.8	37.1–44.5	31.8	28.3–35.3	36.4	33.9–38.9
25–34	64.6	61.9–67.3	43.2	40.3–46.1	54.5	52.4–56.6
35–44	74.9	72.3–77.5	54.7	51.9–57.5	64.9	62.9–66.9
45–54	78.5	76.1–80.9	63.6	60.9–66.3	71.1	69.2–73.0
55–64	78.5	75.8–81.2	69.1	66.0–72.2	73.9	71.7–76.1
65–74	80.6	77.9–83.3	69.3	66.1–72.5	74.9	72.9–76.9
75+	70.3	66.6–74.0	65.7	61.6–69.8	67.8	64.9–70.7
All persons	69.7	68.5–70.9	55.7	54.5–57.0	62.8	61.9–63.7
All persons ('000)	*5,086.2*	. .	*3,933.3*	. .	*9,019.4*	. .
Remoteness						
Major cities	67.7	65.9–69.4	52.6	50.8–54.3	60.2	58.9–61.6
Inner regional	74.9	71.1–78.7	62.9	60.3–65.4	69.0	67.3–70.8
Outer regional and remote	73.8	70.5–77.1	69.3	66.9–71.7	69.3	66.9–71.7
Socioeconomic group						
Group 1 (lowest SES)	67.9	65.0–70.8	63.3	58.5–68.2	65.6	61.9–69.3
Group 2	71.3	68.8–73.8	60.6	57.2–64.0	66.0	64.1–67.8
Group 3	71.2	68.3–74.2	54.6	53.3–55.8	62.9	62.7–63.1
Group 4	70.1	69.3–71.0	53.5	52.9–54.1	62.4	62.2–62.6
Group 5 (highest SES)	68.0	65.2–70.7	47.0	43.5–50.4	57.7	54.5–60.8
Time series[(a)]						
1995	64.8	62.9–66.8	49.4	47.6–51.1	57.2	56.0–58.3
2007–08	67.7	66.2–69.3	54.3	52.6–56.0	61.1	59.8–62.3
2011–12	69.9	68.7–71.1	55.2	53.9–56.5	62.7	61.8–63.6

(a) Age-standardised rates to the 2001 Australian standard population.

Note: Excludes persons for whom height and weight were not taken.

Sources: ABS 2013a; AIHW analysis of ABS 'Microdata: Australian Health Survey, Core Content—Risk Factors and Selected Health Conditions, 2011–12'; AIHW 2012b; ABS 2013b; AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'.

Table C.8: High blood pressure, persons aged 18 and over, by selected population characteristics, 2011–12

	Men		Women		Persons	
Population characteristics	**%**	**95% CI**	**%**	**95% CI**	**%**	**95% CI**
Age group (years)						
18–24	7.6	3.9–11.3	5.7	3.3–8.1	6.6	4.5–8.7
25–34	13.5	11.1–15.9	6.2	4.4–8.0	9.9	8.3–11.5
35–44	21.7	19.0–24.4	14.1	11.6–16.6	17.8	15.9–19.7
45–54	35.9	32.7–39.1	29.3	26.1–32.5	32.6	30.5–34.7
55–64	54.1	50.0–58.2	46.1	42.2–50.0	50.1	47.0–53.2
65–74	69.3	64.6–74.0	69.0	64.9–73.1	69.1	66.3–71.9
75+	80.4	75.5–85.3	83.3	80.0–86.6	81.9	78.8–85.0
All persons	34.1	32.8–35.4	29.1	27.9–30.3	31.6	30.7–32.5
All persons ('000)	*2,456.8*	. .	*2,123.5*	. .	*4,580.3*	. .
Remoteness						
Major cities	32.2	31.0–33.4	27.8	26.3–29.3	30.0	29.0–31.0
Inner regional	39.6	36.0–43.2	32.2	29.2–35.2	36.0	33.4–38.6
Outer regional and remote	37.3	33.2–41.4	32.3	27.9–36.7	34.6	31.3–37.9
Socioeconomic group						
Group 1 (lowest SES)	38.8	35.6–42.0	33.9	30.5–37.3	36.3	33.8–38.8
Group 2	35.8	32.3–39.3	29.6	26.8–32.4	32.6	30.5–34.7
Group 3	34.0	30.6–37.4	29.8	26.6–33.0	31.9	30.2–33.6
Group 4	31.4	28.4–34.4	29.3	25.9–32.7	30.4	28.2–32.6
Group 5 (highest SES)	31.4	28.2–34.6	23.4	20.7–26.1	27.5	25.3–29.7

Note: Excludes persons for whom blood pressure was not measured or a valid reading was not obtained.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'.

Table C.9: Dyslipidaemia, persons aged 18 and over, by selected population characteristics, 2011–12

	Men		Women		Persons	
Population characteristics	**%**	**95% CI**	**%**	**95% CI**	**%**	**95% CI**
Age group (years)						
18–24	30.9	21.6–40.2	36.3	27.0–45.6	33.6	26.7–40.5
25–34	51.7	45.8–57.6	51.2	45.8–56.6	51.5	47.8–55.2
35–44	69.1	64.5–73.7	50.0	44.1–55.9	59.2	55.1–63.3
45–54	73.8	67.8–79.8	68.2	63.6–72.8	70.9	67.1–74.7
55–64	74.8	70.6–79.0	83.0	79.6–86.4	78.9	76.1–81.7
65–74	78.3	73.6–83.0	83.5	79.7–87.3	81.0	77.8–84.2
75+	73.9	67.8–80.0	80.8	73.4–88.2	77.7	72.9–82.5
All persons	63.7	61.4–66.0	62.8	60.1–65.5	63.2	61.3–65.1
All persons ('000)	*4,247.8*	. .	*4,303.2*	. .	*8,551.0*	. .
Remoteness						
Major cities	62.9	59.8–66.0	60.6	57.5–63.7	61.7	59.4–64.0
Inner regional	66.4	61.2–71.6	68.9	63.5–74.3	67.7	64.0–71.4
Outer regional and remote	63.6	55.5–71.7	68.7	62.6–74.8	66.1	60.7–71.5
Socioeconomic group						
Group 1 (lowest SES)	64.4	59.0–69.8	69.7	63.5–75.9	67.1	63.5–70.7
Group 2	70.7	65.3–76.1	65.9	60.8–71.0	68.2	64.3–72.1
Group 3	63.5	57.6–69.4	61.4	55.6–67.2	62.4	57.9–66.9
Group 4	57.5	52.2–62.8	59.8	54.7–64.9	58.6	54.5–62.7
Group 5 (highest SES)	62.9	57.3–68.5	58.6	53.0–64.2	60.7	56.6–64.8

Note: Excludes persons who did not fast for 8 hours or more prior to their blood test.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'.

Table C.10: Impaired fasting glucose, persons aged 18 and over, by selected population characteristics, 2011–12

	Men		Women		Persons	
Population characteristics	**%**	**95% CI**	**%**	**95% CI**	**%**	**95% CI**
Age group (years)						
18–24	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.
25–34	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.
35–44	*2.9	1.0–4.8	*1.2	0.1–2.3	2.1	1.1–3.1
45–54	*4.7	2.3–7.1	*2.2	0.9–3.5	3.5	2.3–4.7
55–64	6.9	4.7–9.1	*2.7	1.3–4.1	4.7	3.5–5.9
65–74	7.8	5.3–10.3	5.2	3.3–7.1	6.5	5.0–8.0
75+	9.8	5.5–14.1	*5.6	2.5–8.7	7.5	4.8–10.2
All persons	4.1	3.3–4.9	2.1	1.6–2.6	3.1	2.6–3.6
All persons ('000)	*272.8*	. .	*142.9*	. .	*415.8*	. .
Remoteness						
Major cities	3.4	2.5–4.3	1.9	1.3–2.5	2.7	2.1–3.3
Inner regional	6.0	3.9–8.1	2.0	1.0–3.0	4.0	2.9–5.1
Outer regional and remote	*5.3	2.0–8.6	*3.7	1.7–5.7	4.5	2.6–6.4
Socioeconomic group						
Group 1 (lowest SES)	5.4	3.3–7.5	3.4	2.0–4.8	4.3	3.0–5.6
Group 2	*5.1	2.5–7.7	*2.4	1.1–3.7	3.7	2.3–5.1
Group 3	4.3	2.6–6.0	2.2	1.2–3.2	3.3	2.2–4.4
Group 4	2.5	1.3–3.7	*1.3	0.5–2.1	1.9	1.2–2.6
Group 5 (highest SES)	3.5	1.9–5.1	*1.4	0.4–2.4	2.5	1.3–3.7

* Estimate has a relative standard error of 25% to 50% and should be used with caution.

Note: Excludes persons with diabetes (i.e. with fasting blood glucose greater than or equal to 7.0 mmol/L), and persons who did not fast for 8 hours or more prior to their blood test.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'.

Risk factors among people with and without CVD, diabetes or CKD

Table C.11: Behavioural risk factors by health condition, persons aged 18 and over, 2011–12

	CVD		Diabetes		CKD	
Behavioural risk factors	**%**	**95% CI**	**%**	**95% CI**	**%**	**95% CI**
Daily smoker						
With condition						
18–39	19.5	11.4–27.6	*24.0	1.3–46.7	*8.2	2.9–13.5
40–54	16.8	12.7–20.9	24.5	15.1–33.9	*16.0	5.1–26.9
55+	6.1	4.9–7.3	6.4	3.9–8.9	6.3	4.4–8.2
Total	*9.8*	*8.4–11.2*	*11.8*	*8.1–15.5*	*8.2*	*5.9–10.5*
Without condition	11.4	10.0–12.8	11.0	9.9–12.1	11.4	10.2–12.5
Inactive or insufficiently active						
With condition						
18–39	38.8	31.4–46.2	82.5	56.4–100.0	65.0	51.1–78.8
40–54	57.9	52.3–63.4	64.3	52.1–76.5	53.9	40.0–67.8
55+	65.2	61.9–68.5	70.8	63.2–78.3	68.1	63.2–73.0
Total	*61.1*	*58.5–63.7*	*69.9*	*64.2–75.6*	*65.3*	*60.5–70.1*
Without condition	50.9	48.4–53.3	52.1	50.2–54.1	51.7	49.6–53.9
Excessive alcohol consumption[(a)]						
With condition						
18–39	*13.1	4.6–21.6	—	—	*16.2	4.9–27.5
40–54	17.6	12.0–23.2	*11.9	2.1–21.7	*20.2	9.5–30.9
55+	18.2	15.1–21.3	11.0	6.5–15.5	17.2	12.2–22.2
Total	*17.5*	*15.1–19.9*	*10.5*	*6.4–14.6*	*17.5*	*13.6–21.4*
Without condition	18.6	16.6–20.6	18.8	17.3–20.3	18.5	16.8–20.1
Inadequate fruit and vegetable consumption						
With condition						
18–39	97.7	92.2–100.0	100.0	100.0–100.0	93.3	83.0–100.0
40–54	94.2	89.5–98.9	94.2	82.9–100.0	93.8	85.6–100.0
55+	92.6	90.3–94.8	92.7	87.7–97.8	94.0	90.4–97.6
Total	*93.4*	*91.4–95.4*	*93.5*	*88.9–98.1*	*93.8*	*90.4–97.2*
Without condition	94.2	93.1–95.4	94.1	93.3–94.8	94.1	93.1–95.0

* Estimate has a relative standard error of 25% to 50% and should be used with caution.

(a) Excessive alcohol consumption relates to lifetime risk of alcohol-related harm or injury.

Note: Refer to Appendix B for definitions of conditions.

Source: AIHW analysis of uunpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'.

Table C.12: Biomedical risk factors by health condition, persons aged 18 and over, 2011–12

	CVD		Diabetes		CKD	
Behavioural risk factors	**%**	**95% CI**	**%**	**95% CI**	**%**	**95% CI**
Overweight and obesity						
With condition						
18–39	62.3	52.3–72.3	69.0	41.9–96.1	33.0	21.9–44.1
40–54	76.2	72.1–80.3	93.2	88.1–98.3	66.4	56.1–76.7
55+	76.1	73.4–78.8	87.6	83.5–91.7	73.1	68.4–77.8
Total	*74.9*	*72.5–77.3*	*87.7*	*84.3–91.1*	*63.0*	*58.6–67.4*
Without condition	57.1	55.0–59.2	59.4	57.8–61.0	60.7	59.0–62.4
High blood pressure						
With condition						
18–39	19.4	10.6–28.2	*43.8	9.9–77.7	*16.4	6.6–26.2
40–54	51.8	43.8–59.8	58.5	41.8–75.2	47.1	33.7–60.5
55+	85.8	83.5–88.1	86.0	81.1–90.9	80.4	75.1–85.7
Total	*70.5*	*67.4–73.6*	*77.2*	*70.2–84.2*	*59.3*	*54.1–64.5*
Without condition	18.6	16.2–20.9	27.0	25.3–28.7	26.5	24.7–28.3
Dyslipidaemia						
With condition						
18–39	56.6	43.7–69.5	86.6	63.7–100	. .	. .
40–54	76.3	71.2–81.4	83.9	71.8–96.0	. .	. .
55+	81.5	78.7–84.3	86.8	82.8–90.8	. .	. .
Total	*78.1*	*75.6–80.6*	*86.1*	*82.1–90.1*	. .	. .
Without condition	59.1	56.5–61.7	61.9	59.9–63.9	. .	. .
Impaired fasting glucose						
With condition						
18–39	n.p.	n.p.	. .	. .	n.p.	n.p.
40–54	*5.9	2.4–9.4	. .	. .	n.p.	n.p.
55+	6.6	5.2–8.0	. .	. .	6.2	4.0–8.4
Total	*5.9*	*4.6–7.2*	. .	. .	*4.6*	*3.0–6.2*
Without condition	2.3	1.6–3.0	. .	. .	2.9	2.3–3.5

* Estimate has a relative standard error of 25% to 50% and should be used with caution.

Notes

1. Refer to Appendix B for definitions of conditions.
2. Exclusions: Overweight or obese—persons for whom height and weight were not taken; high blood pressure—blood pressure was not measured or a valid reading was not obtained; dyslipidaemia and impaired fasting glucose—persons who did not fast for 8 hours or more prior to their blood test.

Source: AIHW analysis of unpublished ABS 'Australian Health Survey, 2011–12 (National Health Measures Survey Component)'.

Glossary

albuminuria: The presence of albumin (a type of protein) in the urine. Two positive tests for albumin in the urine over several weeks indicate persistent albuminuria, a first sign of diabetic kidney disease.

atherosclerosis: A process in which fatty and fibre-like deposits build up on the inner walls of arteries, often forming plaques that can then cause blockages. It is the main underlying condition in heart attack, angina, stroke and peripheral vascular disease.

blood cholesterol: Fatty substance produced by the liver and carried by the blood to supply the rest of the body. Its natural function is to supply material for cell walls and for steroid hormones, but if levels in the blood become too high this can lead to atherosclerosis and heart disease.

blood pressure: The force exerted by the blood on the walls of the arteries as it is pumped around the body by the heart. It is written, for example, as 134/70 mmHg, where the upper number is the systolic pressure (the maximum force against the arteries as the heart muscle contracts to pump the blood out) and the lower number is the diastolic pressure (the minimum force against the arteries as the heart relaxes and fills again with blood). Levels of blood pressure can vary greatly from person to person and from moment to moment in the same person. See also *high blood pressure/hypertension*.

body mass index (BMI): The most commonly used method of assessing whether a person is of 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, kg ÷ 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 is 25 and above (includes obese), and obese is 30 and over.

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

cholesterol: A fatty substance produced by the liver and carried around the body by the blood supply. Having high cholesterol is a risk factor that is known to contribute to the development of chronic diseases such as coronary heart disease and stroke.

chronic diseases: Term applied to a diverse group of diseases, such as heart disease, cancer and arthritis, that tend to be long-lasting and persistent in their symptoms or development. Although these features also apply to some communicable diseases, the term is usually confined to noncommunicable diseases.

chronic kidney disease: Refers to all the 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 diagnosis of disease or condition causing the disease.

comorbidity: When a person has 2 or more health problems at the same time.

coronary heart disease (CHD): Disease due to blockages in the heart's own (coronary) arteries, expressed as angina or a heart attack. Also known as ischaemic heart disease.

diabetes (diabetes mellitus): A chronic condition in which the body cannot properly use its main energy source, the sugar glucose. This is due to either the pancreas not producing enough of the hormone insulin or the body being unable to effectively use the insulin produced. Insulin helps glucose enter the body's cells from the bloodstream and then be processed by them. Diabetes is marked by an abnormal build-up of glucose in the blood and it can have serious short-term and long-term effects on any of the body's systems, especially the blood vessels and nerves. For the different types of diabetes, see *type 1 diabetes, type 2 diabetes, gestational diabetes mellitus (GDM)* and *other types of diabetes*.

dyslipidaemia: A disorder of lipid metabolism, including lipid overproduction or deficiency. Abnormal amounts of lipids in the blood are manifested by elevation of total cholesterol to 5.5 mmol/L or more, the 'bad' low-density lipoprotein (LDL) cholesterol to 3.5 mmol/L or more and/or the triglyceride concentrations to 2.0 mmol/L or more. A person is classified as having dyslipidaemia if they have a decrease in the blood of the 'good' high-density lipoprotein (HDL) cholesterol concentration to 1.0 mmol/L or less for men and 1.3 mmol/L or less for women, or if they are taking lipid-modifying medication.

end-stage kidney disease (ESKD): The most severe form of chronic kidney disease, also known as stage 5 chronic kidney disease (CKD) or kidney failure. People with ESKD generally experience a range of symptoms and abnormalities in several organ systems due to severe loss of kidney function. Kidney replacement therapy (KRT) in the form of dialysis or a kidney transplant is required for survival when kidney function is no longer sufficient to sustain life.

gestational diabetes mellitus (GDM): A form of diabetes defined as glucose intolerance in pregnant women not previously diagnosed with diabetes. GDM is a temporary form of diabetes that usually disappears after birth. Women who have had GDM are at increased risk of developing type 2 diabetes, and GDM increases the risk of perinatal morbidity and mortality. Compare with type 1 diabetes, type 2 diabetes and other types of diabetes.

glucose: The main sugar that the body uses for energy. Glucose is a simple sugar that comes from the breakdown of carbohydrates in the diet as well as from the breakdown of glycogen (the storage form of glucose) in the liver. The body requires the hormone insulin to use glucose properly.

HDL cholesterol: Cholesterol packaged in high-density lipoprotein (HDL) particles. The HDLs are good acceptors of membrane-free cholesterol and transport it back from tissues to the liver.

heart attack: A life-threatening emergency that occurs when a vessel supplying blood to the heart muscle is suddenly blocked completely by a blood clot. The medical term commonly used for a heart attack is acute myocardial infarction.

high blood pressure/hypertension: The definition of high blood pressure (also known as hypertension) can vary, but a well-accepted one is from the World Health Organization: a systolic blood pressure of 140 mmHg or more or a diastolic blood pressure of 90 mmHg or more, or [the person is] receiving medication for high blood pressure. Also see *blood pressure*.

hyperglycaemia: A high blood glucose level.

hypertension: See *high blood pressure*.

hypertensive: High blood pressure.

hypoglycaemia: A low blood glucose level.

impaired glucose tolerance: Slower metabolism of glucose due to insulin deficiency or resistance. Classified as fasting plasma glucose less than 7.0 mmol/L and 2-hour plasma glucose 7.8–11.0 mmol/L after oral glucose tolerance testing.

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

insulin: A hormone produced in the pancreas that helps glucose to enter body cells for energy metabolism.

insulin resistance: A condition in which insulin works inefficiently and the body compensates by producing an excess supply.

LDL cholesterol: Cholesterol packaged in low-density lipoprotein (LDL) particles. LDLs carry cholesterol to the various tissues for use.

metabolic syndrome: A collection of conditions that often occur together and can increase the risk of type 2 diabetes, stroke and heart disease.

nephropathy: Kidney disease or damage.

neuropathy: A disease of the system that results in damage to nerves.

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

overweight: Defined for the purpose of population studies as a body mass index of 25 or over. See also *obesity*.

prevalence: The number or proportion (of cases, instances and so forth) present in a population at a given time. Compare with incidence.

retinopathy: A disease of the small blood vessels in the retina of the eye.

risk factor: Any factor which represents a greater risk of a health disorder or other unwanted condition or event. Some risk factors are regarded as causes of disease, others are not necessarily so. Along with their opposites—protective factors—risk factors are known as determinants.

saturated fats: Fats that are solid and are found in the diet mostly from animal sources. In excess, they tend to raise blood cholesterol.

stroke: When an artery supplying blood to the brain suddenly becomes blocked or bleeds. Often causes paralysis of parts of the body normally controlled by that area of the brain, or speech problems and other symptoms.

triglyceride: A compound made up of a single molecule of glycerol and 3 molecules of fatty acid. Triglycerides are the main constituents of natural fats and oils.

type 1 diabetes: A form of diabetes marked by a complete lack of insulin and needing insulin replacement for survival. This form of diabetes mostly arises in childhood or in young adults, though it can occur at any age. Adults may develop a slowly progressive form of type 1 diabetes called latent autoimmune diabetes in adults (LADA), which can be treated initially without insulin injections. See also *type 2 diabetes, gestational diabetes mellitus (GDM)* and *other types of diabetes*.

type 2 diabetes: The most common form of diabetes, which is marked by reduced or less effective insulin. Some cases may be managed with changes to diet along with increased exercise and weight loss. Many require drugs as well—namely, oral glucose-lowering drugs that work on the pancreas. Many others require insulin in addition to other treatments. See also *type 1 diabetes, gestational diabetes mellitus (GDM)* and *other types of diabetes*.

uncontrolled dyslipidaemia: Abnormal lipid levels in blood irrespective of the person receiving lipid-modifying medication or not. See also *dyslipidaemia*.

uncontrolled high blood pressure/hypertension: Measured blood pressure of 140/90 mmHg or more irrespective of whether the person is receiving medication for high blood pressure. See also *blood pressure and high blood pressure*.

underweight: Defined for population studies as a body mass index of less than 18.5.

References

ABS (Australian Bureau of Statistics) 2012. Australian Health Survey: first results, 2011–12. ABS cat. no. 4364.0.55.001. Canberra: ABS.

ABS 2013a. Australian Health Survey: biomedical results for chronic diseases, 2011–12. ABS. cat. no. 4364.0.55.005. Canberra: ABS.

ABS 2013b. Australian Health Survey: updated results, 2011–2012. ABS cat. no. 4364.0.55.003. Canberra: ABS.

ABS 2013c. Gender indicators, Australia, January 2013. ABS cat. no. 4125.0. Canberra: ABS.

ABS 2013d. Chronic kidney disease. Canberra: ABS. Viewed January 2014, <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4F607AA357FF5A4BCA257BBB001218C7?opendocument>.

ABS 2013e. Australian Health Survey: users' guide, 2011-13. ABS cat. no. 4363.0.55.001. Canberra: ABS.

ABS 2013f. Australian Health Survey: physical activity, 2011-12. ABS cat. no. 4364.0.55.004. Canberra: ABS.

ABS 2014a. Australian Health Survey: nutrition first results—foods and nutrients, 2011–12. ABS cat. no. 4364.0.55.007. Canberra: ABS.

ABS 2014b. Diabetes biomarkers. Canberra: ABS. Viewed May 2014, <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4E3E32BE5981C674CA257C3D000D87DF?opendocument>.

AIHW 2009. Prevention of cardiovascular disease, diabetes and chronic kidney disease: targeting risk factors. Cat. no. PHE 118. Canberra: AIHW.

AIHW 2011. Cardiovascular disease Australian facts 2011. Cardiovascular disease series no. 35. Cat. no. CVD 53. Canberra: AIHW.

AIHW 2012a. Risk factors contributing to chronic disease. Cat. no. PHE 157. Canberra: AIHW.

AIHW 2012b. Risk factor trends: age patterns in key health risk factors over time. Cat. no. PHE 166. Canberra: AIHW.

AIHW 2012c. Australia's food & nutrition. Cat. no. PHE 163. Canberra: AIHW.

AIHW 2014a. Australia's health 2014. Australia's health no. 14. Cat. no. AUS 178. Canberra: AIHW.

AIHW 2014b. Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: prevalence and incidence. Cardiovascular, diabetes and chronic kidney disease series no. 2. Cat. no. CDK 2. Canberra: AIHW.

Baigent C, Landray MJ, Reith C, Emberson J, Wheeler DC, Tomson C et al. 2011. The effects of lowering LDL cholesterol with simvastatin plus ezetimibe in patients with chronic kidney disease (Study of Heart and Renal Protection): a randomised placebo-controlled trial. Lancet 377:2181–92.

Baliunas DO, Taylor BJ, Irving H, Roerecke M, Patra J, Mohapatra S et al. 2009. Alcohol as a risk factor for type 2 diabetes: a systematic review and meta-analysis. Diabetes Care 32:2123–32.

Barri YM 2008. Hypertension and kidney disease: a deadly connection. Current Hypertension Reports 10:39–45.

Beaglehole R & Magnus P 2002. The search for new risk factors for coronary heart disease: occupational therapy for epidemiologists? International Journal of Epidemiology 31:1117–22; author reply 34–5.

Begg SJ, Vos T, Barker B, Stanley L & Lopez AD 2008. Burden of disease and injury in Australia in the new millennium: measuring health loss from diseases, injuries and risk factors. Medical Journal of Australia 188:36–40.

Bennett PH 1999. Type 2 diabetes among the Pima Indians of Arizona: an epidemic attributable to environmental change? Nutrition Reviews 57:S51–4.

Brien SE, Ronksley PE, Turner BJ, Mukamal KJ & Ghali WA 2011. Effect of alcohol consumption on biological markers associated with risk of coronary heart disease: systematic review and meta-analysis of interventional studies. BMJ 342:d636.

Briganti EM, Branley P, Chadban SJ, Shaw JE, McNeil JJ, Welborn TA et al. 2002. Smoking is associated with renal impairment and proteinuria in the normal population: the AusDiab kidney study. Australian Diabetes, Obesity and Lifestyle Study. American Journal of Kidney Diseases 40:704–12.

Brown W, Bauman A, Bull F & Burton N 2013. Development of evidence-based physical activity recommendations for adults (18–64 years). Report prepared for the Australian Government Department of Health, August 2012. Canberra: Department of Health.

Brown WJ, Pavey T, Bauman AE 2014. Comparing population attributable risks for heart disease across the adult lifespan in women. Br J Sports Med Published Online First: 11 February 2014. Viewed August 2014, doi:10.1136/bjsports-2013-093090.

Colagiuri R, Girgis S, Gomez M, Walker K, Colagiuri S & O'Dea K 2009. National evidence-based guideline for the primary prevention of type 2 diabetes. Canberra: Diabetes Australia and the NHMRC.

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.

Cooper AJ, Forouhi NG, Ye Z, Buijsse B, Arriola L, Balkau B et al. 2012. Fruit and vegetable intake and type 2 diabetes: EPIC-InterAct prospective study and meta-analysis. European Journal of Clinical Nutrition 66:1082–92.

Department of Health 2014a. Make your move—sit less—be active for life!: young people (13–17 years). Canberra: Department of Health.Viewed August 2014, <http://www.health.gov.au/internet/main/publishing.nsf/content/health-pubhlth-strateg-phys-act-guidelines#apa1317>.

Department of Health 2014b. Make your move—sit less—be active for life!: children (5–12 years). Canberra: Department of Health.Viewed August 2014, <http://www.health.gov.au/internet/main/publishing.nsf/content/health-pubhlth-strateg-phys-act-guidelines#apa512>.

Department of Health 2014c. Australia's physical activity and sedentary behaviour guidelines. Canberra: Department of Health.Viewed August 2014, <http://www.health.gov.au/internet/main/publishing.nsf/content/health-pubhlth-strateg-phys-act-guidelines#apaadult>.

De Moura F 2008. Whole grain intake and cardiovascular disease and whole grain intake and diabetes: a review. Bethesda, MD: Life Sciences Research Organization.

DoHA (Department of Health and Ageing) 2010. Move and play every day: national physical activity recommendations for children 0–5 years. Canberra: DoHA.

Eriksen M & Whitney C 2013. Risk factors: tobacco. In: McQueen DV (ed.). Global handbook on noncommunicable diseases and health promotion. Springer, NY, 115–36.

Erkkila AT, Herrington DM, Mozaffarian D, Lichtenstein AH 2005. Cereal fiber and whole grain intake are associated with reduced progression of coronary-artery atherosclerosis in postmenopausal women with coronary artery disease. Am Heart J 150(1):94–101.

Fakhrzadeh H & Tabatabaei-Malazy O 2012. Dyslipidemia and cardiovascular disease. In: Kelishadi R (ed.). Dyslipidemia—from prevention to treatment. Rijeka: InTech.

Gratziou C 2009. Respiratory, cardiovascular and other physiological consequences of smoking cessation. Current Medical Research and Opinion 24:535–45.

Hallan SI & Orth SR 2011. Smoking is a risk factor in the progression to kidney failure. Kidney International 80:516–23.

Harris MF 2013. The metabolic syndrome. Australian Family Physician 42:524–7.

He FJ, Nowson CA, Lucas M & MacGregor GA 2007. Increased consumption of fruit and vegetables is related to a reduced risk of coronary heart disease: meta-analysis of cohort studies. Journal of Human Hypertension 21:717–28.

Jamrozik K, Taylor R & Dobson A 2008. Risk factors. In: Heggenhougen K & Quah SR (eds). International encyclopedia of public health. Amsterdam: Elsevier, 606–15.

Kidney Health Australia 2012. Chronic kidney disease (CKD) management in general practice, 2nd edn. Melbourne: Kidney Health Australia.

Kidney Health Australia 2014. State of the nation: chronic kidney disease in Australia. South Melbourne: Kidney Health Australia. Viewed May 2014, <http://www.kidney.org.au/KidneyDisease/FastFactsonCKD/tabid/589/Default.aspx>.

Kirwan JP, Solomon TP, Wojta DM, Staten MA & Holloszy JO 2009. Effects of 7 days of exercise training on insulin sensitivity and responsiveness in type 2 diabetes mellitus. American Journal of Physiology—Endocrinology and Metabolism 297:E151–6.

Li J & Siegrist J 2012. Physical activity and risk of cardiovascular disease—a meta-analysis of prospective cohort studies. International Journal of Environmental Research and Public Health 9:391–407.

Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H et al. 2012. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 380:2224–60.

Lindstrom J, Peltonen M, Eriksson JG, Louheranta A, Fogelholm M, Uusitupa M et al. 2006. High-fibre, low-fat diet predicts long-term weight loss and decreased type 2 diabetes risk: the Finnish Diabetes Prevention Study. Diabetologia 49:912–20.

Lippincot Williams & Wikins 2007. Diabetes mellitus: a guide to patient care. Philadelphia: Lippincott Williams & Wilkins.

Mann JI, De Leeuw I, Hermansen K, Karamanos B, Karlstrom B, Katsilambros N et al. 2004. Evidence-based nutritional approaches to the treatment and prevention of diabetes mellitus. Nutrion, Metabolism and Cardiovascular Diseases 14:373–94.

Martinez-Gonzalez MA, de la Fuente-Arrillaga C, Lopez-Del-Burgo C, Vazquez-Ruiz Z, Benito S & Ruiz-Canela M 2011. Low consumption of fruit and vegetables and risk of chronic disease: a review of the epidemiological evidence and temporal trends among Spanish graduates. Public Health Nutrition 14:2309–15.

Mercado C & Jaimes EA 2007. Cigarette smoking as a risk factor for atherosclerosis and renal disease: novel pathogenic insights. Current Hypertension Reports 9:66–72.

Mooradian AD 2009. Dyslipidemia in type 2 diabetes mellitus. Nature Clinical Practice Endocrinology & Metabolism 5:150–9.

Nathan DM, Davidson MB, DeFronzo RA, Heine RJ, Henry RR, Pratley RP & Zinman B 2007. Impaired fasting glucose and impaired glucose tolerance: implications for care. Diabetes Care 30: 753–9.

NHF (National Heart Foundation of Australia) 2010. Guide to management of hypertension 2008: assessing and managing raised blood pressure in adults—updated December 2010. Melbourne: National Heart Foundation of Australia.

NHF 2012. Reducing risk in heart disease: an expert guide to clinical practice for secondary prevention of coronary heart disease—updated 2012. Melbourne: National Heart Foundation of Australia.

NHMRC (National Health and Medical Research Council) 2009. Australian guidelines to reduce health risks from drinking alcohol. Canberra: NHMRC.

NHMRC 2013a. Clinical practice guidelines for the management of overweight and obesity in adults, adolescents and children in Australia. Melbourne: NHMRC.

NHMRC 2013b. Australian dietary guidelines. Canberra: NHMRC.

NVDPA (National Vascular Disease Prevention Alliance) 2012. Guidelines for the management of absolute cardiovascular disease risk. Melbourne: National Stroke Foundation.

Odermatt A 2011. The Western-style diet: a major risk factor for impaired kidney function and chronic kidney disease. American Journal of Physiology Renal Physiology 301:F919–31.

OECD (Organisation for Economic Cooperation and Development) 2013. Health at a glance 2013: OECD indicators. Paris: OECD Publishing.

Orth SR & Hallan SI 2008. Smoking: a risk factor for progression of chronic kidney disease and for cardiovascular morbidity and mortality in renal patients—absence of evidence or evidence of absence? Clinical Journal of the American Society of Nephrology 3:226–36.

Priebe MG, van Binsbergen JJ, de Vos R, Vonk RJ 2008. Whole grain foods for the prevention of type 2 diabetes mellitus. Cochrane Database Systematic Reviews 1:CD006061.

RACGP (Royal Australian College of General Practitioners) & Diabetes Australia 2014. General practice management of type 2 diabetes 2014–15. East Melbourne: RACGP.

Rehm J, Baliunas D, Borges GL, Graham K, Irving H, Kehoe T et al. 2010. The relation between different dimensions of alcohol consumption and burden of disease: an overview. Addiction 105:817–43.

Robinson-Cohen C, Littman AJ, Duncan GE, Weiss NS, Sachs MC, Ruzinski J et al. 2014. Physical activity and change in estimated GFR among persons with CKD. Journal of the American Society of Nephrology 25:399–406.

Ronksley PE, Brien SE, Turner BJ, Mukamal KJ & Ghali WA 2011. Association of alcohol consumption with selected cardiovascular disease outcomes: a systematic review and meta-analysis. BMJ 342:d671.

Ruel G, Shi Z, Zhen S, Zuo H, Kroger E, Sirois C et al. 2014. Association between nutrition and the evolution of multimorbidity: the importance of fruits and vegetables and whole grain products. Clinical Nutrition 33:513–20.

Scollo MM & Winstanley MH 2012. Tobacco in Australia: facts and issues. 4th edn. Melbourne: Cancer Council Victoria.

Shaw JE & Chisholm DJ 2003. 1: Epidemiology and prevention of type 2 diabetes and the metabolic syndrome. Medical Journal of Australia 179:379–83.

Stengel B, Tarver-Carr ME, Powe NR, Eberhardt MS & Brancati FL 2003. Lifestyle factors, obesity and the risk of chronic kidney disease. Epidemiology 14:479–87.

Talayero BG & Sacks FM 2011. The role of triglycerides in atherosclerosis. Current Cardiology Reports 13:544–52.

Taylor F, Ward K, Moore TH, Burke M, Davey Smith G, Casas JP et al. 2011. Statins for the primary prevention of cardiovascular disease. Cochrane Database of Systematic Reviews 1:CD004816.

Thomas DE, Elliott EJ & Naughton GA 2006. Exercise for type 2 diabetes mellitus. Cochrane Database of Systematic Reviews 3:CD002968.

Tsimihodimos V, Mitrogianni Z & Elisaf M 2011. Dyslipidemia associated with chronic kidney disease. The Open Cardiovascular Medicine Journal 5:41–8.

Tuomilehto J, Lindstrom J, Eriksson JG, Valle TT, Hamalainen H, Ilanne-Parikka P et al. 2001. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. The New England Journal of Medicine 344:1343–50.

Twigg SM, Kamp MC, Davis TM, Neylon EK & Flack JR 2007. Prediabetes: a position statement from the Australian Diabetes Society and Australian Diabetes Educators Association. Medical Journal of Australia 186:461–5.

USDHHS (US Department of Health and Human Services) 2010. How tobacco smoke causes disease: the biology and behavioral basis for smoking-attributable disease: a report of the Surgeon General. Atlanta, GA: USDHHS.

USDHHS 2014. The health consequences of smoking—50 years of progress. a report of the Surgeon General. Atlanta, GA: USDHHS.

Wakefield MA, Coomber K, Durkin SJ, Scollo M, Bayly M, Spittal MJ et al. 2014. Time series analysis of the impact of tobacco control policies on smoking prevalence among Australian adults, 2001–2011. Bulletin of the World Health Organization 92:413–22.

Wang Y, Chen X, Song Y, Caballero B & Cheskin LJ 2008. Association between obesity and kidney disease: a systematic review and meta-analysis. Kidney International 73:19–33.

White SL, Dunstan DW, Polkinghorne KR, Atkins RC, Cass A & Chadban SJ 2011. Physical inactivity and chronic kidney disease in Australian adults: the AusDiab study. Nutrition, Metabolism and Cardiovascular Diseases 21:104–12.

White SL, Polkinghorne KR, Cass A, Shaw JE, Atkins RC & Chadban SJ 2009. Alcohol consumption and 5-year onset of chronic kidney disease: the AusDiab study. Nephrology Dialysis Transplantation 24:2464–72.

Whitworth JA 2003. 2003 World Health Organization (WHO)/International Society of Hypertension (ISH) statement on management of hypertension. Journal of Hypertension 21:1983–92.

WHO 2000. Obesity: preventing and managing the global epidemic. Report of a WHO consultation. Geneva: WHO.

WHO 2003. Diet, nutrition and the prevention of chronic diseases. Report of a joint WHO/FAO expert consultation. Geneva: WHO.

WHO 2013. WHO recommendations for the prevention and management of tobacco use and second-hand smoke exposure in pregnancy. Geneva: WHO.

WHO 2014a. Estimated age-standardised mean total cholesterol trends (mmol/l total cholesterol). Geneva: WHO. Viewed October 2014, <http://apps.who.int/gho/data/node.main.A891>.

WHO 2014b. WHO Global Health Observatory Data Repository. Blood pressure: raised blood pressure (SBP ≥ 140 or DBP ≥ 90 or on medication). Geneva: WHO. Viewed June 2014, <http://apps.who.int/gho/data/node.main.A878?lang=en>.

WHO 2014c. Risk factors. Geneva: WHO. Viewed July 2014. <http://www.who.int/topics/risk_factors/en/>.

WHO & IDF (International Diabetes Federation) 2006. Definition and diagnosis of diabetes mellitus and intermediate hyperglycaemia: report of a WHO/IDF consultation Geneva: WHO.

Willi C, Bodenmann P, Ghali WA, Faris PD & Cornuz J 2007. Active smoking and the risk of type 2 diabetes: a systematic review and meta-analysis. Journal of the American Medical Association 298:2654–64.

Wilson PW, Meigs JB, Sullivan L, Fox CS, Nathan DM & D'Agostino RB, Sr. 2007. Prediction of incident diabetes mellitus in middle-aged adults: the Framingham Offspring Study. Archives of Internal Medicine 167:1068–74.

Xie XT, Liu Q, Wu J & Wakui M 2009. Impact of cigarette smoking in type 2 diabetes development. Acta Pharmacologica Sinica 30:784–7.

Yeboah J, Bertoni AG, Herrington DM, Post WS & Burke GL 2011. Impaired fasting glucose and the risk of incident diabetes mellitus and cardiovascular events in an adult population: MESA (Multi-Ethnic Study of Atherosclerosis). Journal of the American College of Cardiology 58:140–6.

Yusuf HR, Giles WH, Croft JB, Anda RF & Casper ML 1998. Impact of multiple risk factor profiles on determining cardiovascular disease risk. Preventative Medicine 27:1–9.

Zwar N, Richmond R, Borland R, Peters M, Litt J, Bell J et al. 2011. Supporting smoking cessation: a guide for health professionals. Melbourne: Royal Australian College of General Practitioners.

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Related publications

Now available

AIHW (Australian Institute of Health and Welfare) 2008. Diabetes: Australian facts 2008. Diabetes series no. 8. Cat. no. CVD 40. Canberra: AIHW.

AIHW 2011. Cardiovascular disease: Australian facts 2011. Cardiovascular disease series no. 35. Cat. no. CVD 53. Canberra: AIHW.

AIHW 2012. Risk factor trends: age patterns in key health risks over time. Cat. no. PHE 166. Canberra: AIHW.

AIHW 2012. Risk factors contributing to chronic disease. Cat. no. PHE 157. Canberra: AIHW.

AIHW 2014. Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: mortality. Cat. no. CDK 1. Canberra: AIHW.

AIHW 2014. Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: prevalence and incidence. Cat. no. CDK 2. Canberra: AIHW.

AIHW 2014. Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: morbidity—hospital care. Cat. no. CDK 3. Canberra: AIHW.

Forthcoming

AIHW 2015. Cardiovascular disease, diabetes and chronic kidney disease—Australian facts: Indigenous Australians. Canberra: AIHW.

Cardiovascular disease, diabetes and chronic kidney disease—Australian facts is a series of 5 reports by the National Centre for Monitoring Vascular Diseases at the Australian Institute of Health and Welfare that describe the combined burden of cardiovascular disease (CVD), diabetes and chronic kidney disease (CKD).

This report on ***Risk factors*** presents the latest statistics on the behaviours and characteristics that increase the likelihood of a person developing these chronic diseases. It also describes risk factors among people who already have CVD, diabetes or CKD. It examines age and sex characteristics and variations across population groups, including by geographical location and socioeconomic disadvantage.